GEOTECHNICAL REPORT

Ventura-Santa Barbara Counties Intertie Project
Ventura & Santa Barbara Counties California

Submitted To:

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Subject: **Geotechnical Report**
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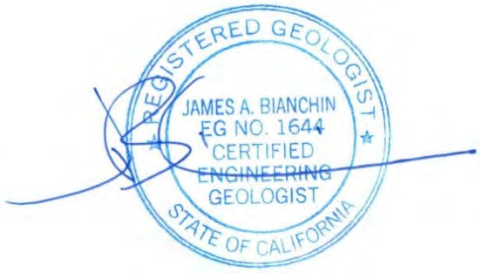
Dear Messrs. Borgic & Lewis:

Bajada Geosciences, Inc., is pleased to submit this geotechnical report to Water Works Engineers for the Ventura-Santa Barbara Counties Intertie Project located in Ventura & Santa Barbara Counties, California. This geotechnical report discusses field mapping and explorations performed, laboratory testing results, subsurface conditions encountered, and geotechnical analyses associated with the study.

We appreciate the opportunity to perform this study. If you have any questions pertaining to this report, or if we may be of further service, please contact us at (530) 638-5263 at your earliest convenience.

Sincerely,

BAJADA GEOSCIENCES, INC.



James A. Bianchin, P.G., C.E.G.
Principal Engineering Geologist



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Principal Geotechnical Engineer

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1 GENERAL

Bajada Geosciences, Inc. (BAJADA), is pleased to present this geotechnical report for Casitas Municipal Water District's (CMWD) proposed Santa Barbara-Ventura Counties Intertie Project located in Ventura and Santa Barbara Counties, California. The location of the project site is shown on Plate 1 – Site Location Map. Our services are provided to assist Water Works Engineering, Inc. (WWE), the project civil engineer, with the design of this project. The following sections present our understanding of the project, the purpose of our study, the procedures we used to collect data, and our geotechnical findings, conclusions, and recommendations for the project.

1.1 PROJECT UNDERSTANDING

We understand that CMWD intends to design and construct a new water pipeline connecting Santa Barbara County water transmission systems with Ventura County water transmission systems. Currently, we understand that such an intertie pipeline does not exist between the two counties. Thus, the proposed project consists of tying in Carpinteria Valley Water District's (CVWD) system with a CMWD water transmission pipeline.

The proposed project pipeline alignment studied is presented as Plate 2 – Proposed Pipeline Alignment. The pipeline will be buried at relatively shallow depths (up to 5 feet to the crown) along most of the alignment, except where trenchless methods will be used to place a segment of the alignment (see Plate 2 and the discussion below regarding horizontal directional drilling [HDD]). We understand that the proposed pipeline will have a diameter of 16 inches and will be constructed using a variety of materials. Plates 3.1 through 3.3 – Pipeline Alignment Geotechnical Map, show the pipeline stationing and other details.

The proposed low-pressure segment of the pipeline, between about Station 10+00 and 59+72, excluding the HDD alignment, is proposed to be constructed using high density polyethylene (HDPE). The HDD alignment is proposed to be constructed using either HDPE or fusible polyvinyl chloride (PVC) piping. The high-pressure segment of the pipeline, located between about Stations 100+70 and 310+00, is proposed using mortar-coated, mortar-lined steel pipeline.

As shown on Plate 2 and Plates 3.1 through 3.3, the proposed pipeline will extend south and east along Highway 192 starting at a point (Station 10+00) about 1,250 feet south of Shepard Mesa Road, where it ties into the CVWD pipeline. The proposed alignment will then extend about 1,450 feet along SR192 to the northern HDD terminus (Station 24+50) and then extend southeast 2,575 lineal feet to the southern HDD terminus (Station 50+25). From there, the pipeline alignment will be constructed using cut and cover methods for about 875 feet northeast along Avocado Hill Road to where it enters Booster Pump Station A (BPS-A; Station 59+00). The pipeline will exit BPS-A (Station 110+00) and extend in an east-southeast direction for about 2,000 feet along an unnamed access road to the tie-in point with the existing Rincon Main pipeline (Station 310+00).

We understand that a new valve vault will be constructed at about Station 310+00 at the tie-in point between the proposed pipeline and the Rincon Main pipeline. That vault will be approximately 15 feet deep.

As noted above, we understand that a portion of the proposed pipeline is planned to be constructed using HDD methods. The HDD segment is noted on Plate 2 and Plate 5 – HDD Cross Section. The HDD segment is proposed to extend about 2,575 lineal feet from SR 192, southeast beneath Rincon Creek, to Rincon del Mar Ranch. It is anticipated that the HDD alignment will extend about 109 feet beneath the existing ground surface at its deepest location.

To simplify discussions within this report, we have divided the proposed pipeline into the following three segments and assigned stationing:

- **Low-Pressure Segment** – that portion of the pipeline alignment located between Stations 10+00 and 59+00 (BPS-A), excluding the HDD segment;
- **Trenchless Crossing Segment** – that portion of the pipeline alignment to be constructed using HDD methods between about Stations 25+50 and 50+25; and
- **High-Pressure Segment** – that portion of the pipeline alignment extending from BPS-A to tie in with the existing CMWD pipeline (from about Station 110+00 to 310+00).

In addition to the proposed pipeline, we understand one booster pump stations will be designed and constructed. Those booster pump stations have been labeled BPS-A and BPS-B and their locations are shown on Plate 2 and on Plates 4.1 through 4.3 – Booster Pump Station Geotechnical Maps. Two locations were explored for BPS-A, one on the Brown property (Plate 4.1) and one on the Barnard property (Plate 4.2). We understand that BPS-A (Barnard) is the preferred location. Thus, further discussions and recommendations for BPS-A made in this report are specific to BPS-A (Barnard).

Improvements at BPS-A are proposed to consist of a building with dimensions of about 40 feet by 50 feet that will house the pumps, and electrical and chemical room; a surge tank; a transformer; switchgear; and a storage/laydown areas, as shown on Plate 4.2. We understand that the depth below grade to the pumps will be about 15 feet.

Improvements at BPS-B are proposed to consist of a pump house building with dimensions of about 15 feet by 25; an electrical building; a surge tank; a transformer; and switchgear, as shown on Plate 4.3. We understand that the depth below grade to the pumps will be about 14 feet.

1.2 PROJECT LOCATION

The project pipeline alignment is shown on Plates 2 and 3.1 through 3.3. The proposed pump station locations are shown on Plates 2, 4.2 and 4.3. The proposed valve vault location is shown on Plates 2 and 3.3. Latitude and longitude of the proposed improvements are noted as follows:

PROJECT ELEMENT LOCATIONS				
Location[1]	**BPS-A**	**BPS-B**	**New Valve Vault**	**HDD Alignment**
Latitude	34.387945	34.382693	34.386099	34.388165
Longitude	-119.461946	-119.391319	-119.455515	-119.467883
[1] – Approximate center point of each location.				

1.3 STUDY PURPOSE

The purpose of our geotechnical study was to explore and evaluate selected site surface and subsurface conditions to collect and evaluate selected geotechnical data to assist WWE with the design and construction of the subject project.

1.4 SCOPE OF SERVICES

Our scope of services included:

- Reconnaissance of the site surface conditions;
- Acquisition of drilling permits from Santa Barbara and Ventura County Environmental Health Departments;
- Acquisition of an encroachment permit from Caltrans District 5 for work along Highway 192;
- Advancement of twenty-seven drill holes at selected locations along the proposed pipeline alignment, HDD alignment, and booster pump station sites. Locations of drill holes are shown on Plates 3.1 through 3.3 and 4.1 through 4.3. Exploration procedures and Logs of Drill Holes are presented in Appendix A – Subsurface Exploration;
- Performance of laboratory testing on selected samples obtained during our field investigation. Laboratory test procedures and results of those tests are presented in Appendix B – Laboratory Testing;
- Evaluation of the modulus of soil reaction (E') values for natural soils, backfill materials, and composite materials;
- Performance of geophysical surveys along portions of the proposed HDD alignment to help characterize subsurface conditions. Results of those surveys are presented in Appendix C – Geophysical Surveys;
- Preparation of this report, which includes:
    - A description of the proposed project;
    - A summary of our field exploration and laboratory testing programs;
    - A description of site surface and subsurface conditions encountered during our field investigation;
    - Geotechnical maps showing approximate field exploration locations, presented as Plates 3.1 through 3.3 and 4.1 through 4.3;
    - Seismicity data based upon 2019 California Building Code (CBC) seismic design criteria;
        - Geotechnical recommendations for:

- Site preparation, engineered fill, site drainage, and subgrades;
- Suitability of on-site materials for use as engineered fill;
- Construction of proposed slopes at the project sites;
- Foundation and slab-on-grade design;
- Temporary excavations, shoring, and trench backfill;
- Trench backfill and compaction recommendations;
- Lateral earth pressures for retaining structure design and construction; and
- Preliminary structural pavement design.

- Appendices that present a summary of our field investigation procedures and laboratory testing programs.

1.5 PREVIOUS WORK PERFORMED

BAJADA previously prepared a draft preliminary (desktop) geotechnical study for the proposed project (BAJADA, 2019). That report is presented as Appendix D – Preliminary (Desktop) Geotechnical Study. BAJADA (2019) presented a number of sections addressing preliminary geologic and geotechnical conditions, along with preliminary geotechnical recommendations to be used for planning-level studies only. This report will not repeat sections presented in the BAJADA (2019) unless additional information has been obtained. If updated information is available, those sections will be included within the body of this report.

A discussion regarding available geotechnical and environmental studies in the project area is presented in BAJADA (2019). Since submittal of BAJADA (2019), additional information regarding the locations of oil and gas exploration and improvements was obtained from California Geologic Energy Management Division (CalGEM, 2022). Reports concerning two oil wells and other developments were obtained and reviewed and are discussed further in Section 3.5. Portions of those reports are presented in Appendix E – Oil Development Data. Additional documents were referred to during this study and are referenced in the text and cited in Section 9.0 of this report.

2 FINDINGS

2.1 FIELD INVESTIGATION

BAJADA conducted investigations to evaluate selected subsurface soil and rock conditions at drill hole locations and to obtain samples for laboratory testing. Our field investigation consisted of subsurface exploration through advancement of twenty-seven drill holes. The drill holes were advanced on October 4 through 7, 2021, January 17 & 18, 2022, April 29, 2022, and July 18 through 25, 2022. Exploration locations are shown on Plates 3 and 4. Descriptions of soils and rocks encountered are presented on the drill hole logs included in Appendix A. A summary of drill hole information is presented in the following table:

SUMMARY OF DRILL HOLE INFORMATION

Location	Date Drilled	Approximate Station/ Location [1]	Total Drill Hole Depth (ft)	Approximate Pipeline Springline Depth (ft)	Depth of Encountered Groundwater (ft) [2]	USCS Group Symbol [3]	SPT N-Value[4]
DH-1	10/04/2021	14+20	16.5	5.5	NE	CH	18
DH-2	10/04/2021	26+25	36.5	10.5	NE	CL	29
DH-3	10/05/2021	28+50	94.5	56	NM	SP	>50
DH-4	10/04/2021	50+25	36.5	5.5	NE	SM	10
DH-4A	7/19/2022	50+25	51.5	5.5	NE	SM	10
DH-5	10/06/2021	54+40	16.5	5.5	NE	CL	24
DH-6	10/06/2021	BPS-A (Brown)	51.5	NA	NE	CL/SM/SP/SW/SC	NA
DH-7	10/06/2021	BPS-A (Brown)	23.5	NA	NE	CL/ML/SM	NA
DH-8	10/06/2021	170+65	11.5	5.5	NE	SP/SW	20
DH-9	10/07/2021	310+00	21.5	5.5	NE	CL/ML	43
DH-10	10/07/2021	BPS-B	21.5	NA	NE	CL/ML/Rx	NA
DH-11	10/07/2021	BPS-B	11.5	NA	NE	CL/ML/SP/SW/Rx	NA
DH-12	10/07/2021	BPS-B	21.5	NA	NE	CL/ML/SM/SC/Rx	NA
DH-13	1/18/2022	34+60	66.0	40	NE	Rx	>50
DH-14	1/17/2022	38+50	25.0	50	NE	Rx	NA
DH-14A	4/29/2022	38+50	40.5	50	NE	Rx	>50
DH-15	1/17/2022	44+55	37.0	58	NE	Rx	32
DH-16	7/18/2022	39+00	41.5	50	NM	Rx	>50
DH-17	7/18/2022	39+50	34.5	50	NM	Rx	>50
DH-18	7/20/2022	40+00	61.5	50	NM	SC/CH/CL	83
DH-19	7/20/2022	40+50	45.0	50	NE	Rx	NM
DH-20	7/20/2022	41+00	51.0	50	51	Rx	>50
DH-21	7/21/2022	41+50	44.0	50	NE	Rx	NM
DH-22	7/21/2022	42+90	55.5	52	52	SC/CL	>50
DH-23	7/21/2022	43+40	60.5	52	52	CH/CL	>50
DH-24	7/19/2022	BPS-A	36.0	NA	NE	CL/SM/SP	NA
DH-25	7/19/2022	BPS-A	26.5	NA	NE	GP/SM/SP	NA

[1] – See Plates 3.1 & 3.2 for stationing. See Plate 4 for locations at proposed booster pump stations; [2] – NE = not encountered. NM = not measured due to rotary-wash drilling methods; [3] – At approximate springline. See Appendix A for description of USCS symbols; [4] – Equivalent N-value from the closest sample depth to the approximate springline of the proposed pipeline; NA = not applicable. NM = not measured.

2.2 SITE CONDITIONS

2.2.1 Surface Conditions

The following table provides the general observed surface conditions along the proposed pipeline alignment.

OBSERVED ALIGNMENT SURFACE CONDITIONS			
Stationing[1]		Segment/Site	Observed Surface Conditions
From	To		
10+00	25+99	Low-Pressure	SR-192 – AC paved surface inclined downward towards northwest at less than 10 degrees. Elevations range from about 133 to 195 feet.
25+99	29+65	HDD	SR-192 – AC paved surface inclined downward towards northwest at less than 10 degrees. Elevations range from about 195 to 228 feet.
29+65	30+80	HDD	Fallow surface inclined towards northwest at up to about 15 degrees. Surface covered with seasonal grasses and brush. Elevations range from about 228 to 239 feet.
30+80	32+70	HDD	Steep landslide scarp and failure surface descending to southeast at up to about 50 degrees. Surface fallow with sparse to thick seasonal grasses and brush and bare ground exposing cobbles and boulders. Elevations range from less than 115 to 239 feet.
32+70	35+00	HDD	Crossing of Rincon Creek and adjacent terrace. Creek banks steeply inclined. Terrace inclined towards southwest at less than 10 degrees. Abundant grasses, brush, and mature oak trees. Elevations range from less than 115 to 195 feet.
35+00	35+40	HDD	SR-150 - AC paved surface. Essentially flat and slightly inclined. Elevations range from about 127 to 129 feet.
35+40	51+50	HDD	Agricultural lands covered by relatively young to mature avocado and lemon trees. Ground inclined down towards the west-southwest at less than 10 degrees. Elevations range from about 129 to 180 feet.
50+46	59+72	Low-Pressure	Alignment crosses a rock and gravel stockpile and processing area then climbs a 17-foot-tall brush covered slope inclined at up to about 40 degrees. The alignment then extends along Avocado Hill Road, which at one time was paved with AC that is now largely in disrepair. Numerous mature oak trees line the roadway. Elevations range from about 180 to 202 feet.
100+75	300+20	High-Pressure	Alignment extends up access road paved with Portland cement concrete (PCC) and AC. It is anticipated that the PCC is at least 6 inches thick. Mature avocado trees line roadway. Roadway inclined downward towards northwest at less than 10 degrees. Elevations range from about 188 to 276 feet.
NA		BPS-A	Area developed with relatively mature avocado trees. Development includes pipelines, valves, and filters located at the southwest corner of the site. Buried pipelines and irrigation hoses are likely present across the site. Ground gently inclined at less than 5 degrees. Elevation is about 183 to 185 feet.
NA		BPS-B	Area fallow and covered with seasonal grasses, shrubs, and surrounded by mature oak trees. Site inclined to the south at less than 10 degrees. Unnamed drainage channel located immediately to the south of the site. Elevations range from about 801 to 806 feet.

[1] – See Plates 3.1 through 3.3, 4.1 and 4.2. Elevations noted above derived from WWE (2022).

2.2.2 Subsurface Conditions

A variety of soil and rock types were encountered along the proposed pipeline alignment, the HDD segment, and at BPS-A and BPS-B. The following sections discuss the subsurface conditions for each of these project elements.

2.2.2.1 Project Areas Excluding HDD Alignment

The following table provides the general observed surface conditions along the proposed pipeline alignment.

ANTICIPATED SUBSURFACE CONDITIONS ALONG PROPOSED SHALLOW PIPELINE ALIGNMENT AND BOOSTER PUMP STATIONS, EXCLUDING HDD SEGMENT

Stationing/Site[1]		Underlying Soils[2]	General Soil Conditions Observed at Exploration Locations Within Segment/Location
From	To		
10+00	24+50	Silty Sand & Clay	Undetermined thickness of asphaltic concrete (AC and aggregate base (AB) along SR 192. Silty sand was moist, dense, fine to medium grained and containing varying amounts of subangular to subrounded fine to medium gravels. Clays were dry to moist, very stiff, slightly plastic, with trace pores, and trace subrounded fine to medium gravels.
50+46	51+40	Silty Sand	Loose, dry to moist, fine to medium grained, with trace to moderate subangular to subrounded fine to medium gravels.
51+40	59+72	Silty Sand & Clay	Silty sand was dry, loose to dense, fine to medium grained with subangular to subrounded fine to medium gravels. Clays were dry to moist, very stiff, slightly plastic, with trace pores and subrounded fine to medium gravels.
100+75	300+20 & vault location	Sand, Silty Sand, Clayey Silt, & Silty Clay	Sand and silty sand were dry, loose to medium dense, fine to medium grained with subangular to subrounded fine to medium gravels. Clayey silt and silty clay were dry, loose/soft, slightly plastic, with trace subrounded fine to medium gravel.
BPS-A		Sandy Clay and Silty Sand	Clayey sand was dry to damp, loose to very dense, slightly plastic to plastic, with trace to moderate subrounded to rounded fine to coarse gravel and local organics. Silty sand was dry, loose to medium dense, fine to coarse grained with fine to medium angular to subangular gravels.
BPS-B		Silty Clay, Clayey Silt, Clay, Silty Sand, Sand, Sandstone	Silty clay and clay were dry to moist, stiff to hard, nonplastic to slightly plastic, with trace to moderate subrounded fine to medium gravels and local organics. Clayey silt, silty sand, and sand were dry, very dense, fine to medium grained, with local to abundant pores. Sandstone of the Sespe Formation was dry, weak, poorly indurated, and fine grained.

[1] – See Plates 3.1 through 3.3. [2] – For the upper 10 feet of the soil profile for the proposed pipeline located between Stations 10+00 and 24+50 and 50+46 to 59+72 and 100+75 to 310+00. For upper 20 feet of the soil profile for BPS-A and BPS-B.

2.2.2.2 HDD Alignment

The HDD alignment will extend through a variety of earth materials, as shown on Plate 5 – HDD Section. The granular soils (silts, sands, gravels, cobbles, and boulders) were dry to moist, loose to very dense, fine to medium grained, with local coarse grains, and containing subrounded to rounded

fine to coarse gravel, cobbles, and boulders. In exposures of the surface slope around Station 31+00, cobbles and boulders up to an estimated dimension of at least 24 inches can be observed. It is anticipated that the HDD alignment will need to avoid penetrating that zone of gravels, cobbles, and boulders.

Abundant gravels, cobbles, and boulders were also encountered in alluvial soils between about Stations 38+50 to 44+00. Local cobbles and boulders also could be present in alluvial soils in other areas along the alignment. The top of that zone of very coarse material was at a depth of about 10 to 12 feet and the bottom of the zone ranged in depth from about 28 to 52 feet. It is anticipated that the HDD alignment will be designed to extend below this zone of very coarse material.

For fine-grained soils (silty and sandy clay and clay), the materials were moist, stiff to hard, nonplastic to plastic, with local fine pores, trace fine to coarse sand, and local subrounded to rounded fine gravels.

2.3 GEOLOGIC CONDITIONS

2.3.1 Project Areas excluding HDD Alignment

The proposed pipeline alignment extends across a variety of Plio-Pleistocene-age and more recent sediments. With the exception of the HDD segment, the following table presents the anticipated geological materials that will be crossed by the proposed pipeline on a station-by- station basis:

ANTICIPATED GEOLOGIC CONDITIONS UNDERLYING THE PROPOSED PIPELINE ALIGNMENT AND BOOSTER PUMP STATIONS, EXCLUDING HDD SEGMENT

Stationing/Site[1]		Mapped Geologic Unit[1]
From	To	
10+00	24+50	Older Alluvium & Casitas Formation
50+46	51+00	Alluvium & Colluvium
51+00	59+00	Alluvium, Colluvium, Older Landslide Deposits, Casitas Formation
100+75	310+00	Alluvium & Colluvium
BPS-A		Alluvium
BPS-B		Alluvium & Sespe Formation

[1] – See Plates 3.1 through 3.3, 4.1, and 4.2

2.3.2 HDD Alignment

As shown on Plate 5, the proposed HDD alignment extends through alluvium, older alluvium, and the Casitas Formation. The older alluvium along the proposed alignment is projected to be up to 20 feet thick and anticipated to be encountered between about Stations 24+50 and 27+00. Along the proposed alignment, the alluvium is projected to be up to about 52 feet thick and anticipated to extend from about Stations 32+40 to past the launch location located at about Station 50+25. The

Casitas Formation underlies both the alluvium and older alluvium, is not anticipated to be fully penetrated to any underlying formation by the HDD alignment and is projected to be encountered between about Stations 26+00 and 48+00.

Alluvium and colluvium in the project area consist of mixtures of sand, silt, and clay with varying amounts of gravels, cobbles, and boulders. Alluvium and colluvium are considered Holocene-age and are up to about 52 feet thick.

Older alluvium consists of mixtures of sand, silt, and clay with varying amounts of gravels, cobbles, and boulders. It is considered Pleistocene in age and ranges in thickness up to about 45 feet, as shown on Plate 5.

The Casitas Formation is a Pleistocene-age, terrestrial sedimentary deposit consisting of sand, silt, clay, siltstone, sandstone and conglomerate. Casitas Formation is up to 4,000 feet thick (Thomasson, 1951).
Sespe Formation is Oligocene-age and consists of interbedded sandstone, conglomerate and shale. The Sespe Formation has a characteristic reddish color, is terrestrial in origin, and up to 7,500 feet thick (Dickinson & Leventhal, 1988).

2.4 GROUNDWATER

Most drill holes advanced for this study did not encounter groundwater. The majority of those drill holes were advanced in the fall of 2021 after a prolonged period of drought and may not represent groundwater elevations during average or above average rain years. Drill holes in which groundwater was encountered are shown in the following table:

GROUNDWATER DEPTHS & ELEVATIONS MEASURED BY BAJADA DURING SUBSURFACE EXPLORATION

Exploration	Date Measured	Groundwater	
		Depth (ft) [1]	Elevation (ft) [2]
DH-1	10/04/2021	NE	NE
DH-2	10/04/2021	NE	NE
DH-3	10/05/2021	NE	NE
DH-4	10/04/2021	NE	NE
DH-4A	7/19/2022	NE	NE
DH-5	10/06/2021	NE	NE
DH-6	10/06/2021	NE	NE
DH-7	10/06/2021	NE	NE
DH-8	10/06/2021	NE	NE
DH-9	10/07/2021	NE	NE
DH-10	10/07/2021	NE	NE
DH-11	10/07/2021	NE	NE
DH-12	10/07/2021	NE	NE
DH-13[3]	7/1/2022	15.3	109.7
DH-14	1/17/2022	NE	NE
DH-14A	4/29/2022	NE	NE

GROUNDWATER DEPTHS & ELEVATIONS MEASURED BY BAJADA DURING SUBSURFACE EXPLORATION

Exploration	Date Measured	Groundwater	
		Depth (ft) [1]	Elevation (ft) [2]
DH-15	1/17/2022	NE	NE
DH-16	7/18/2022	NE	NE
DH-17	7/18/2022	NE	NE
DH-18	7/20/2022	NE	NE
DH-19	7/20/2022	NE	NE
DH-20	7/20/2022	51	91
DH-21	7/21/2022	NE	NE
DH-22	7/21/2022	52	98
DH-23	7/21/2022	52	100
DH-24	7/19/2022	NE	NE
DH-25	7/19/2022	NE	NE

[1] – Groundwater depth measured immediately upon completion of drilling and may not reflect stabilized groundwater depth). NE – Not Encountered

[2] – Per WWE (2022)

[3] – Transducer and data logger installed on 7/22/2022. Data will be reported separately.

In addition, as noted in BAJADA (2019) located in Appendix D, other geotechnical studies in the project region have encountered groundwater as shallow as 11.6 feet below the ground surface (Caltrans, 2002).

A groundwater monitoring well was constructed within drill hole DH-13 along the proposed HDD alignment. That monitoring well was constructed to a depth of 65 feet. An Insite HOBO transducer and datalogger were installed on 7/22/2022 within that well to record groundwater elevation fluctuations over time. At the time this report was prepared, the datalogger had been in place for only a short period. Data will periodically be downloaded from the datalogger and reported in separate technical memorandums at later dates.

Groundwater elevations beneath the proposed project alignment will fluctuate over time. The depth to groundwater can vary throughout the year and from year to year. Intense and long duration precipitation or drought conditions, modification of topography, groundwater extraction, and cultural land use changes can contribute to fluctuations in groundwater levels. Localized saturated conditions or perched groundwater conditions near the ground surface could be present during and following periods of heavy precipitation or if on-site sources contribute water.

3 GEOLOGICAL HAZARDS

3.1 FAULTING & SEISMICITY

3.1.1 Regulatory Seismic Setting

The site is not located within an AP Earthquake Fault Zone. The alignment is located within or immediately adjacent to the Rincon Creek fault, which, while not zoned as an AP fault zone, is considered an active fault by local geologists. As noted on Plate 3.1, the proposed pipeline between about Stations 10+00 to 48+00 is located adjacent to or within the Rincon Creek fault zone. See BAJADA (2019) for a more in-depth discussion of the Rincon Creek fault.

3.1.2 CBC Seismic Design Recommendations

At a minimum, structures should be designed in accordance with the following seismic design criteria:

CBC SEISMIC DESIGN PARAMETERS

California Building Code	Parameter	Location		
		BPS-A	BPS-B	Valve Vault
Site Coordinates	Latitude	34.387945	34.382693	34.386099
	Longitude	-119.461946	-119.391319	-119.455515
Section 1613.5.3 Table 1613.5.3(1)	Site Coefficient, F_a	1.2	1.2	1.2
Section 1613.5.3 Table 1613.5.3(2)	Site Coefficient, F_v	1.4	1.4	1.4
Section 1613.5.1 Figure 1613.5	Site Class Designation	C	C	C
	Seismic Factor, Site Class C at 0.2 Seconds, S_s	2.313	2.265	2.315
	Seismic Factor, Site Class C at 1.0 Seconds, S_1	0.842	0.829	0.843
Section 1613.5.3	Site Specific Response Parameter for Site Class C at 0.2 Seconds, S_{MS}	2.776	2.718	2.778
	Site Specific Response Parameter for Site Class C at 1.0 Seconds, S_{M1}	1.179	1.160	1.180
Section 1613.5.4	$S_{DS}=2/3S_{MS}$	1.851	1.812	1.852
	$S_{D1}=2/3S_{M1}$	0.786	0.773	0.787

Per the 2019 CBC

3.1.3 Probabilistic Estimates of Strong Ground Motion

Probabilistic evaluations of horizontal strong ground motion that could affect the site were performed using attenuation evaluation methods provided by the U.S. Geological Survey (USGS, 2021c). The evaluations were performed using an estimated shear wave velocity in the upper 100 feet of the profile of 537 meters per second. Evaluations were performed for upper-bound (UBE) and design-basis (DBE) probabilistic exposures, and maximum considered earthquake (MCEg). The

UBE corresponds to horizontal ground accelerations having a 10 percent probability of exceedance in a 100-year exposure period, with a statistical return period of 949 years. The DBE corresponds to horizontal ground accelerations having a 10 percent probability of exceedance in a 50-year exposure period, with a statistical return period of 475 years. The MCEg corresponds to horizontal ground accelerations having a 2 percent probability of exceedance in a 50-year exposure period, with a statistical return period of 2,475 years. The results of these evaluations are presented in the following table:

PROBABILISTIC GROUND MOTION DATA						
Earthquake Level	Probabilistic Estimate Exposure Period (years)	Probability of Exceedance (%)	Return Period (years)	Estimated Peak Horizontal Ground Acceleration (g)		
				BPS-A	BPS-B	Valve Vault
Upper-Bound Ground-Motion	100	10	949	0.675	0.701	0.741
Design-Basis Ground-Motion	50	10	475	0.511	0.503	0.527
Maximum Considered Earthquake, geometric mean (MCEg)	50	2	2,475	0.928	1.026	1.081

It should be noted that although the seismic hazard models used for this study predict the probability of exceedance for various levels of acceleration during a given exposure period, the models are not able to account for the effect that the passage of time since past earthquakes has on future earthquake probability. Thus, while time may affect the incipient risk of earthquakes occurring, the UBE, DBE, MCEg values are based on any 100-year and 50-year exposure period, respectively, regardless of how recently earthquakes have occurred.

3.2 LIQUEFACTION

Liquefaction is described as the sudden loss of soil shear strength due to a rapid increase of soil pore water pressures caused by cyclic loading from a seismic event. In simple terms, it means that a liquefied soil acts more like a fluid than a solid when shaken during an earthquake. In order for liquefaction to occur, the following conditions and characteristics are needed:

- Granular soils (sand, silty sand, sandy silt, and some gravels);
- A high groundwater table; and
- A low density in the granular soils underlying the site.

If those criteria are present, then there is a potential that the soils could liquefy during a seismic event. The adverse effects of liquefaction include local and regional ground settlement, ground cracking and expulsion of water and sand, the partial or complete loss of bearing and confining

forces used to support loads, amplification of seismic shaking, and lateral spreading. In general, the effects of liquefaction on the proposed project could include:

- Lateral spreading;
- Vertical settlement; and/or
- The soils surrounding lifelines can lose their strength and those lifelines can become damaged or severed.

Lateral spreading is defined as lateral earth movement of liquefied soils, or soil riding on a liquefied soil layer, down slope toward an unsupported slope face, such as a creek bank, or an inclined slope face. In general, lateral spreading has been observed on low to moderate gradient slopes but has been noted on slopes inclined as flat as one degree.

Earth materials observed in the drill holes at or below the anticipated pipe invert depths and below the BPS sites were primarily fine-grained soils (clays) or weathered mudstone, neither of which are likely to liquefy. Where granular soils were encountered, they consisted of medium dense to very dense sands, which also have a low potential for liquefaction. Based on the observed soil types and consistencies, and the apparent lack of groundwater within the depth of exploration, it is our opinion that liquefaction has a low potential to adversely affect the proposed pipeline and booster pump stations.

3.3 EXPANSION POTENTIAL

Expansive soils have the greatest potential to adversely affect structures founded on shallow foundation systems, such as the booster pump stations associated with this project. To a lesser degree, expansive soils could potentially impact pipelines buried at relatively shallow depths. Pipelines emplaced using HDD methods have a low potential to be impacted by expansive soils due to their emplacement depths, the general low variability of moisture variations at depths, and the overcut or annular space created around the HDD pipeline during installation. Thus, in our opinion, if expansive soils are present in the project area, they have the greatest opportunity to adversely affect BPS-A and BPS-B.

There is a direct relationship between plasticity of a soil and the potential for expansive behavior, with expansive soil generally having a high plasticity. Thus, granular soils typically have a low potential to be expansive, whereas clay-rich soils can have a low to high potential to be expansive. To help estimate the expansive potential of soils in the project area, Plasticity Index (PI) tests were performed on sixteen selected soil samples obtained during this study. The results of those tests are as follows:

PLASTICITY INDEX TEST RESULTS				
Drill Hole No.	**Location[1]**	**Sample Depth**	**Liquid Limit**	**Plasticity Index**
DH-1	SPL	5'	47	31
DH-4A	HDD	40'	31	15
DH-4A	HDD	45'	29	14
DH-4A	HDD	50'	32	17
DH-5	SPL	3'	42	23
DH-6	BPS-A (Brown)	6'	29	10
DH-7	BPS-A (Brown)	5'	29	8
DH-9	SPL	10'	30	8
DH-10	BPS-B	5'	26	9
DH-13	HDD	20'	38	20
DH-13	HDD	50' – 65'	20	3
DH-16	HDD	40'	38	18
DH-18	HDD	60'	46	28
DH-20	HDD	42'	56	35
DH-22	HDD	55'	22	7
DH-24	BPS-A (Barnard)	3'	NA	NP
[1] – SPL – Trenched pipeline, HDD – horizontally directionally drilled pipeline, BPS – booster pump station.				

Typically, shallow pipelines (those placed in excavated trenches) are generally unaffected by expansive soils unless the soils have a high to very high expansion potential and a relatively deep activation zone (the zone influenced by seasonal moisture fluctuations which can lead to expansion or contraction of soils). For this project, soils along the cut and cover portion of the pipeline had PIs ranging from 8 to 31, which are correlated with soils having a very low to high expansion potential, as noted in the table below (Day, 1999). Areas of correlated high expansion potential soils are present from about Stations 12+00 to 25+00 and locally along the HDD alignment.

EXPANSION POTENTIAL – PLASTICITY INDEX CORRELATION	
Plasticity Index	**Correlated Expansion Potential**
0 – 10	Very Low
10 – 15	Low
15 – 25	Medium
25 – 35	High
35+	Very High
Taken from Day (1999)	

3.4 CORROSION

Soil chemistry tests for evaluation of corrosion potential were performed on eight selected soil samples obtained during this study. The following table presents the results of those tests:

SOIL CHEMISTRY RESULTS					
Drill Hole	**Depth (ft)**	**Sulfates (ppm)**	**Chlorides (ppm)**	**pH**	**Resistivity (ohms-cm)**
DH-1	5	95.5	64.8	6.23	860
DH-5	7	54.0	10.7	6.60	1,930
DH-6	0-5	110.1	9.7	7.14	1,740
DH-9	5	124.4	2.8	6.50	1,740
DH-11	1-5	22.9	2.7	6.36	480
DH-16	55	419.7	15.4	7.41	620
DH-23	55	39.3	8.4	8.12	1,370
DH-25	3	26.3	2.2	6.87	3,220

According to the ACI-318, a sulfate concentration below 0.10 percent by weight (1,000 ppm) is negligible. A chloride content of less than 500 ppm is generally considered non-corrosive to reinforced concrete. Based on the results of the soil chemistry tests, the site soils have a low potential for corrosion of concrete due to sulfates and chlorides.

RESISTIVITY & CORROSION CORRELATION	
Minimum Resistivity (ohm-cm)	**Corrosion Potential**
0 to 1000	Severely Corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately Corrosive
Over 10,000	Mildly Corrosive

Resistivity testing of soil samples was also evaluated for the five samples. A commonly accepted correlation between soil resistivity and corrosivity towards ferrous metals (NACE, 1984) is provided below. Thus, according to the table above, the soils are estimated to be corrosive to severely corrosive to ferrous metal.

BAJADA is not a corrosion engineering firm. Therefore, to further define the soil corrosion potential and interpret the above test results, or to design cathodic protection or grounding systems, a licensed Corrosion Engineer should be consulted.

3.5 GEOENVIRONMENTAL CONCERNS

BAJADA obtained a number of files from Ventura County Department of Environmental Health that relate to oil development activities on portions of Rincon del Mar Ranch. Portions of those files pertain to the Ranch Headquarters area (APN 008-016-048). Within those files were geoenvironmental reports prepared by Trak Environmental Group (1997a and 1997b) pertaining to voluntary cleanup programs that had been performed in the area between pipeline Stations 50+00 to about 59+00 and near the proposed BPS-A site. Those reports note that three oil wells and a number of above-ground oil and fuel tanks were present in this area, as shown on Plate 6 - Former Oil Development.

We were able to obtain information on two of the three wells from the CalGEM (2022) database in the vicinity noted by Trak. That database had information for oil wells Rincon del Mar 1 (RDM1) and Del Mar 43-35 (DM43). RDM1 was drilled in 1985, was 7,200 feet deep, and was plugged and abandoned in 1985. DM43 was drilled in 1983, was 7,656 feet deep and was abandoned and plugged in 1986. We have included information on those wells in Appendix E. Locations of those wells, as noted by CalGEM, are shown on Plate 6.

As noted on Plate 6, the proposed pipeline and BPS-A appear to have been sited to avoid the locations of those former developments.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL

Based on the results of our study, it is our opinion that the proposed pipeline, booster pump stations, and vault can be constructed as proposed provided that conclusions presented, herein, are utilized during design and construction of the project. The following conclusions and recommendations are based upon plans provided by WWE (2022) along with stated assumptions. Changes in the configurations from those studied during this investigation may require supplemental recommendations.

4.2 GEOLOGIC HAZARDS

Geologic hazards that could impact the proposed project are discussed in Section 3 of this report and in BAJADA (2019), which is included in Appendix D. As noted in that section and report, faulting, landslides, expansive soils, soil corrosion and soil contamination could adversely affect the project and are discussed below.

4.2.1 Faulting

As discussed in BAJADA (2019), a portion of the proposed pipeline alignment is situated parallel to and almost directly on top of the projected trace of the Holocene-Active Rincon Creek fault. Based on available information, the HDD alignment will likely cross the trace of this fault. Probabilistic evaluations of fault displacement across the fault range from displacements of 5 to 25 inches (depending on method utilized) with an average displacement of about 12 inches. A more detailed discussion of this fault and options to reduce risks associated with establishing the pipeline across or in close proximity to the fault are discussed in BAJADA (2019) in Appendix D.

4.2.2 Landslides

A landslide is present along a proposed segment of the pipeline alignment; however, that segment of the pipeline will extend beneath the landslide, as shown on Plates 3.1 and 3.2, using HDD construction methods.

4.2.3 Expansive Soils

Soils with very low to high expansion potential are present in the soils tested in the project area. Soils beneath proposed BPS-A, BPS-B, and the valve vault have PIs associated with soils having very low to low expansion potential. Soils along the proposed pipeline alignment between about Stations 10+00 and 25+00 have PIs associated with soils having a high expansion potential. Because the pipeline will be constructed at a depth of 3 to 5 feet beneath the paved road surface in this area, expansive soils are expected to have a low potential to adversely affect the proposed pipeline due to the relatively stable soil moisture conditions that should be provided by the overlying road pavement. On that basis, it is our opinion that expansive soils have a low potential to adversely affect the proposed booster pump stations and cut-and-cover pipeline segments. It is our opinion that expansive soils also have a low potential to adversely affect the HDD portion of the pipeline alignment.

4.2.4 Soil Corrosion

Soil samples tested during this study were found to be corrosive to severely corrosive to ferrous metals. We recommend that a corrosion expert be retained to evaluate whether mitigation measures need to be implemented to reduce the potential for corrosion to adversely impact the proposed pipeline and improvements.

4.2.5 Geoenvironmental Concerns

As noted in Section 3.5, prior oil exploration and development has been performed on the Rincon del Mar Ranch and surrounding areas where the proposed pipeline is proposed and near BPS-A. As noted in the documents in Appendix E, oil wells RDM1 and DM43 have been plugged and abandoned (destroyed). In addition, according to Trak (1997b), oil contaminants around proposed BPS-A have been cleaned to concentrations below action levels. Based on those documents, it appears that the risk of encountering contaminants along the proposed pipeline between Stations 50+00 and 59+00 and at BPS-A should be low. It should be noted that some residual oil and other contaminants could be encountered during construction in this area. If this occurs, the Contractor should contact CMWD and assess if a health and safety risk is present prior to continuing with construction or have an experienced, certified industrial hygienist on site who can assess the risks when working in this area.

4.3 SITE PREPARATION AND GRADING

4.3.1 Stripping

Prior to general site grading and/or construction of planned improvements along the pipeline alignment and at BPS-A, BPS-B, and the valve vault sites, existing vegetation, organic topsoil, debris, and deleterious materials should be stripped and disposed of off-site or outside the construction limits. For unpaved areas, stripping depths on the order of 2 to 3 inches should be anticipated with deeper stripping possible depending on the conditions encountered during grading. In areas where oak, avocado, or other trees are removed, deeper stripping to depths ranging from 2 feet to over 4 feet might be needed to remove the root mass from these trees. The stripping in areas where trees are removed should be observed and approved by an experienced, qualified geotechnical engineer or engineering geologist prior to site preparation and/or engineered fill placement.

4.3.2 Existing Utilities, Wells, and/or Foundations

Existing pipelines and/or subsurface improvements are located within the proposed improvement areas. Those include municipal utilities, agricultural pipelines, and possibly former oil and gas related pipelines and improvements. When encountered, these improvements, where possible, should be removed and/or rerouted beyond construction limits. Buried tanks or wells, if present, should be removed in compliance with applicable regulatory agency requirements. Existing, below-grade utility pipelines that extend beyond the limits of the proposed construction and that will be abandoned in-place should be plugged with lean concrete or grout to prevent migration of soil and/or water. All excavations resulting from removal and demolition activities should be cleaned of loose or disturbed material prior to placing any fill or backfill.

4.3.3 Keying and Benching

The proposed pipeline, booster pump station, and vault locations, aside from the HDD pipeline segment, are proposed on relatively flat and level ground. Keying and benching are not anticipated to be needed for construction of improvements associated with these projects.

4.3.4 Wet/Unstable Soil Conditions

Near-surface groundwater was not encountered in our drill holes advanced along the pipeline alignment, at BPS-A or BPS-B, nor at the proposed vault location. It is unlikely that near-surface groundwater will be encountered during construction. However, perched groundwater and/or wet soil conditions due to precipitation, irrigation, or other methods of water discharge and usage could hinder equipment access as well as efforts to compact soils to a specified level of compaction. If over optimum soil moisture content conditions are encountered during construction, disking to aerate, replacement with imported material, chemical treatment, stabilization with a geotextile fabric or grid, and/or other methods will likely be required to facilitate earthwork operations. The applicable method of stabilization is the Contractor's responsibility and will depend on the Contractor's capabilities and experience, as well as other project-related factors beyond the scope of this investigation. Therefore, if over-optimum moisture within the soil is encountered during construction, BAJADA should review these conditions (as well as the Contractor's capabilities) and, if requested, provide recommendations for their treatment.

4.3.5 Site Drainage

Grading should be performed in such a manner that provides a positive surface gradient away from all structures. The ponding of water should not be allowed adjacent to structures, retaining walls, or the top of cut or fill slopes. Surface runoff should be directed toward engineered collection systems and not allowed to flow across the site or over slopes. Discharge from structures should also be collected, conveyed, and discharged at least 20 feet away from structures.

4.3.6 Excavation Characteristics

Between Station 10+00 and 24+50, the proposed pipeline will extend along a segment of Highway 192 that is paved with asphaltic concrete (AC). It is anticipated that excavation through the AC can be performed with conventional heavy grading equipment in good working order. The pipeline segment located between about Stations 110+40 and 310+00 is paved with Portland cement concrete (PCC). The PCC is anticipated to be at least 6 inches thick. It is unknown if steel reinforcement was placed within the PCC. The PCC will likely require saw cutting in order to allow excavation of the pipe trench.

Subsurface exploration for this project was performed by a drill rig using 8.25-inch-diameter hollow-stem auger, 4-inch-diameter rotary-wash, or 4-inch-diameter solid-stem auger methods, or a 3-inch-diameter sonic coring rig. Penetration of underlying alluvial, colluvial, older alluvial, and Casitas Formation soil and rock materials was performed with little to moderate difficulty except where concentrations of gravels, cobbles, and/or boulders were encountered. It is our opinion that the alluvial, colluvial, older alluvial, and Casitas Formation materials, where encountered for project

segments excluding the HDD alignment, should be excavatable with heavy grading equipment in good working order and operated by experienced personnel. The presence of gravels, cobbles, and boulders in those materials could pose difficult excavation conditions for near surface improvements and will pose difficult drilling conditions for the HDD alignment, which will be discussed in greater detail by DCM Consulting, Inc., in their report concerning the HDD portion of the project.

In addition, at BPS-B, sandstone of the Sespe Formation was encountered at depths that will likely be encountered during construction of that facility, as shown on Plate 4.3. Those sandstone materials were generally moderately to slightly weathered and should generally be excavatable using conventional heavy grading equipment in good working order and operated by experienced personnel. However, relatively hard sandstone could be encountered that could require unconventional excavation methods, such as the use of a hydraulic hoe-ram or other methods to chip rock materials from the excavation.

4.3.7 Overexcavation

Overexcavation is not anticipated to be needed for the project except possibly at the proposed BPS-B site. See Section 4.4.1 for a discussion of overexcavation at that location.

4.3.8 On-Site Soil Materials

It is our opinion that most of the near-surface soils encountered in the project area can be used for general engineered fill provided they are free of organics, debris, oversized particles (>3") and deleterious materials. Highly plastic clayey materials (materials having a plasticity index exceeding 30 and a liquid limit more than 50) should be segregated and excluded from engineered fill, where possible. If potentially unsuitable soil is considered for use as engineered fill, BAJADA should observe, test, and provide recommendations as to the suitability of the material prior to placement as engineered fill.

4.3.9 Engineered Fill Materials and Placement

4.3.9.1 General Engineered Fill

If imported fill materials are used for this project, they should consist of soil and/or soil-aggregate mixtures generally less than 3 inches in maximum dimension, nearly free of organic or other deleterious debris, and essentially non-plastic. Typically, well-graded mixtures of gravel, sand, non-plastic silt, and minor quantities of clay are acceptable for use as imported general engineered fill. Gradation and plasticity recommendations for general engineered fill are presented in the table below.

4.3.9.2 Structural Fill

Structural fill materials are defined as those materials specifically intended for support of structures and pavements. General recommendations for structural fill are presented in the table below and should be considered minimum requirements.

All imported fill materials, whether General or Structural, should be sampled and tested prior to importation to the project site to verify that those materials meet the recommended material criteria, in accordance with applicable test procedures to verify material suitability, as shown in the following table.

IMPORTED FILL RECOMMENDATIONS				
GRADATION				
Sieve Size	**General Fill**	**Structural Fill**	**Test Procedures**	
	Percent Passing		**ASTM**	**AASHTO**
3-inch	100	100	D422	T88
¾-inch	70 – 100	70 – 100	D422	T88
No. 200	0 - 30	<5	D422	T88
PLASTICITY				
Liquid Limit	<30	NA	D4318	T89
Plasticity Index	<12	Nonplastic	D4318	T90
ORGANIC CONTENT	<1%	<1%	D2974	NA
SOIL CHEMISTRY	Chloride <500 ppm	Sulfate <1,000 ppm	Resistivity >2,000 ohm-cm	pH 6-7

4.3.10 Controlled Low Strength Material

Controlled low strength material (CLSM) can be used to backfill excavated areas or as engineered fill materials. CLSM consists of a fluid, workable mixture of aggregate, cement, and water that is of limited strength as to allow future excavation and maintenance of buried improvements yet capable of supporting the proposed improvements. If CLSM is used as engineered fill material, we recommend that it conform to and be placed per specifications presented in Section 19-3.062 of the Caltrans Standard Specifications (most current edition).

4.3.11 Placement & Compaction

Soil and/or soil-aggregate mixtures used for general engineered fill should be uniformly moisture-conditioned to within 3 percent of optimum moisture content, placed in horizontal lifts less than 8 inches in loose thickness, and compacted to at least 90 percent relative compaction in accordance with standard test method ASTM D1557[1]. All structural fill should be placed in the same manner and compacted to at least 95 percent relative compaction per ASTM D1557.

It is recommended that fill materials be placed and compacted uniformly in elevation around buried structures and that the vertical elevation differential of contiguous lifts diverge no more than three feet around the structure during compaction. Testing should be performed to verify that the relative compactions are being obtained as recommended herein. Compaction testing, at a minimum,

[1] This test method (ASTM D1557) applies wherever relative compaction, maximum dry density, or optimum moisture content is referenced within this report.

should consist of one test per every 500 cubic yards of soil being placed or at every 1.5-foot vertical fill interval, whichever comes first.

In general, a "sheep's foot" or "wedge foot" compactor should be used to compact fine-grained fill materials. A vibrating smooth-drum roller could be used to compact granular fill materials and final fill surfaces.

4.4 FOUNDATIONS & SLABS

4.4.1 General

At the time that this report was prepared, the design of proposed structures, such as foundation loads, structural drawings and final building configurations, had not been developed; thus, portions of this report pertaining to foundation design are preliminary in nature. An addendum or amended report will be presented once foundation loads and structural drawings for the proposed structures are available and provided to BAJADA. It should be noted that the geotechnical recommendations for site preparation and foundation design to be presented in the addendum could vary from those presented herein.

4.4.2 Transition Lots

Transitions lots are those sites where a structure foundation will be supported partially by two different geologic materials, such as artificial fill beneath one portion of the structure and undisturbed native soil beneath the remainder of the structure. Those two materials could cause structures to settle at differing rates and magnitudes. The resulting differential settlement could cause damage to the structure, to structure performance, or to performance of equipment within the structure.

It is anticipated that BPS-A and the proposed valve vault will be underlain by alluvial and colluvial soils and will not have a transition lot present, as noted on Plate 7.1 – BPS-A Geotechnical Section. BPS-B, however, will be underlain partially by sandstone of the Sespe Formation and partially by alluvium and colluvium, thus creating a transition lot condition. This is illustrated on Plate 7.2 – BPS-B Geotechnical Section, which shows one proposed development scenario for the site. Under that scenario, the electrical building is situated immediately adjacent to the pump house and possibly attached to that building.

As noted on Plate 7.2, the pump house is situated so that it will likely rest entirely on the deeper Sespe Formation sandstone and the electrical building on the near-surface alluvium and/or colluvium. Thus, the pump house is likely to settle relatively little, whereas the electrical building will likely settle at a higher rate and magnitude relative to the pump house. The most direct method to reduce differential settlement of these two structures is to separate them so that they are not directly adjacent to each other and not structurally tied to each other. Under that scenario, we recommend that structures be separated by at least 10 feet.

If separating the two structures is not feasible, we recommend that the electrical building be supported on cast-in-drilled-hole (CIDH) piles extending into the Sespe Formation and tied to structural grade beams supporting the structure. Recommendations for CIDH piles or other foundation alternatives will be evaluated and presented once the BPS-B design details are developed and plans are available.

It is anticipated that the remainder of the proposed improvements at BPS-B will consist of lightly loaded slab-on grade foundations located over alluvial and colluvial soils and should not have transition lot conditions.

4.4.3 Foundations

The foundations for all structures should be designed by the project civil/structural engineer in accordance with the recommendations presented in this report. We recommend that BAJADA be allowed to observe foundation excavations to confirm projected site conditions prior to construction.

4.4.4 Bearing Pressures

The following table provides preliminary bearing pressures for the various improvements and anticipated soil/rock conditions:

PRELIMINARY ALLOWABLE BEARING PRESSURES

Location	Geologic Unit	Allowable Bearing Pressure (psf)
BPS-A	Alluvium	1,500
BPS-B	Alluvium/Colluvium	1,500
BPS-B	Sespe Formation	3,000
Valve Vault	Alluvium/Colluvium	1,500

4.4.5 Sliding Resistance

Sliding resistance generated through a compacted soil/concrete interface can be computed by multiplying the total dead weight structural loads by a coefficient of friction of 0.35 for compacted native soil, and 0.40 for approved structural fill material, Class II AB, or CLSM. If a membrane, such as polysheeting or PVC, is utilized between the fill pad and concrete footings/slabs, then the coefficient of friction between concrete and the sheeting should be established through consultation with the membrane manufacturer.

4.4.6 Passive Resistance

Ultimate passive resistance developed from lateral bearing of foundation elements against compacted soil surfaces for that portion of the foundation element extending below a depth of 1 foot below the lowest adjacent grade can be estimated using an equivalent fluid weight of 375 pcf.

This value can be modified for deeper foundations bearing against intact rock formations if additional lateral resistance is needed and will provided as the foundation design progresses.

4.4.7 Safety Factors

Sliding resistance and passive pressure may be used together in conjunction with the following recommended safety factors. A minimum factor of safety of 1.5 is recommended for sliding resistance where passive pressure is neglected; a minimum factor of safety of 2.0 is recommended for sliding resistance where passive pressure is included.

4.4.8 Frost Penetration

Frost heave is not typically a hazard in the project area and is generally not considered in design of foundation systems. Therefore, no recommendations for frost protection have been provided for this project.

4.4.9 Slab-on-Grade Design

All ground-supported concrete slabs should be supported on a minimum 12-inch-thick layer of non-expansive, granular material such as aggregate base or clean sand, which is uniformly moisture-conditioned to near the optimum moisture content and compacted to at least 95 percent relative compaction per ASTM D1557. Subgrade soils underlying concrete slabs should consist of non-expansive soil uniformly moisture-conditioned to near the optimum moisture content and compacted to at least 95-percent relative compaction.

Structural slabs should be designed by a structural or civil engineer to support the anticipated loading conditions. Reinforcement for slabs should meet all applicable code requirements and should be placed in the slab per the design requirements of the structural or civil engineer with provisions to ensure it stays in that position during construction and concrete placement.

4.5 PIPELINE DESIGN FACTORS

4.5.1 HDD Pipeline Segment

Geotechnical and other recommendations related to the HDD pipeline segment have been prepared in a separate report by DCM Consultants, Inc. (DCM, 2022). As such, recommendations noted below are not to be applied to the HDD pipeline segment.

4.5.2 External Loads on Buried Pipelines

External loads on buried pipes will consist of loads due to the overlying earth materials, loads due to construction activities, loads due to traffic, and other post construction land uses. It is recommended that the pipe be designed to resist the imposed loads with a factor of safety and an amount of deflection, as recommended by the pipeline manufacturer.

Loads on the pipe due to the overlying soil will be dependent upon the depth of placement, type and method of backfill, the configuration of the trench, the depth of ground water, and whether any

additional fill will be placed above the pipeline on the ground surface. The earth loads on the pipe can be estimated using formulas developed by Marston (1930) and Spangler (1982).

The following Marston formula can be used to estimate vertical soil loads on rigid pipeline placed in backfilled trenches or tunneled in place (American Concrete Pipe Association [ACPA], 2011):

$$W_d = C_d \gamma B_d^2$$
$$W_t = C_t \gamma B_t^2 - 2cC_tB_t$$

Where:

W_d, W_t	=	Vertical soil load on rigid pipe due to trench backfill and overlying soils, respectively (pounds per foot [lb./ft])
γ	=	145 pounds per cubic foot (pcf) for imported granular trench backfill; and 125 pcf for native soil trench backfill
B_d, B_t	=	Trench width and width of tunnel bore (feet), respectively
C_d, C_t	=	See below
c	=	Soil cohesion (psf)

Plate 8 – Marston's Load Coefficients, can be used to estimate C_d and C_t. The parameters C_d and C_t will depend on: 1) the backfill type; 2) the trench or tunnel width; and 3) the installation depth. For a trench installation with a ratio of backfill depth to trench width at the top of pipe (H/B_d) of at least 1 and for a trench width at top of pipe no greater than 3 times the pipe diameter, the value of C_d and C_t may be calculated using the following equation (ACPA, 2011):

$$C_{d/t} = \frac{1 - e^{-2K\mu' \frac{H}{B_{d \text{ or } B_t}}}}{2K\mu'}$$

Where:

K	=	Rankine's lateral earth pressure coefficient
μ'	=	Friction coefficient between fill material and sides of trench
H	=	Backfill height above pipe crown (ft)

The value $K\mu'$ is dependent on the backfill type, degree of compaction, and moisture content. Where backfill materials are compacted as recommended in Section 4.5.7, the following estimated $K\mu'$ values are applicable for various types of soil and rock encountered during this study and anticipated to be used within the trench zone:

ESTIMATED Kμ' VALUES FOR PIPE DESIGN	
Soil Type	**Kμ'**
Clay (CL, CH)	0.120
Silt (ML)	0.130
Clayey Sand (SC)	0.150
Sand & Gravel (SM, GM)	0.165
Estimated from ASCE (1982)	

For flexible pipelines, the prism method (Moser & Folkman, 2008) can be used to estimate the vertical soil loads imposed on pipelines in new trenches. That formula is as follows:

$$W = B\gamma H$$

Where:

W	=	Vertical soil load (lb/ft)
B	=	Outside diameter of the pipeline (ft)
γ	=	145 pounds per cubic foot (pcf) for imported granular trench backfill; and 125 pcf for native soil trench backfill
H	=	Depth of backfill (ft)

In addition to the dead loads noted above, the proposed pipeline will be subjected to vertical live loads within roadways and driveways. Vertical soil pressures due to live vehicular loads can be estimated using the graph presented on Plate 9 – Vertical Soil Pressures Induced by Live Loads.

4.5.3 Modulus of Soil Reaction (E')

Flexible and semi-rigid pipes are typically designed to withstand a certain amount of deflection from applied earth loads. Those deflections can be estimated with the equations developed by Spangler (1982). The modulus of soil reaction (E') values for the project were estimated using relations of Howard (1996), Hartley & Duncan (1986), and Jeyapalan & Watkins (2004). The table below presents E'_b values, which are recommended E' values for pipe zone backfill materials (pipe zone backfill). The recommended E'_b values presented in the table below apply to the initial backfill materials along the sides of the pipe at the recommended level of compaction.

MODULUS OF SOIL REACTION FOR PIPE ZONE BACKFILL MATERIALS (E'_B)		
Soil Type	**Depth of Burial**	**Recommended E'_b (psi)[1]**
Pipe Bedding and Pipe Embedment (clean crushed rock or sand)	5'	1,000
	10'	1,125
	15'	1,250
	15'+	1,375
Soil-Cement Slurry (backfilled within 2 days of placement)	Not Applicable	3,000
[1] – Jeyapalan & Watkins (2004)		

E'_n corresponds to the E' value for the natural trench wall soils. The following table presents the E'_n values for each of the exploration locations estimated using methods of Hartley & Duncan (1986), Howard (1996), and Jeyapalan & Watkins (2004).

ESTIMATED E'_n VALUES AT EXPLORATION LOCATIONS

Location	Approximate Station/ Location[1]	USCS at Springline[2]	Estimated Relative Compaction (%)	E'_n Value (psi)			
				Howard (1996)	Hartley & Duncan (1986)	Jeyapalan & Watkins (2004)	Average
DH-1	14+20	CH	94	380	988	940	769
DH-2	26+25	CL	92	820	1,144	1,080	1,015
DH-4	50+25	SM	87	520	744	720	661
DH-5	54+40	CL	91	700	960	900	853
DH-6	BPS-A	CL	91	320	772	760	617
DH-7	BPS-A	CL	87	240	644	580	488
DH-8	170+65	SP	90	700	960	900	853
DH-9	310+00	CL/ML	89	280	788	660	576
DH-10	BPS-B	CL/ML	93	360	916	880	719
DH-11	BPS-B	CL/ML/SP /SW	97	840	1,144	1,160	1,048
DH-12	BPS-B	CL/ML	98	1,060	1,216	1,240	1,172

[1] – See Plated 3.1 through 3.3, 4.1, and 4.2. [2] – See Appendix A for description of USCS symbols

E'_n values have been developed for this project based on the varying earth material data obtained in our field and laboratory investigations. Based on our evaluations, we recommend the following E'_n values be used for design of the pipeline:

E'_n VALUES FOR ON-SITE MATERIALS

Stationing[1]		E'_n Value (psi)
From	To	
10+00	26+25	750
50+20	51+00	550
51+00	58+30	900
58+30	59+00	550
110+00	310+00	800
BPS-A		550
BPS-B		1,000

[1] – See Plates 3.1 through 3.3, 4.1 and 4.2.

Where the zone of backfill beside the pipe is less than five times the pipeline diameter, the E'_b values above may not be applicable and the E'_n will affect flexible pipe design. The actual E' value at the pipe depth will lie somewhere in between E'_b and E'_n depending on the trench width. For trench widths of less than five times the diameter of the pipe, the composite design E'_c (E'_b and E'_n) may

be calculated using the Soil Support Combining Factors (S_c) presented in the table below, where B_d is the trench width at pipe springline and D is the diameter of the pipe.

SOIL SUPPORT COMBINING FACTORS (S_C)						
E'_n/E'_b	$B_d/D=1.5$	$B_d/D=2.0$	$B_d/D=2.5$	$B_d/D=3.0$	$B_d/D=4.0$	$B_d/D=5.0$
0.1	0.15	0.30	0.60	0.80	0.90	1.00
0.2	0.30	0.45	0.70	0.85	0.92	1.00
0.4	0.50	0.60	0.80	0.90	0.95	1.00
0.6	0.70	0.80	0.90	0.95	1.00	1.00
0.8	0.85	0.90	0.95	0.98	1.00	1.00
1.0	1.00	1.00	1.00	1.00	1.00	1.00
1.5	1.30	1.15	1.10	1.05	1.00	1.00
2.0	1.50	1.30	1.15	1.10	1.05	1.00
3.0	1.75	1.45	1.30	1.20	1.08	1.00
>5.0	2.00	1.60	1.40	1.25	1.10	1.00
Source: "Pipeline Installation," A. Howard, 1996						

The corresponding composite design E'_c can be calculated by selecting the appropriate S_c value from the table above and multiplying the appropriate E'_b value by S_c, as noted below:

$$E'_c = E'_b(S_c)$$

4.5.4 *Thrust Resistance*

Where the proposed pipelines change direction abruptly, resistance to thrust, if needed, can be provided by mobilizing frictional resistance between pipe and the surrounding soil, by use of a thrust block, by use of restrained pipe joints, or by a combination of the above.

To design thrust resistance by mobilizing frictional resistance, we recommend that a coefficient of friction of 0.20 for steel, PVC, or HDPE pipelines be used. The coefficient of friction value includes a factor of safety of 1.5 and assumes that a sand with a Sand Equivalent (SE) of 30 or greater will be placed within the pipe zone in accordance with recommendations presented in Section 4.4.5.1. For design of thrust block resistance, an ultimate passive lateral earth pressure of 375 psf/ft of depth may be used.

4.5.5 *Excavations, Trenches, Dewatering, & Shoring*

4.5.5.1 Excavation and Trench Slopes

Construction of the proposed project will require temporary excavations and trenching to facilitate construction of earthwork, pipelines, vaults, and other below-ground improvements. All temporary excavations and slope inclinations must comply with applicable local, state, and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards. Construction site safety is the responsibility of the Contractor, who should be solely responsible for the means,

methods, and sequencing of construction operations so that a safe working environment is maintained.

Subsurface soil conditions encountered in project excavations are to be monitored and evaluated by the Contractor in accordance with OHSA guidelines. OSHA soil classification typing includes the following:

OSHA SOIL TYPE DETERMINATIONS	
Stable Rock	Natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed. It is usually identified by a rock name such as granite or sandstone. Determining whether a deposit is of this type may be difficult unless it is known whether cracks exist and whether or not the cracks run into or away from the excavation.
Type A Soils	Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) (144 kPa) or greater. Examples of Type A cohesive soils are often: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. (No soil is Type A if it is fissured, is subject to vibration of any type, has previously been disturbed, is part of a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H:1V) or greater, or has seeping water.
Type B Soils	Cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa). Examples of other Type B soils are: angular gravel; silt; silt loam; previously disturbed soils unless otherwise classified as Type C; soils that meet the unconfined compressive strength or cementation requirements of Type A soils but are fissured or subject to vibration; dry unstable rock; and layered systems sloping into the trench at a slope less than 4H:1V (only if the material would be classified as a Type B soil).
Type C Soils	Cohesive soils with an unconfined compressive strength of 0.5 tsf (48 kPa) or less. Other Type C soils include granular soils such as gravel, sand and loamy sand, submerged soil, soil from which water is freely seeping, and submerged rock that is not stable. Also included in this classification is material in a sloped, layered system where the layers dip into the excavation or have a slope of four horizontal to one vertical (4H:1V) or greater.
Layered Geological Strata	Where soils are configured in layers, i.e., where a layered geologic structure exists, the soil must be classified on the basis of the soil classification of the weakest soil layer. Each layer may be classified individually if a more stable layer lies below a less stable layer, i.e., where a Type C soil rests on top of stable rock.

Preliminary estimates of OSHA Soil Types that might be encountered indicate that Soil Types B and C are likely to be present along the pipeline alignment. Actual OSHA Soil Types at the site should be determined during construction by the Contractor's Competent Person or by a registered design professional retained by the Contractor as soils are exposed within the excavations. OSHA allows designation of slope inclinations based on soil types without the support of a registered design professional if those slopes are less than 20 feet high. To do so, the Contractor is required to designate a "Competent Person" that takes the ultimate responsibility for soil type classification.

The following maximum slope inclinations are allowed based upon OSHA soil types:

OSHA MAXIMUM ALLOWABLE SLOPES	
Soil Type	**Slope Ratio[1]**
Stable Rock	Vertical
Type A	¾:1
Type B	1:1
Type C	1½:1
[1] – horizontal : vertical	

Based on the soils observed at the project site during this investigation, it is anticipated that loose, running, raveling, and/or flowing conditions may be encountered in natural soils exposed in some excavations or trenches. If such conditions are encountered during construction, inclinations of unshored slope excavations may not stand exposed at the slope ratios noted above for OSHA Soil Types. In such situations, proposed excavations in those areas could fail and expand in an area much larger than the proposed width unless the excavation and/or trench is shored and adequately supported.

Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed within a 1:1 (horizontal to vertical) projection from the toe of an unsupported trench or other excavation to the ground surface. Where the stability of project improvements is endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability and to protect personnel working within the excavation.

4.5.5.2 Dewatering

Relatively shallow groundwater (within the depths of the pipeline trench excavation) was not encountered within any of the explorations advanced for this study. It is anticipated that groundwater is unlikely to be encountered within trench depths during construction of the proposed pipeline segments. However, if groundwater is encountered, it is the Contractor's responsibility for developing and implementing the means and measures for capturing and removing or diverting groundwater during construction of the proposed pipeline. If groundwater is encountered during construction, it is recommended that the Contractor install measures to capture and/or divert groundwater from entering the excavations. If this is not possible, then the Contractor should channel groundwater to flow towards collection points to be removed from the excavations and disposed of at an approved area in a manner acceptable to regulatory agencies.

4.5.5.3 Shoring

Preliminary design of braced shoring for trenches may be based on the preliminary shoring pressure diagrams provided on Plate 10 - Preliminary Shoring Pressure Diagrams. The preliminary shoring pressure diagrams provided on Plate 10 represent typical soil conditions encountered during this study. Final earth pressures and pressure diagrams for the design and implementation of individual shoring systems will be dependent upon the following:

- The actual subsurface conditions encountered during construction;
- The shoring type, design, and installation method; and
- Surcharge pressures from traffic, equipment, stockpiles, etc.

If layers of cohesionless materials (i.e., sands and gravels) are encountered then those materials could flow or ravel, if in a wet or saturated condition, or ravel or run when dry (Federal Highways Administration, 2014). Flowing soils act like a viscous fluid and can enter a trench from the sidewalls and can flow for relatively long distances. Raveling soils have chunks or flakes of material falling or toppling from trench sidewalls into the trench. Running soils are unstable at angles greater than their angle of repose and will run like pea gravel, granulated sugar or dune sand from a trench side wall into the trench until the slope flattens to that angle of repose.

Hydraulic speed shores and trench box shoring in flowing, running, or raveling ground conditions should not be allowed. Furthermore, soils subject to running, flowing, or raveling will have insufficient strength and stand-up time to safely hold full-depth vertical excavations long enough for complete trench box or speed-shore installations. Vertical excavations in such soils will most likely experience excavation wall loss and related undermining of adjacent pavements, utilities, structures, and improvements. Therefore, as a precautionary measure, shoring with trench boxes in flowing, running, or raveling soils will require very careful interior excavation through the trench box so that there are no unsupported vertical excavation faces as the trench box is incrementally lowered into place. Additionally, pre-advancing/driving steel backer plates in soil around the exterior perimeter of the trench box and ahead of excavations within the trench box may be necessary to maintain stable sidewalls and protect adjacent pavement, utilities, and structures. Shoring with speed shores in running or fast raveling ground will require solid sheet backing to provide full face support.

In localized cases near critical structures or utilities, special shoring or ground improvement (such as grout stabilization) prior to excavation may be needed to reduce consequential damage. The Contractor should be required to provide any special shoring designs for engineering review. Areas requiring special shoring design should receive preconstruction condition surveys and video/photo documentation of conditions.

Shoring systems that do not provide positive support of excavation walls may allow surface settlement and related damage to existing roadways, utilities, structures, and improvements. A summary of the potential surface settlement of passively-shored excavations is provided in the following table:

POTENTIAL SURFACE SETTLEMENT OF PASSIVELY-SHORED EXCAVATIONS		
Soil Type	**Surface Settlement (% of Excavation Depth)**	**Lateral Zone of Disturbance (Multiples of Excavation Depth)**
Sand	0.5%H[1]	H
Soft to medium stiff clay	1%-2%H	3-4H
Stiff clay	<1%H	2H
[1] – Where H equals the height of the excavation sidewall. Suprenant and Basham (1993)		

4.5.5.4 Considerations Regarding Adjacent and Crossed Utility Trenches

The presence of existing nearby utility trenches can cause potential construction issues when trenching close to those adjacent utilities. Backfill of utility trenches is often performed using select sand, rock, or other materials that, when exposed, can flow or topple and can lead to unsupported utility exposure unless anticipated prior to construction.

For the proposed project, there could be locations along Highway 192 and on agricultural grounds where existing buried utilities extend parallel or subparallel, or perpendicular to the proposed pipeline segments. If parallel or subparallel utilities are located close to the new pipeline trench excavation, then there is a potential that the proposed pipeline trench, during excavation, could impinge upon the adjacent trench backfill and expose/undermine the adjacent buried utility. Plate 11 – Adjacent Utility Trenches, provides methods for estimating whether impingement into existing, adjacent utility trenches might occur, based upon the diameter and depth of the existing utility.

If the pipeline trenches are found to be within a distance where impingement might occur, then shoring, as discussed in Section 4.5.5.3 might be required. It is the Contractor's responsibility for developing the means, methods, and procedures to employ during construction to eliminate the risks associated with impingement into adjacent existing buried utilities.

In addition, trench backfill materials for existing buried utilities that cross the proposed pipeline alignment can transmit water and possibly contaminants within the trench zone and/or pipe zone materials. Discharge of those waters and possibly contaminants into the pipeline trench excavations can occur, causing wet conditions and possible contamination issues. The Contractor should anticipate this potential risk and either evaluate this potential prior to excavation or have a plan in place to deal with this potential issue should it occur during construction.

4.5.6 *Pipe Zone & Trench Zone Materials*

The use of appropriate pipe zone and trench zone backfill materials is critical for the long-term performance of a buried, flexible pipeline. Pipe zone and trench zone backfill materials are discussed below. Plate 12 - Trench Nomenclature, graphically illustrates the locations of pipe zone and trench zone backfill areas.

4.5.6.1 Pipe Zone Backfill

The pipe zone, as discussed herein, is that cross-sectional area that extends from the bottom of the trench to 12 inches over the crown of the pipeline, and from trench wall to trench wall, as shown on Plate 12. Pipe zone backfill materials should meet or exceed CMWD's standards (CMWD, 2019), which require:

PIPE ZONE BACKFILL GRADATION	
Sieve Size	**% Passing Sieve**
3/8"	100
No. 200	0 - 10

In addition, pipe zone materials should have a Sand Equivalent of no less than 50. On-site soils are not anticipated to meet these specifications.

4.5.6.2 Trench Zone Backfill

Trench zone backfill materials are specified by CMWD (2019) to be as follows:

TRENCH BACKFILL GRADATION	
Sieve Size	**% Passing Sieve**
3"	100
No. 4	40 – 100

It is likely that some natural soils excavated for the pipeline trench will meet the specifications noted above for trench zone backfill. However, a significant proportion of those soils will not meet the criteria.

4.5.6.3 Controlled Low Strength Backfill

An alternative to the use of pipe zone and trench zone backfill materials noted above is the use of controlled low strength material (CLSM) as pipe and/or trench zone backfill. CLSM consists of a fluid, workable mixture of aggregate, cement, and water that is of limited strength as to allow future excavation and maintenance of buried improvements yet capable of supporting the proposed pipeline and backfill. If CLSM is used in the pipe zone or trench zone, we recommend that those materials conform and be placed according to specifications presented in Section 19-3.062 of the Caltrans Standard Specifications (most current edition). Care should be taken during placement of CLSM materials to prevent the pipeline from floating.

4.5.7 *Placement & Compaction*

Pipe zone and trench zone backfill should be placed and compacted using mechanical compaction methods. Jetting should not be allowed as a means of compaction. Special care should be given to ensure that adequate compaction is made beneath the haunches of the pipeline (that area from the pipe springline to the pipe invert, as shown on Plate 12) and that no voids remain in this space. For

all testable materials, the minimum relative compaction of 95 percent relative to standard test method ASTM D1557 is required.

Compaction tests of pipe zone backfill should be performed at horizontal intervals of no more than 200 feet and vertical intervals of no more than 18 inches. Within the pipe zone, compaction tests should be performed near the springline and near the top of the pipe zone backfill. Assessment of the potential presence of voids within the haunch area should be performed following completion of those compaction tests. If voids are observed, then the Contractor should be required to rework the pipe zone materials to eliminate the presence of voids in the pipeline haunches. Retesting of the pipe zone materials should then be performed. All areas of failing compaction tests should be reworked and retested until the specified relative compaction is achieved. Compaction of trench zone backfill should be performed at horizontal intervals of no more than 200 feet and vertical intervals of no more than 18 inches.

Placement of CLSM materials should be performed in accordance with specifications presented in Caltrans Standard Specification 19-3.03F and 19-3.03I. If CLSM is used, then compaction tests are not required; however, a minimum of four hours should be allowed between placement of CLSM and placement of engineered fill materials above the CLSM, as noted in Caltrans Standard Specification 19-3.03F.

4.5.8 *Trench Subgrade Stabilization*

Soft and yielding trench subgrade could locally be encountered along the bottom of trench excavations made within the existing site soils. If yielding subgrade is encountered, it is recommended that the bottom of trenches be stabilized prior to placement of the pipeline bedding so that, in the judgment of the geotechnical engineer, the trench subgrade is firm and unyielding. The Contractor should have the sole responsibility for design and implementation of trench subgrade stabilization techniques. Some methods that we have observed used to stabilize trench subgrades include the following:

- Use of ¾–inch to 1½-inch floatrock worked into the trench bottom and covered with a geotextile fabric such as Mirafi 500X;
- Placement of a geotextile fabric, such as Mirafi 500X, on the trench bottom and covered with at least one foot of compacted processed miscellaneous base (PMB) conforming to the requirements of Section 200-2.5 of the Greenbook, latest edition;
- Overexcavation of trench subgrade and placement of two-sack sand-cement slurry; and
- In extreme conditions, injection grouting along the trench alignment.

If floatrock is used, typically sand with an SE of 50 or more should be used to fill the voids in the rock prior to placement of pipe bedding materials.

4.5.9 *Permanent Subsurface Pipeline Structures*

For this project, subsurface structures likely consist of vaults that will be up to 15 feet deep.

4.5.9.1 Structures

Foundations for vaults bearing on soil or rock should be designed using an allowable bearing pressure of 1,500 psf. This bearing pressure can be increased by one-third where needed to resist transient loading on the structures. Total settlement of vault structures should be less than 0.5 inches and should occur relatively rapidly upon load application. The maximum recompression settlement should be 0.25 inches or less.

The bearing pressure and settlement recommendations are based upon the vaults resting on an undisturbed subgrade that is free of loose soils and debris. If the subgrade is found to be soft, loose, disturbed by construction, yielding, or unstable, we recommend that the subgrade be overexcavated to such a depth that a firm and unyielding subgrade can be established by installing a minimum of 12 inches of clean, durable, natural, 1.5-inch crushed (i.e., angular) drain rock wrapped with geotextile fabric. See the table below for recommended foundation material gradations. The geotextile fabric is used to separate the open-graded drain rock from the surrounding finer grained native soils and pipe bedding material, and should be overlapped a minimum of 12 inches. Foundation material is recommended for any excavations where the trench or excavation bottom is unstable, yielding, disturbed by construction activity, or where overexcavation occurs.

FOUNDATION MATERIAL	
Sieve Size	**Percent Passing**
2 inch	100
1.5 inch	90-100
¾-inch	5-30
3/8-inch	5-20
No. 200	0-4

The geotextile fabric should be a nonwoven material consisting of polyester, nylon, and polypropylene filaments formed into a stable network. The fabric shall be permeable, not act as a wicking agent, be inert to commonly encountered chemicals, be rot proof, and be resistant to ultraviolet light. The geotextile fabric shall also conform to the physical properties in the following table:

GEOTEXTILE FABRIC		
Property	**Test Value**	**ASTM Test Method**
Weight	5.4 oz/yd^2 (min.)	D5261
Grab tensile strength	150 lb (min.)	D4632
Elongation at break	50% (max.)	D4632
Puncture strength	80 lb (min.)	D6241
Burst strength	300 psi (min.)	D3786
Apparent opening size	#70 (max.)	D4751
Permittivity	1.0 sec^{-1} (min.)	D4491
UV resistance	70% (min.)	D4355

4.5.9.2 Backfill

The contractor should be made solely responsible for protecting structures from damage during placement/compaction of backfill materials. Backfill material around structures should consist of Class II aggregate base (AB) or CLSM. Class II AB should be placed in maximum 8-inch-thick loose lifts and compacted to a minimum of 95% relative compaction (ASTM D1557) at a moisture content at or near optimum to within 30 inches of the ground subgrade.

4.5.10 *Lateral Earth Pressures*

Lateral earth pressures provided in the following table are for permanent subsurface pipeline structures (vaults or manholes) based on the type and condition of the soil and bedrock mapped in the project area and encountered in project test borings. Vault walls that are not free to deflect should be designed to resist at-rest earth pressures as well as the additional loading from a seismic event.

LATERAL EARTH PRESSURES	
Condition	**Equivalent Fluid Pressure (pcf)**
At-Rest	60
Active	40
For structures to a maximum of 15 feet in depth. These pressures do not include (1) lateral surcharge loads from vehicles, fills or structures where an imaginary 1.5H:1V plane projected downward from an existing or planned structure projects above or intersects the side of the structure; (2) hydrostatic pressures; and (3) dynamic pressures from seismic shaking.	

A maximum coefficient of sliding friction of 0.35 between concrete structures and compacted native soil, and 0.40 between concrete and approved structural fill material, Class II AB, or CLSM can be used in calculations for lateral force resistance.

4.5.11 *Construction Vibrations*

The project will be constructed in native soils and existing fills and backfills that will transmit construction vibrations to existing nearby surface and subsurface structures (such as utilities and pipelines). Therefore, the type and operation of equipment to be used during project construction should be selected by the Contractor to limit construction vibrations to levels that will not damage existing structures and improvements, including utilities, pipelines, and nearby residences.

A commonly accepted damage threshold criterion for high-frequency peak particle velocity vibrations at existing surface structures and improvements is on the order of 1 to 2 inches per second (Siskind, 1980). High-frequency peak particle velocities above these values can cause cosmetic damage to structures such as cracking of plaster and drywall.

If construction vibrations are of concern, those vibrations should be monitored and documented by qualified technicians with approved vibration measuring equipment (seismographs) located at structures nearest the site of actual ongoing construction. Vibration levels greater than 1 inch per second at nearby surface structures will require modification of the Contractor's construction

procedures to reduce vibration levels. Photographic pre-construction surveys of the structures located adjacent to the project area should be performed to establish baseline conditions prior to project construction and to aid in assessing construction damage claims, if any.

5 PAVEMENT REPLACEMENT

It is anticipated that pavement sections along Highway 192 will be disturbed during trenching and construction activities. Pavement disturbed during those processes should be replaced in accordance with requirements and conditions imposed by Caltrans in the encroachment permit issued for this project. Those conditions are unknown at this time but anticipated to be, at a minimum, replacement in-kind of the existing pavement section.

6 MONITORING WELL DESTRUCTION

A monitoring well was constructed at drill hole DH-13, located at about Station 33+75 (See Plate 3.1). That monitoring well should be destroyed in accordance with the California Department of Water Resources and Ventura County standards. Due to the proximity of the monitoring well to the HDD alignment, we recommend that the well be destroyed sufficiently in advance of the HDD construction to reduce the potential of drilling fluids hydrofracturing to the ground surface through the well during the HDD drive.

7 REVIEW OF PLANS AND SPECIFICATIONS

We recommend BAJADA conduct a general review of preliminary and final plans and specifications to evaluate whether recommendations contained herein have been properly interpreted and implemented during design. If BAJADA is not retained to perform this recommended review, we will assume no responsibility for misinterpretation of our recommendations.

8 LIMITATIONS

This report has been prepared in substantial accordance with the generally accepted engineering geologic and geotechnical engineering practices, as they exist in the site area at the time our services were rendered. No other warranty, either express or implied, is made.

Conclusions contained in this report were based on the conditions encountered during our field investigation and are applicable only to those project features described herein (see Section 1.1 – Project Understanding). Soil and rock deposits can vary in type, strength, and other geotechnical properties between points of observation and exploration. Additionally, groundwater and soil moisture conditions can also vary seasonally and for other reasons. Therefore, we do not and cannot have a complete knowledge of the subsurface conditions underlying the project site.

The conclusions and recommendations presented in this report are based upon the findings at the points of exploration, and interpolation and extrapolation of information between and beyond the

points of observation, and are subject to confirmation based on the conditions revealed by construction. If conditions encountered during construction differ from those described in this report, or if the scope or nature of the proposed construction changes, we should be notified immediately to review and, if deemed necessary, conduct additional studies.

The scope of services provided by BAJADA for this project did not include the investigation and/or evaluation of toxic substances, or soil or groundwater contamination of any type. If such conditions are encountered during site development, additional studies may be required. Further, services provided by BAJADA for this project did not include the evaluation of the presence of critical environmental habitats or culturally sensitive areas.

This report may be used only by our client and their agents and only for the purposes stated herein, within a reasonable time from its issuance. Land use, site conditions, and other factors may change over time that may require additional studies. In the event significant time elapses between the issuance date of this report and construction, BAJADA shall be notified of such occurrence to review current conditions. Depending on that review, BAJADA may require that additional studies be conducted and that an updated or revised report is issued.

Any party other than our client who wishes to use all or any portion of this report shall notify BAJADA of such intended use. Based on the intended use as well as other site-related factors, BAJADA may require that additional studies be conducted and that an updated or revised report be issued. Failure to comply with any of the requirements outlined above by the client or any other party shall release BAJADA from any liability arising from the unauthorized use of this report.



9 REFERENCES

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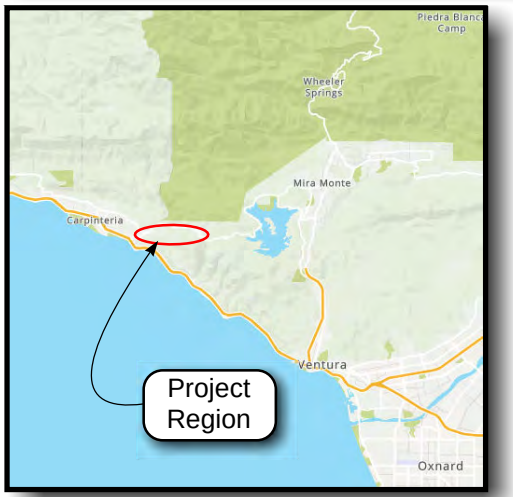
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Base maps from Google Maps. Scale undetermined.

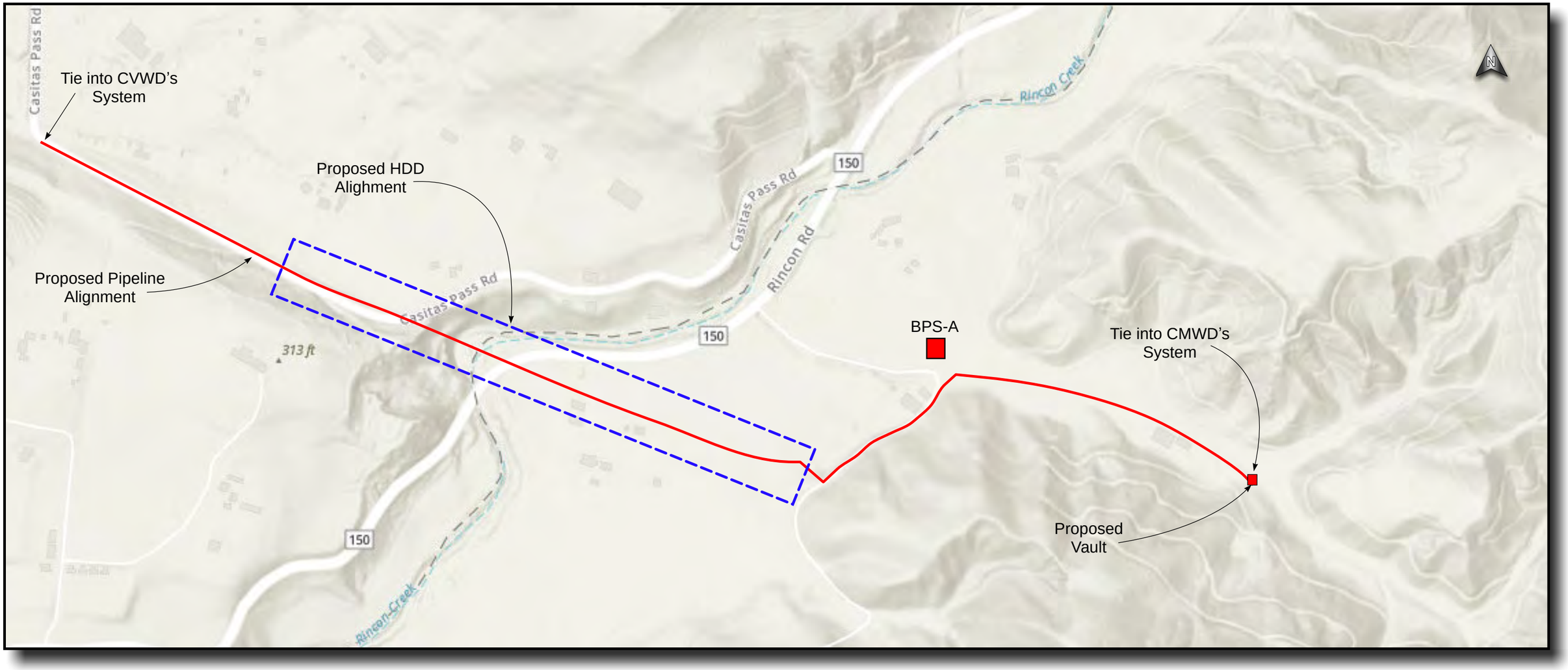
SITE LOCATION MAP

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 1

BAJADA Geosciences, Inc.

Project no. 2101.0113



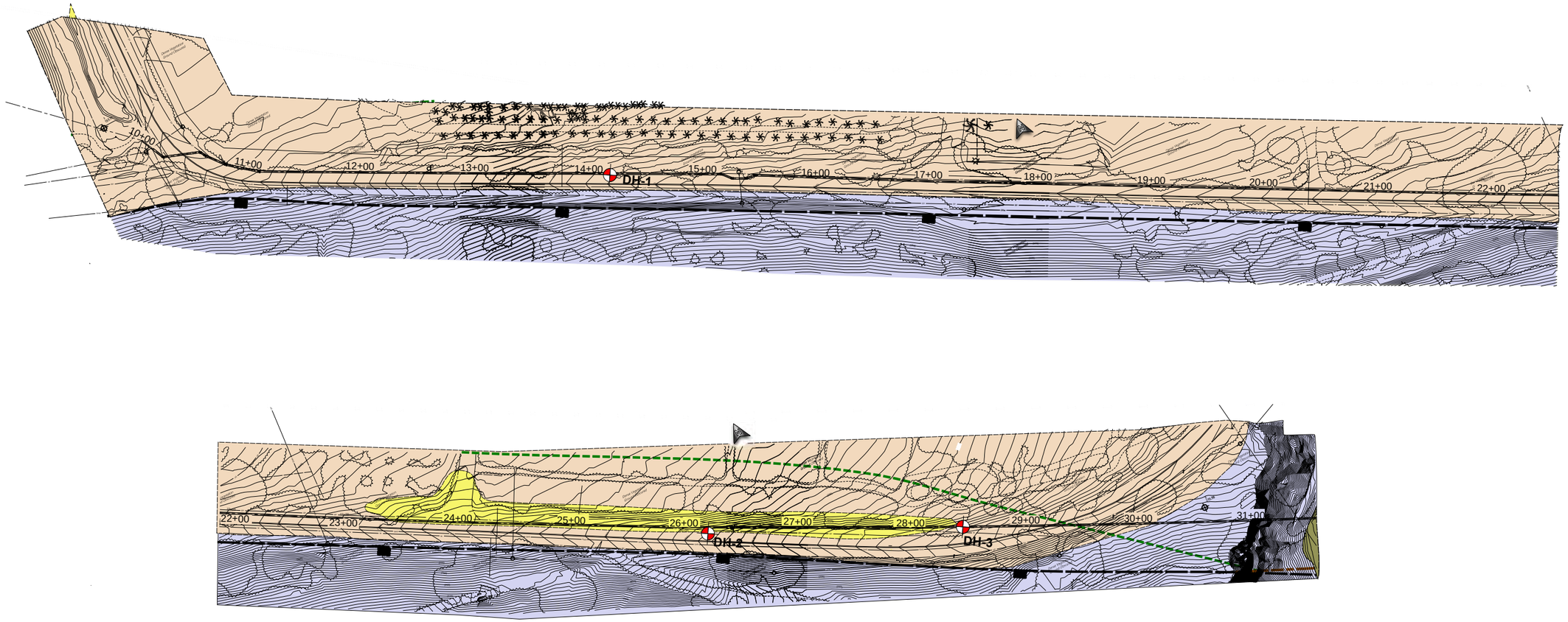
0 250 500

Scale: 1"=500'

Base maps from DWR 2022.

PIPELINE ALIGNMENT MAP

Ventura-Santa Barbara Intertie Project Casitas Municipal Water District Water Works Engineers Santa Barbara & Ventura Counties, CA	Plate No. 2
BAJADA Geosciences, Inc.	Project no. 2101.0113



af Artificial Fill

Qal Alluvium

Qls Landslide Deposits

Qoal Older Alluvium

Qols Older Landslide Deposits

Qca Casitas Formation

DH-25 Approximate Drill Hole Location

Geologic Contact, Dashed where approximate

Rincon Creek Fault Minor & Brant (2015) block on down dip plane

Possible Rincon Creek Fault Prominant Lineation

Rincon Creek Fault per USGS & CGS

79+00 Proposed Pipeline with Stationing

0 50 100

Scale: 1”=100’
1:1,200

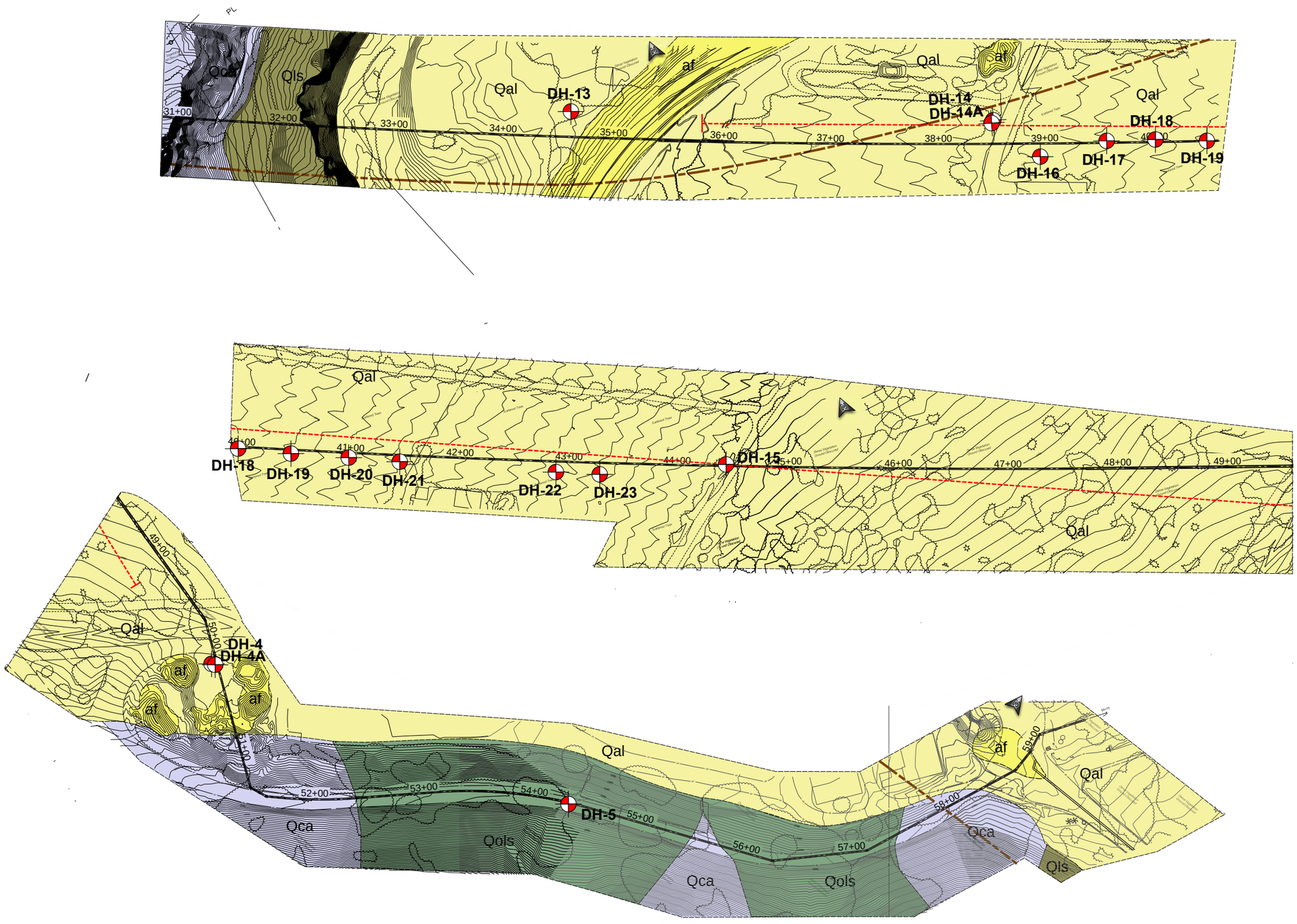
PIPELINE ALIGNMENT GEOTECHNICAL MAP

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 3.1

BAJADA Geosciences, Inc.

Project no. 2101.0113



- af — Artificial Fill
- Qal — Alluvium
- Qls — Landslide Deposits
- Qoal — Older Alluvium
- Qols — Older Landslide Deposits
- Qca — Casitas Formation

- DH-25 — Approximate Drill Hole Location
- Geophysical Survey Alignment
- Geologic Contact, Dashed where approximate
- Rincon Creek Fault Minor & Brant (2015) block on down dip plane
- Possible Rincon Creek Fault Prominant Lineation
- Rincon Creek Fault per USGS & CGS
- 79+00 — Proposed Pipeline with Stationing

0 50 100

Scale: 1”=100’
1:1,200

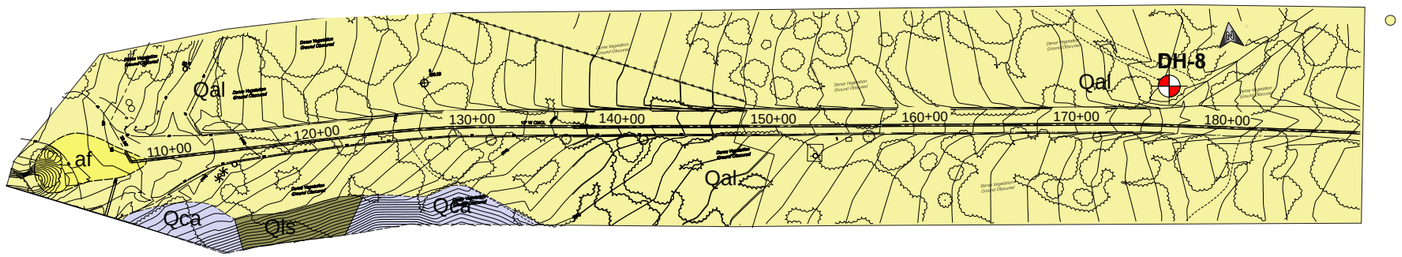
PIPELINE ALIGNMENT GEOTECHNICAL MAP

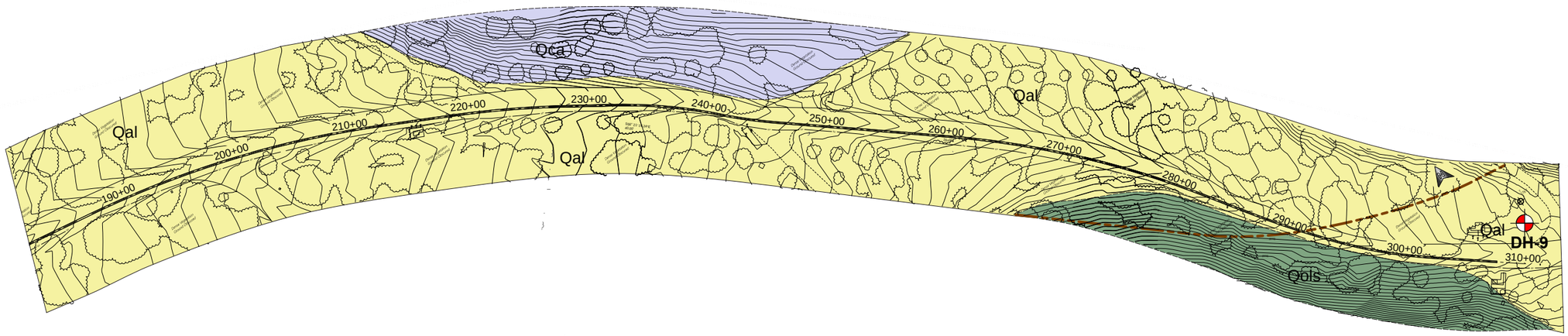
Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 3.2

BAJADA Geosciences, Inc.

Project no. 2101.0113





Approximate Drill Hole Location
DH-25

af Artificial Fill

Qal Alluvium

Qls Landslide Deposits

Qoal Older Alluvium

Qols Older Landslide Deposits

Qca Casitas Formation

Geologic Contact,
Dashed where approximate

Rincon Creek Fault Minor & Brant (2015)
block on down dip plane

Possible Rincon Creek Fault
Prominant Lineation

Rincon Creek Fault
per USGS & CGS

79+00 Proposed Pipeline with Stationing

0 50 100
Scale: 1”=100’
1:1,200

Base maps from WWE 2022.

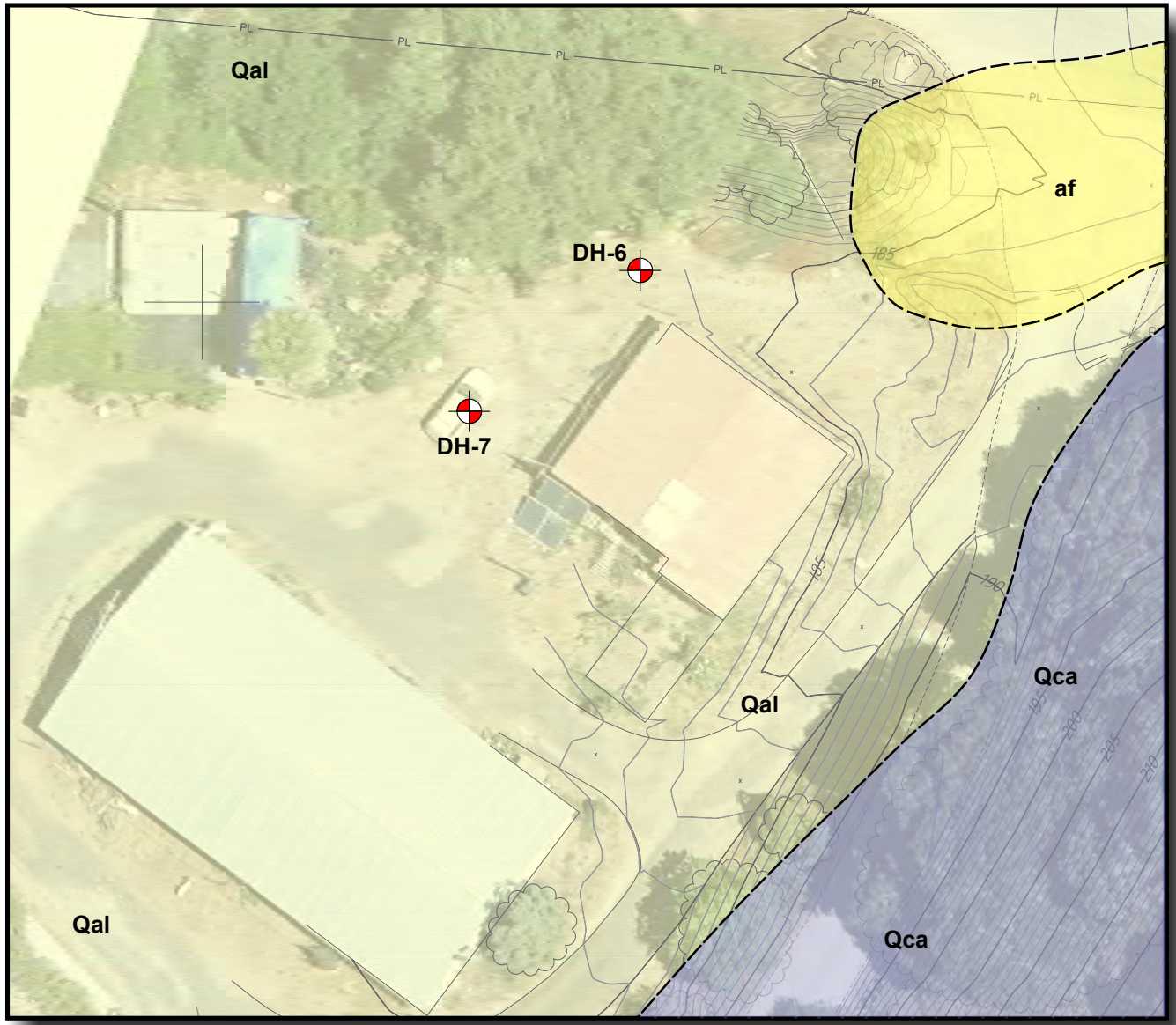
PIPELINE ALIGNMENT GEOTECHNICAL MAP

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 3.3

BAJADA Geosciences, Inc.

Project no. 2101.0113



N

af	Artificial fill
Qal	Alluvium
Qca	Casitas Formation

0 30’

Scale: 1”=30’

DH-7 Approximate Drill Hole Location

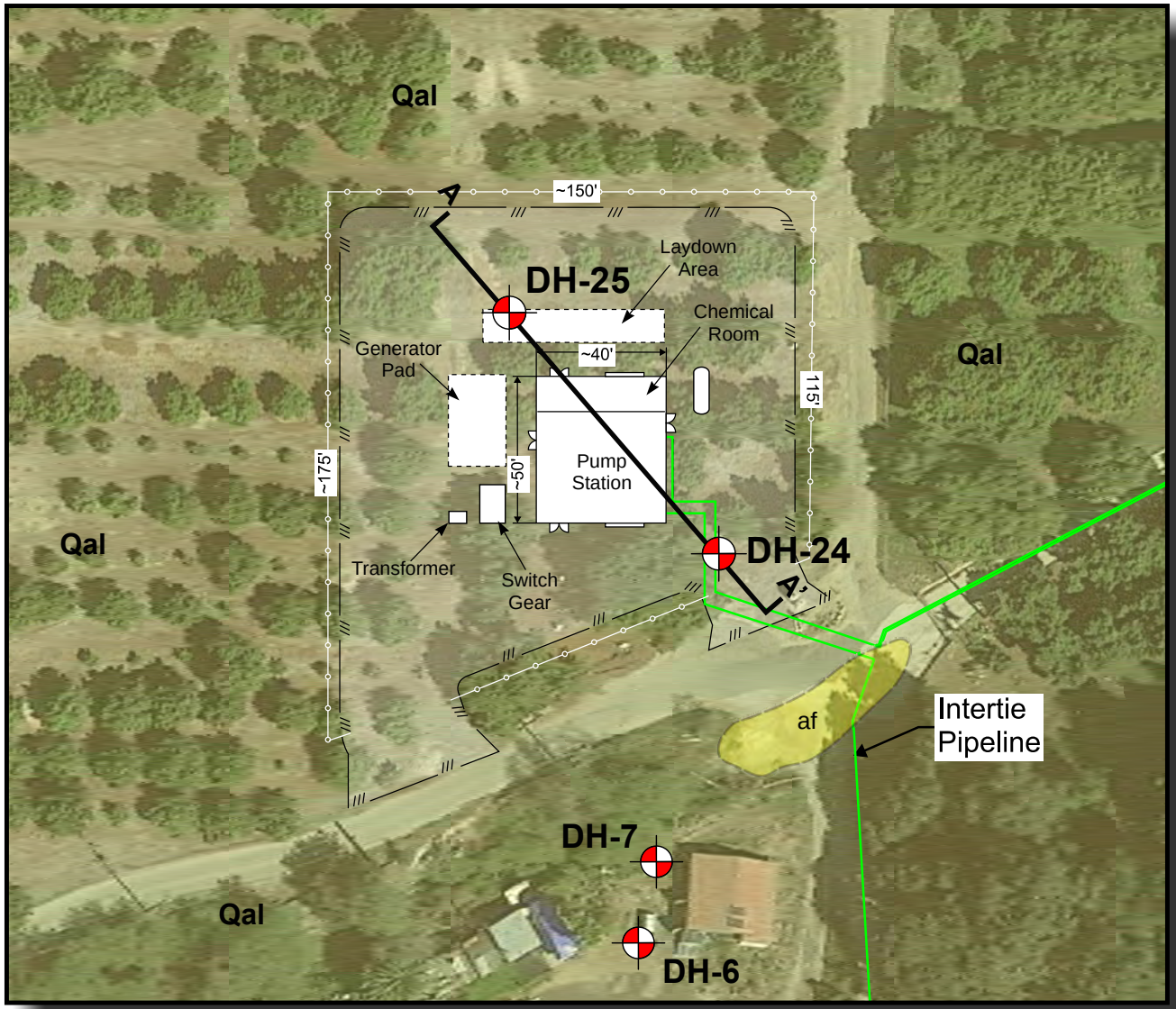
BOOSTER PUMP STATION GEOTECHNICAL MAP, BPS-A (BROWN)

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.
4.1

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2101.0113



N

0 40 80

Scale: 1"=80'

Approximate Drill Hole Location
DH-25

A A' Cross Section see Plate 7.1

af Artificial fill

Qal Alluvium

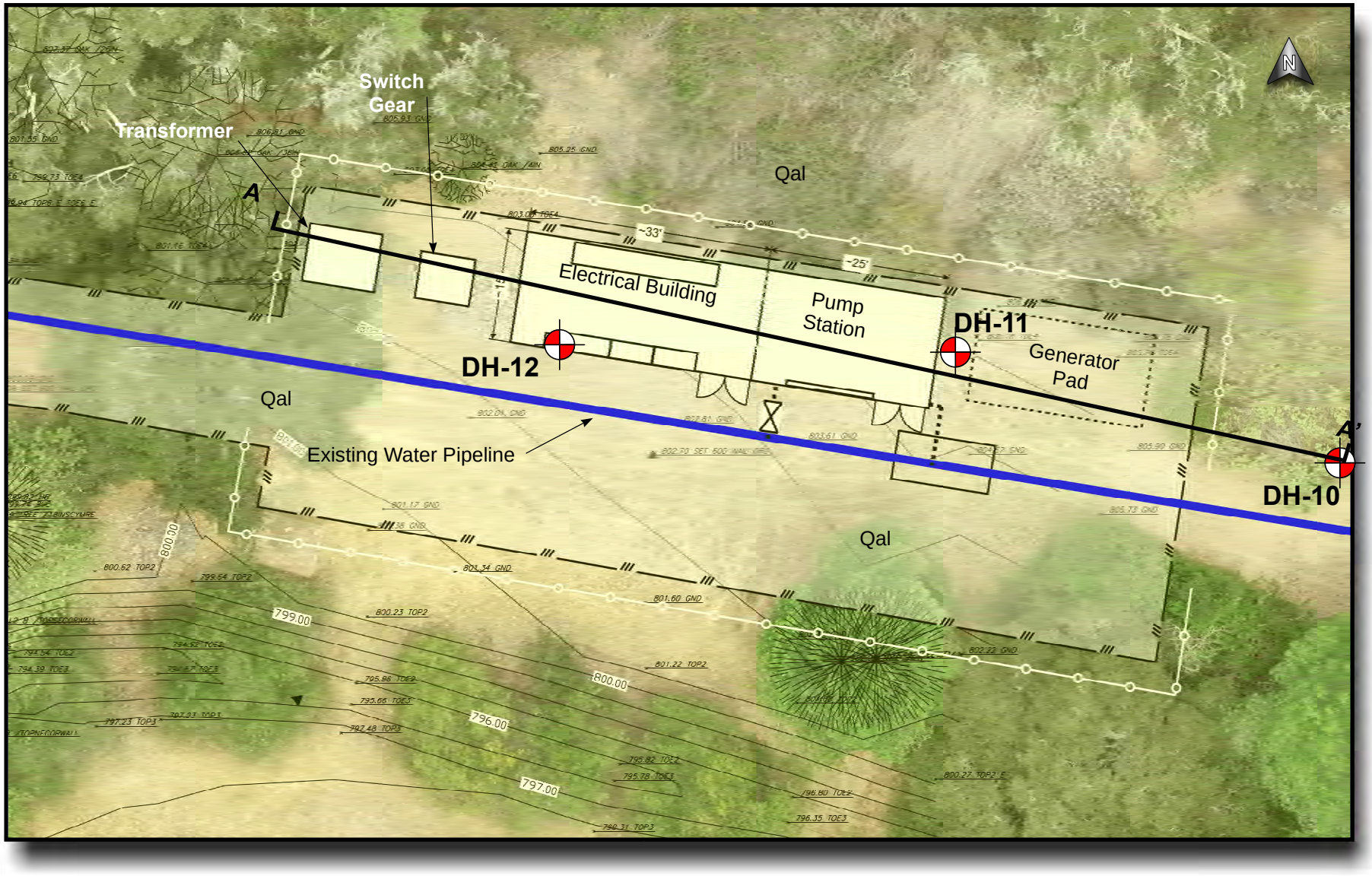
BOOSTER PUMP STATION GEOTECHNICAL MAP, BPS-A (BARNARD)

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 4.2

BAJADA Geosciences, Inc.

Project no. 2101.0113



Approximate Drill Hole Location
DH-25

Qal Alluvium

A A' Cross Section see Plate 7.2

0 10 20
Scale: 1"=20'

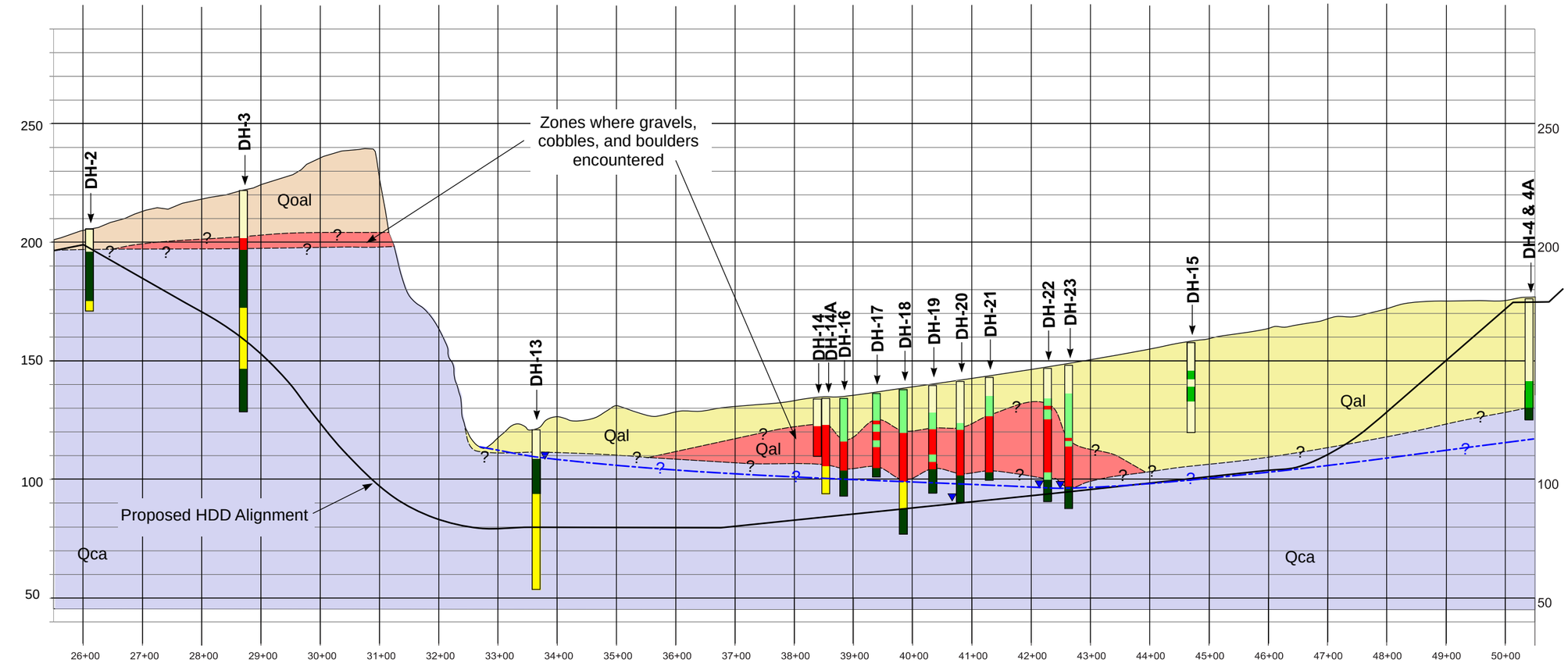
BOOSTER PUMP STATION GEOTECHNICAL MAP, BPS-B

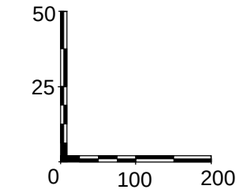
Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 4.3

BAJADA Geosciences, Inc.

Project no. 2101.0113





Scale:
Horizontal:1”=200’
Vertical: 1”=50’
Vertical Exaggeration 4x



Drill Hole Unit Legend

Alluvium & Older Alluvium
- Predominantly granular soils
- Predominantly fine-grained soils
- Soils containing gravels, cobbles, & boulders

Casitas Formation
- Claystone
- Sandstone

Geologic Unit Legend

- Qal — Alluvium
- Qoal — Older Alluvium
- Qca — Casitas Formation
- Encountered Groundwater

0 100 200
Scale: 1”=200’
1:2,400

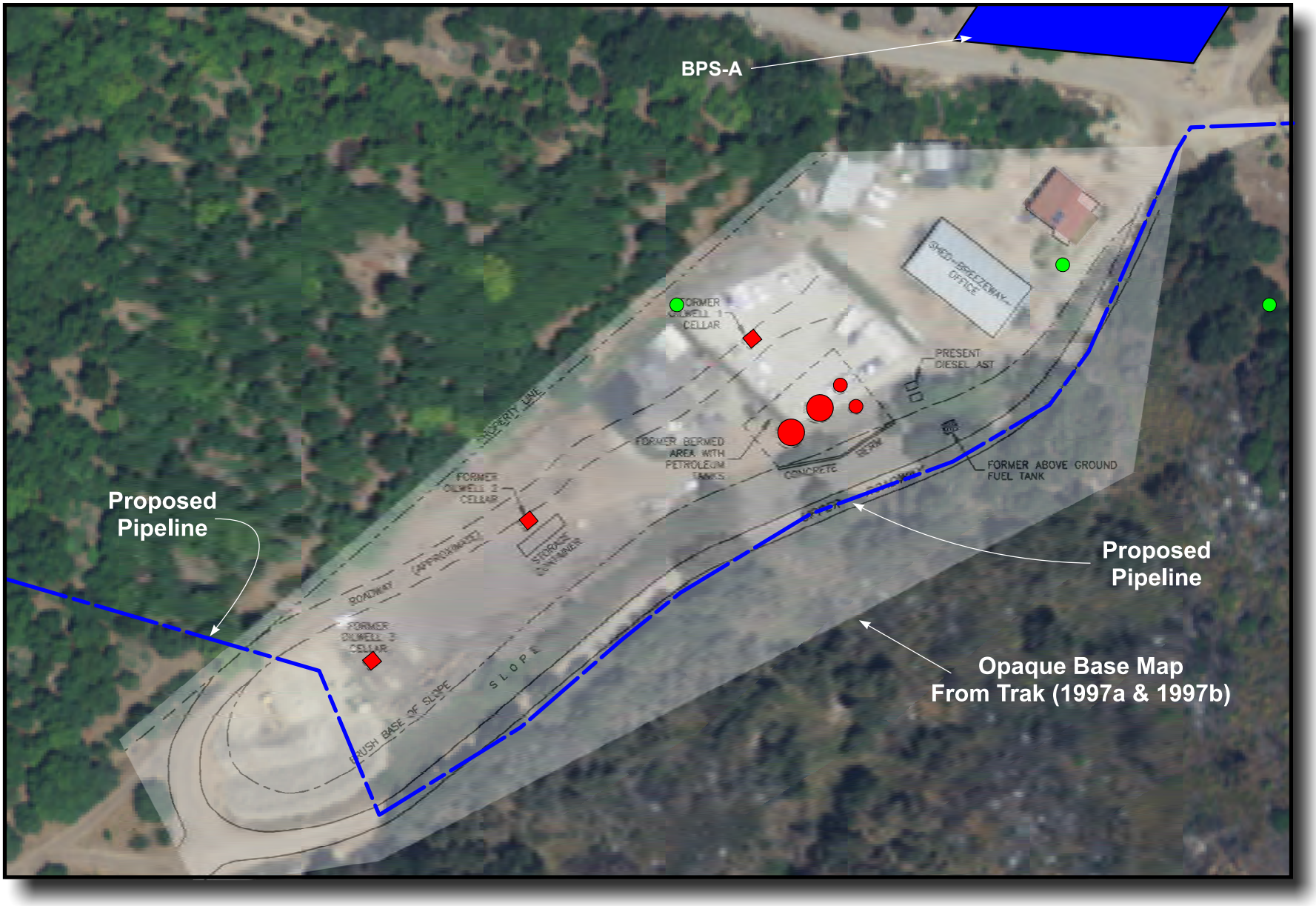
HDD CROSS SECTION

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 5

BAJADA Geosciences, Inc.

Project no. 2101.0113



Scale undetermined

Former oil storage tank locations per Trak (1997a & 1997b)

Former oil well location per Trak (1997a & 1997b)

Former oil well location per CalGEM (2022)

Base imagery from Google Maps

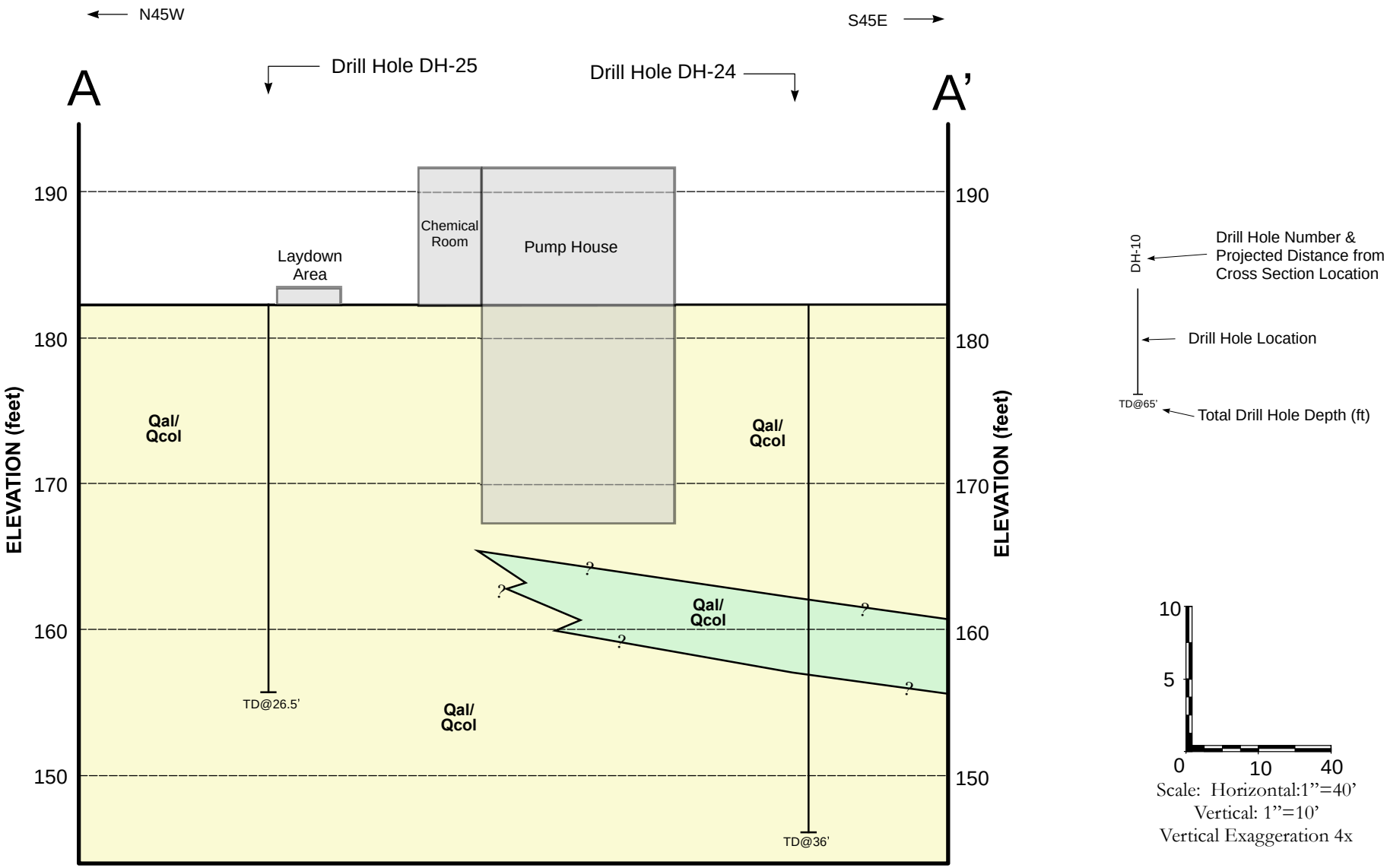
FORMER OIL DEVELOPMENT

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 6

BAJADA Geosciences, Inc.

Project no. 2101.0113



Qal/ Qcol — Collivium & Alluvium Predominantly Fine Grained

Qal/ Qcol — Collivium & Alluvium Predominantly Granular

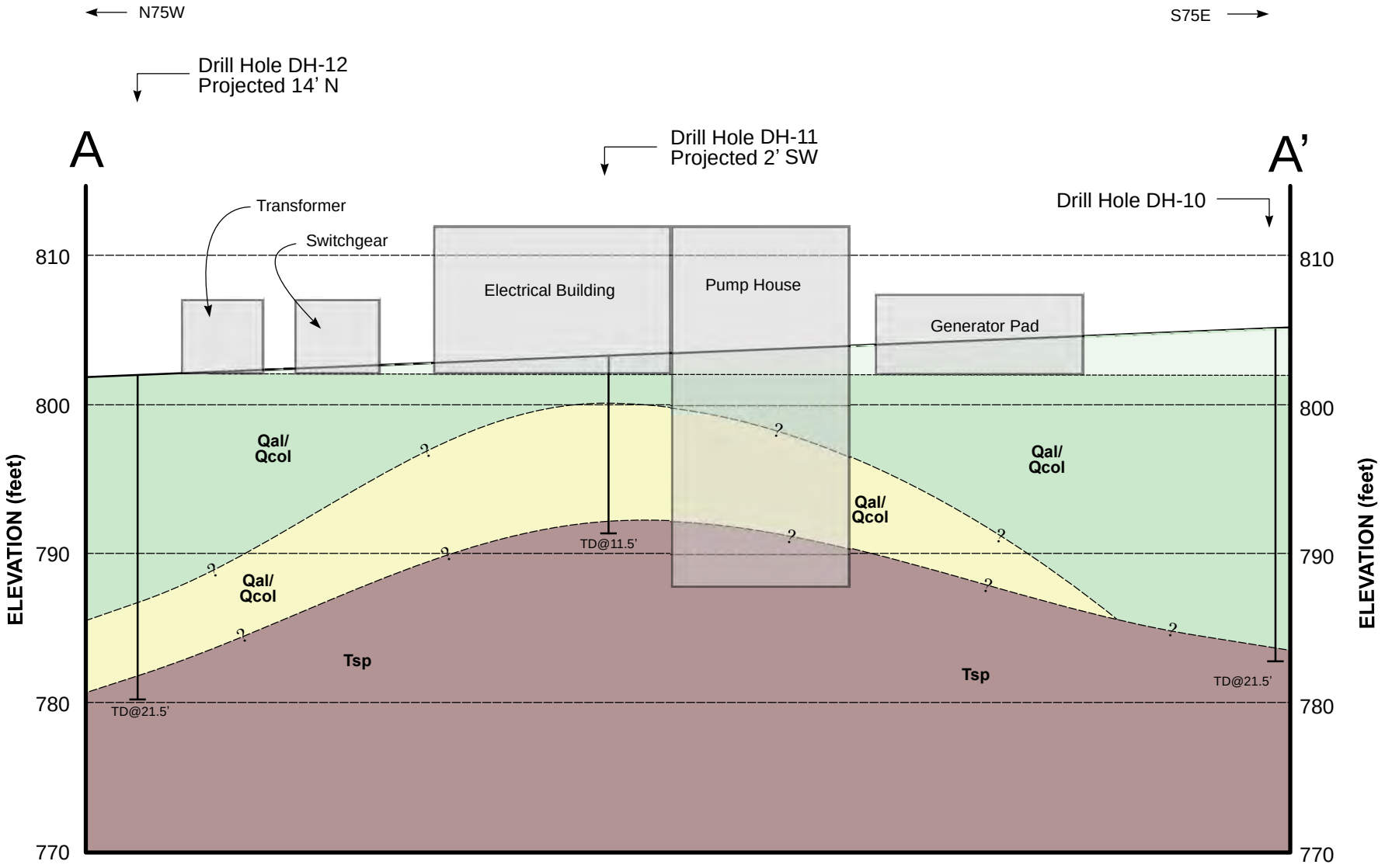
BPS-A (BARNARD) GEOTECHNICAL SECTION

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 7.1

BAJADA Geosciences, Inc.

Project no. 2101.0113



Qal/ Qcol — Collivium & Alluvium Predominantly Fine Grained

Qal/ Qcol — Collivium & Alluvium Predominantly Granular

Tsp — Sespe Formation Sandstone

DH-10 — Drill Hole Number & Projected Distance from Cross Section Location

Drill Hole Location

TD@65' — Total Drill Hole Depth (ft)

10
5
0
10
20

Scale: Horizontal:1"=20'
Vertical: 1"=10'
Vertical Exaggeration 2x

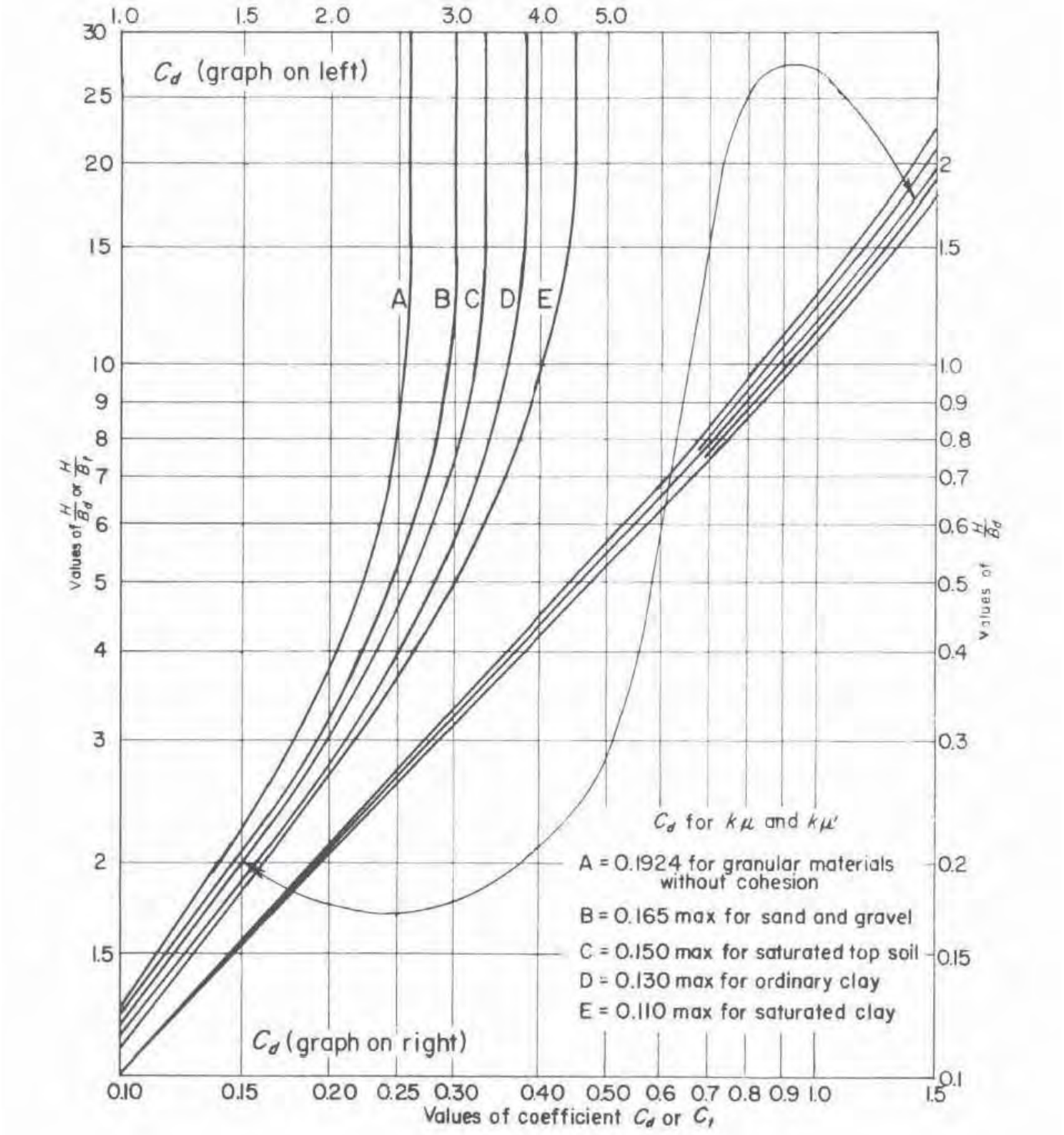
BPS-B GEOTECHNICAL SECTION

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.
7.2

BAJADA Geosciences, Inc.

Project no.
2101.0113



Curve from ASCE (1982)

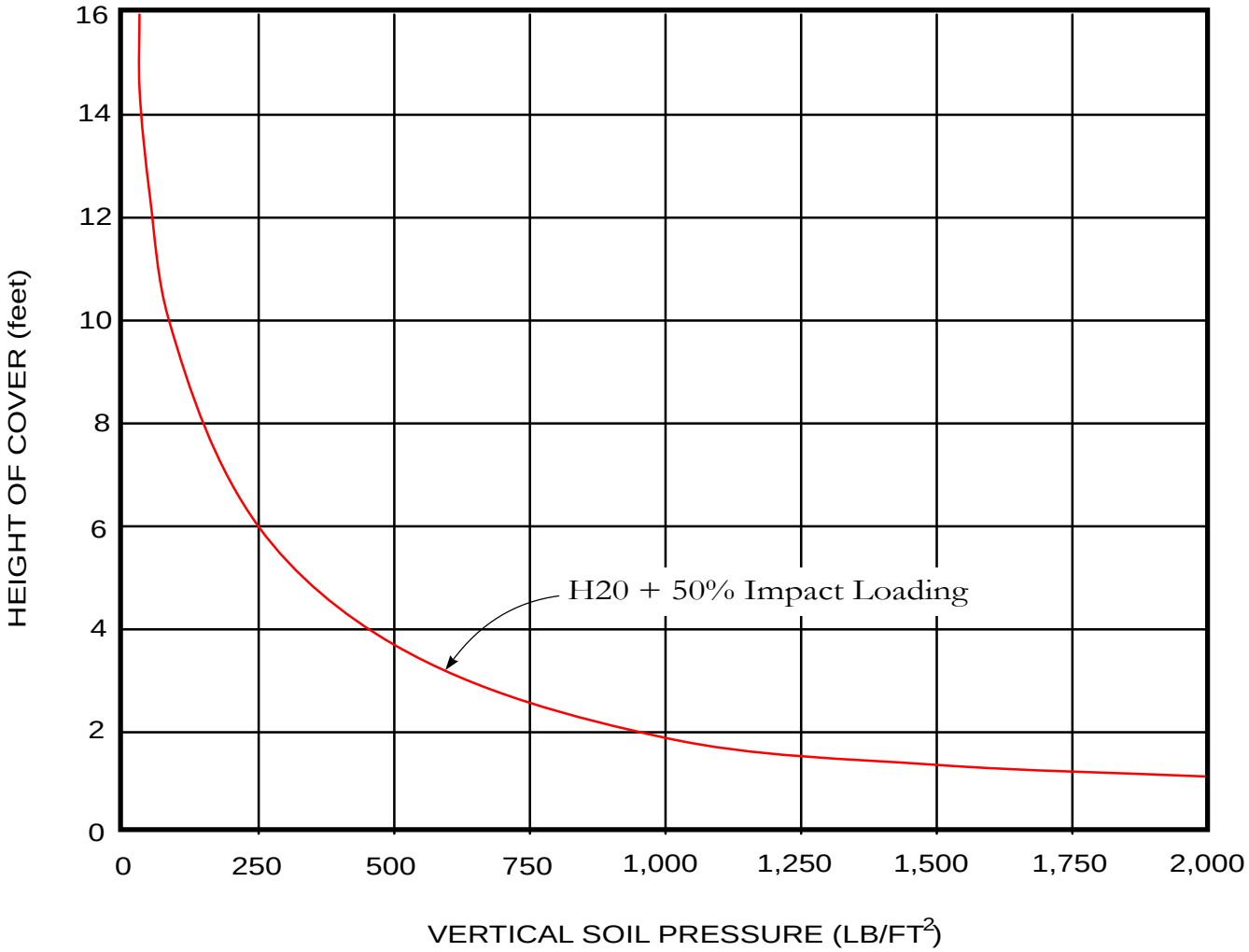
MARSTONS LOAD COEFFICIENTS

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 8

BAJADA Geosciences, Inc.

Project no. 2101.0113



Apply vertical soil pressure to diameter of pipeline (horizontal projection to calculate vertical load

H20 +50% Impact Loading: Simulates a highway load of a 20-ton truck with a 50% impact factor to account for the dynamic effects of traffic

Derived from Moser & Feldman (2008)

VERTICAL SOIL PRESSURES INDUCED BY LIVE LOADS

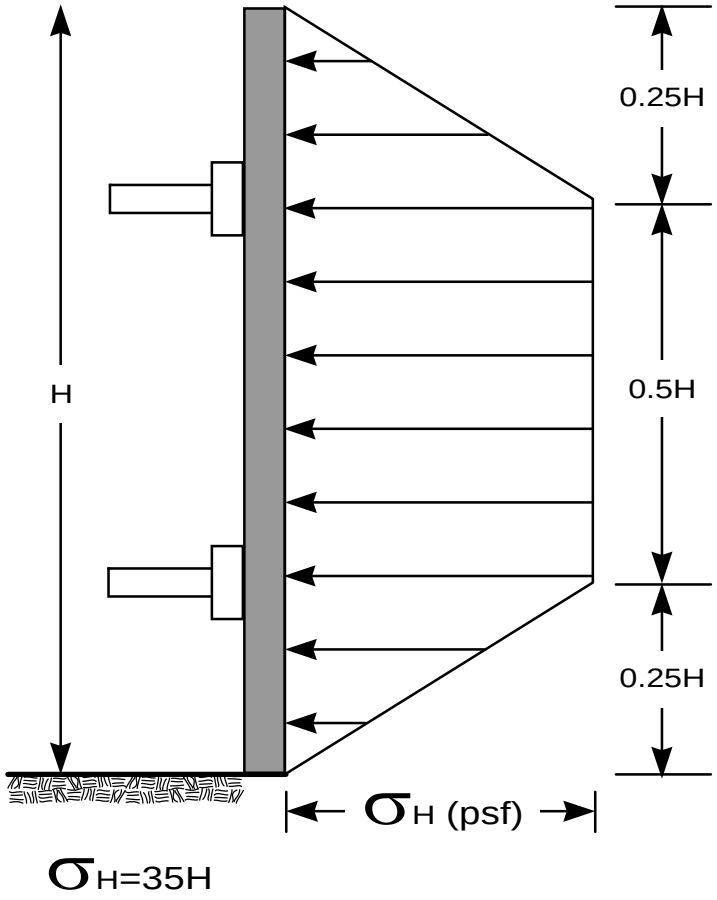
Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 9

BAJADA Geosciences, Inc.

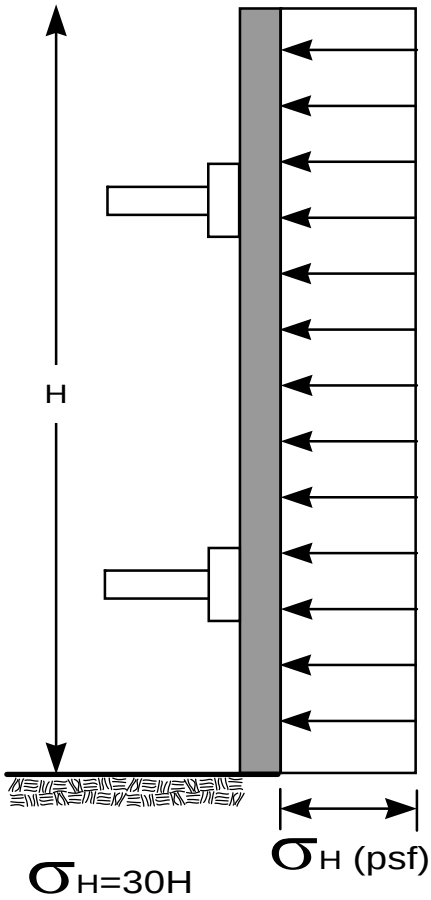
Project no. 2101.0113

CLAY PRESSURE DIAGRAM



$\sigma_{H=35H}$

SAND PRESSURE DIAGRAM



$\sigma_{H=30H}$

Preliminary shoring pressure diagrams are for excavations in unsaturated soils only.

These preliminary shoring pressure diagrams do not take into account hydrostatic pressures nor surcharge pressures. The effects of these conditions must be added to these pressure diagrams where applicable.

Excavation base stability should be analyzed after base width has been selected.

Final design shoring pressure diagrams will need to be developed by the Contractor based on selection of a shoring system and the actual soil, groundwater, and surcharge conditions encountered during construction.

PRELIMINARY SHORING PRESSURE DIAGRAMS

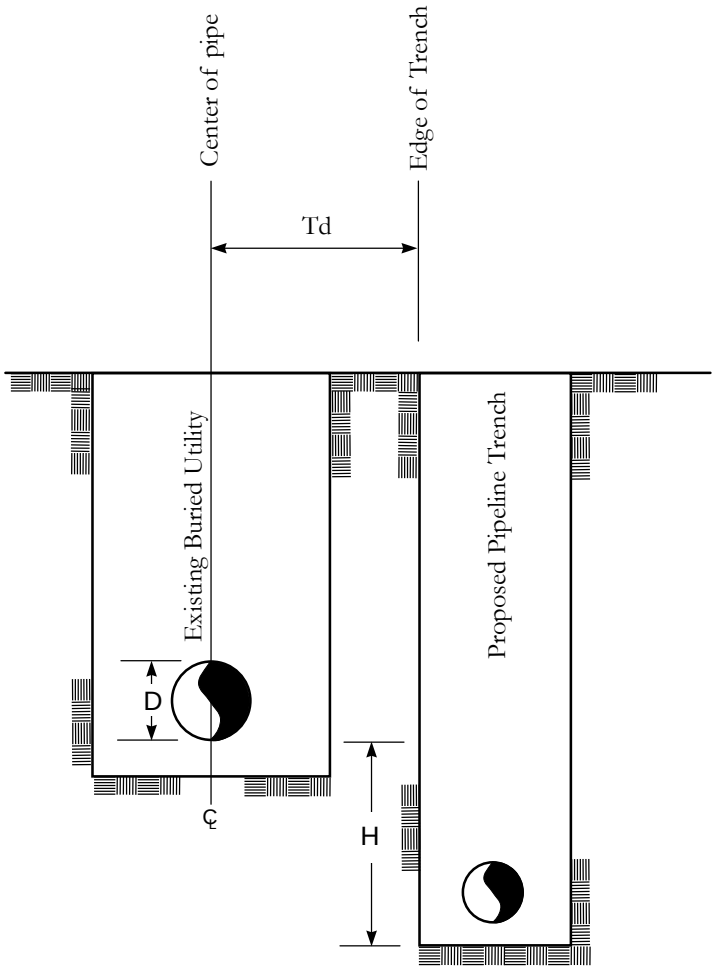
Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 10

BAJADA Geosciences, Inc.

Project no. 2101.0127

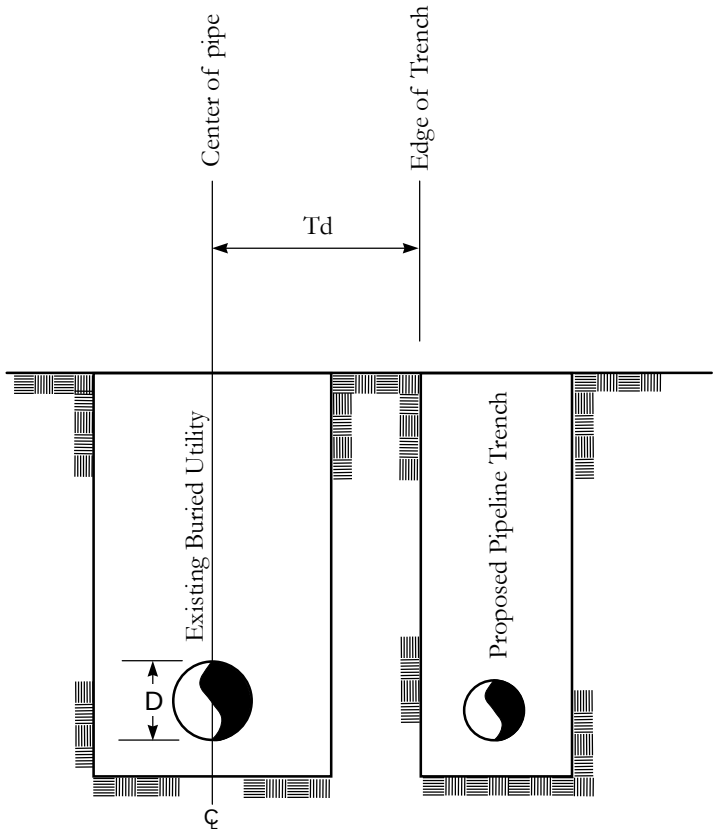
WHERE PIPELINE IS DEEPER THAN ADJACENT BURIED UTILITY



If D is less than or equal to 54": Td = (D/2)+24+(H/2)
If D is greater than 54": Td = (D/2)+36+(H/2)

Where D = existing pipeline diameter in inches.
H = vertical distance, in inches, between bottom of existing utility pipeline and bottom of proposed trench.
Td = minimum distance, in inches, for proposed trench sidewall where impingement into adjacent trench is unlikely.

WHERE PIPELINE IS SHALLOWER OR AT SAME DEPTH AS ADJACENT BURIED UTILITY



If D is less than or equal to 54": Td = (D/2)+24
If D is greater than 54": Td = (D/2)+36

Where D = existing pipeline diameter in inches.
Td = minimum distance, in inches, for proposed trench sidewall where impingement into adjacent trench is unlikely.

Not to scale

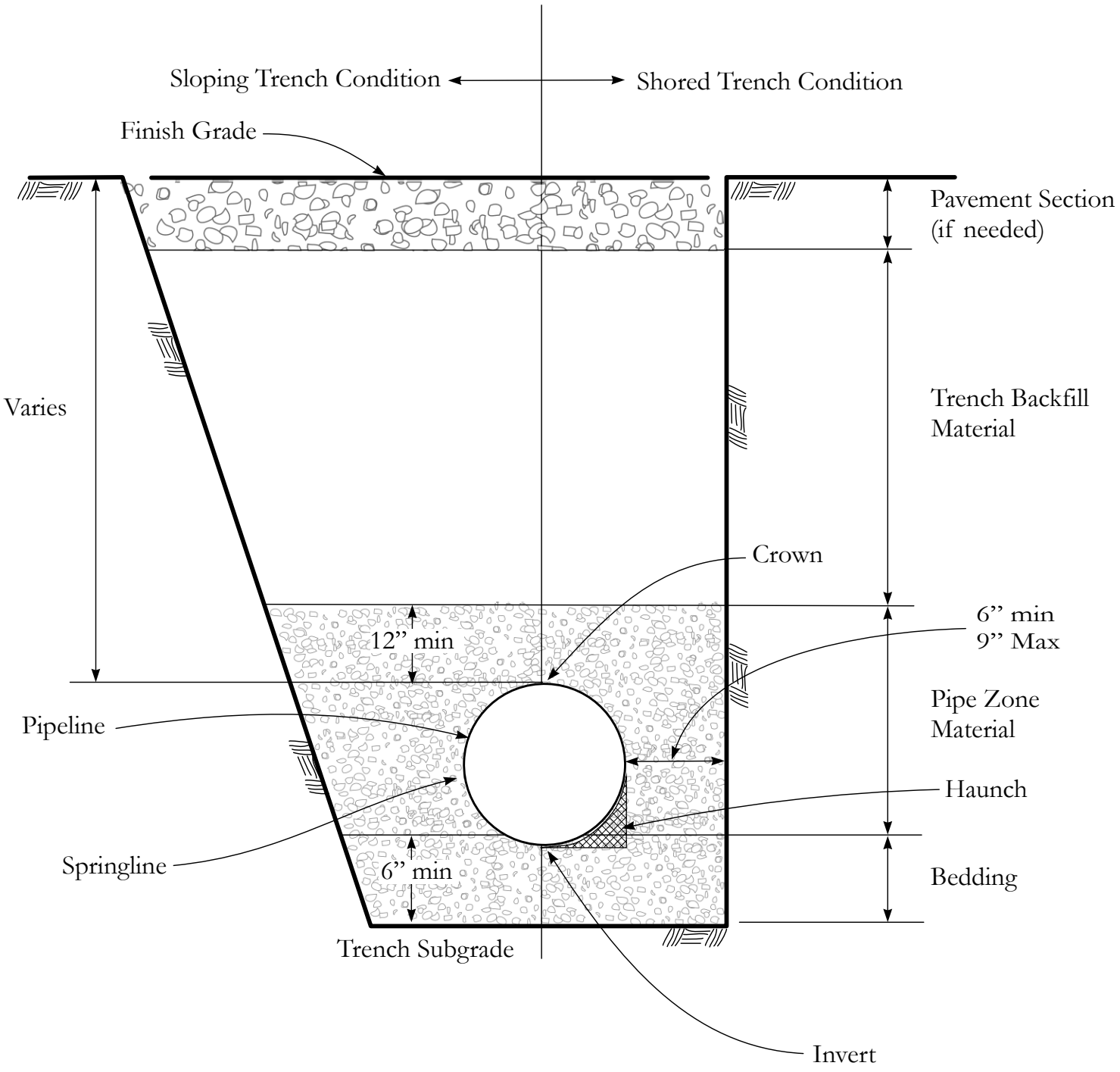
ADJACENT UTILITY TRENCHES

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 11

BAJADA Geosciences, Inc.

Project no. 2101.0113



Not to Scale

TRENCH NOMENCLATURE

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 12

BAJADA Geosciences, Inc.

Project no. 2101.0113

APPENDIX A

Subsurface Exploration

APPENDIX A
SUBSURFACE EXPLORATION

The subsurface exploration program for this study consisted of the advancement of twenty-seven exploratory drill holes at selected locations, as shown on Plates 3.1through 3.3 and 4.1 through 4.3. Prior to exploration, a drilling permit was obtained from Santa Barbara and Ventura County Environmental Health Departments. In addition, an encroachment permit was obtained from Caltrans District 5 for exploration along SR 192.

The drill holes were advanced on October 4 through 7, 2021, January 17 & 18, 2022, April 29, 2022, and July 18 through 25, 2022. Exploration was performed using CME 75 track-mounted drill rigs provided by Britton Exploration of Los Gatos, California and GeoEx Exploration, Inc., of Dixon, California. In addition, a Geoprobe 4-inch diameter double-walled sonic coring system provided by GeoEx Subsurface Exploration, Inc., was utilized during a portion of the exploration. Drill holes were advanced using 8.25-inch diameter hollow-stem auger, 4-inch diameter rotary-wash drilling methods, or 3-inch diameter sonic coring methods.

Samples of soils were collected from selected depth increments in the drill holes using California modified split-spoon and/or Standard Penetration Test (SPT) samplers. Samplers were driven by a 140-pound hammer situated on the drill rig, in accordance with standard test method ASTM D1586-11 Bulk samples were also obtained at selected depth intervals. Sample types and depths are presented on Plates A-1.1 through A-1.27. All samples were returned to Bajada's office for assignment of laboratory testing. The results of the testing procedures are attached within Appendix B.

One drill hole, DH-13, was completed as a groundwater monitoring well. The well was completed using 2-inch-diameter slotted and solid pipeline, protected by a flush-mount well protector. Construction details of the monitoring well are shown on Plate A-3.1.

The exploration log describes the earth materials encountered. The logs also show the location, exploration number, date of exploration, and the names of the logger and equipment used. BAJADA geologists logged the explorations using ASTM 2488 for visual soil classification. The boundaries between soil types shown on the logs are approximate because the transition between different soil layers may be gradual and may change with time. The drill holes were backfilled with cement grout. Soils generated by drilling operations were spread across the project site.

The drill hole logs are presented as Plates A-1.1 through A-1.27. A legend to the drill hole logs is presented as Plate A-2.1. The details of monitoring well DH-13 are presented as Plate 3.1.

LOG OF EXPLORATION: DH-1

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	175'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 14+20	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	16.5 feet
START DATE:	10/04/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/04/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	175					SM	: OLDER ALLUVIUM (Qoal) Silty SAND, brown to dark brown, moist, with abundant organic material and subangular to subrounded fine to medium grained gravels.							
				1	(31)	CH	: CLAY, dark brown, dry, slightly plastic, very stiff, with trace roots and organic material.		115.2	12.7				P.P.= 4.5, 4.5, 4.5
5	170			2	(25)		: At 5 feet: abundant white caliche, and light brownish red mottling.		110.2	17.1		47	31	P.P.= 4.5, 4.5, 4.5 At 5':PI, Soil Chem
				3	(24)				104.6	20.0				P.P.= 4.5, 4.5, 4.5
				4	(26)									P.P.= 4.5, 4.5, 4.5
10	165													
				5	(28)									P.P.= 4.5, 4.5, 4.5
15	160			6	(32)									P.P.= 4.5, 4.5, 4.5
							: Bottom of Drill Hole at a Depth of 16.5 feet							

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.1

LOG OF EXPLORATION: DH-2

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	205'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station 26+25	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	36.5 feet
START DATE:	10/04/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/04/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	205			B1		SM	: OLDER ALLUVIUM (Qoal) Silty SAND, brown to dark brown, moist, with fine to medium grained subangular to subrounded gravels, and trace charcoal.				37			GS, Curve
5	200			1	(36)		: At 5 feet: dense with abundant fine pores.		112.3	7.0	49			GS
10	195			2	(41)	CL	: CASITAS FORMATION (Qca) CLAY, dark brown to reddish brown mottled dark grey to black, moist, plastic, very stiff, with trace fine to medium grained rounded gravels, and abundant pores and carbon.		113.7	14.9				P.P.= 4.5, 4.5, 4.5
15	190			3	(19)		: At 15 feet: dark brown to greyish brown, stiff.		107.3	19.8		41	26	P.P.=4.5, 4.0, 4.5 PI
20	185			4	(40)		: At 20 feet: very stiff, increase in dark black mottling, increase in carbon content.		116.4	15.0	78			P.P.=4.0, 4.5, 4.5 GS

BAJADA Geosciences, Inc.

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PLATE NO.: A-1.2

LOG OF EXPLORATION: DH-2

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	205'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station 26+25	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	36.5 feet
START DATE:	10/04/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/04/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
25	180			5	(54)	CL	: Sandy CLAY, dark brown to light brown, dry, slightly plastic, very stiff to hard, with abundant caliche, pores, and tannish white to grey mottling.		121.6	10.6				
30	175			6	(27)	SW/ SP	: SAND, brown to orangish brown, dry, medium dense, with trace fines.		109.6	6.0	10			GS, DS
35	170			7	(71)		: At 35 feet: very dense		119.9	5.5	18			GS
							: Bottom of Drill Hole at a Depth of 36.5 feet							

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.2

LOG OF EXPLORATION: DH-3

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	222'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Rotary Wash	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 28+50	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	94.5 feet
START DATE:	10/05/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/05/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	220					SM	: OLDER ALLUVIUM (Qoal) Silty SAND, brown to dark brown, moist, with fine to medium grained subangular to subrounded gravels, minor fines, and minor charcoal.							
5	215			1	(61)		: At 5 feet: dense, with trace black and greenish brown to tan mottling, and trace organic material.		116.7	11.2				
10	210			2	(53)		: At 10 feet: trace fine pores.		118.4	12.8				
15	205			3	(20)		: At 15 feet: medium dense, with trace carbon		114.3	9.5	36			GS
20	200			4	50:6"	GP	: CASITAS FORMATION (Qca) Sandy GRAVEL, light brown to tannish brown, moist, very dense, with abundant fine to medium grained subrounded to rounded gravels, subrounded cobbles and boulders, trace organics, black mottling, and carbon.			12.6	14			GS
25	195			5	(54)	CL	: CLAY, light to dark tannish brown, dry, hard, non-plastic, with trace coarse grained sands.		115.3	8.9				
30	190			6	(32)	CL/ ML	: Silty CLAY / Clayey SILT, dark brown to brown, moist, very stiff to hard, slightly plastic, with abundant fine to medium grained subrounded to subangular gravels, and trace tan to black mottling and caliche.		121.7	8.9				

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.3

LOG OF EXPLORATION: DH-3

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	222'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Rotary Wash	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 28+50	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	94.5 feet
START DATE:	10/05/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/05/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
35	185			7	(50:5")		: At 40 feet: hard, with trace coarse sand grains.		118.9	11.9				
40	180			8	(50:6")				118.8	9.0	62	24	5	PI, GS
45	175			9	(50:6")				120.2	10.2				
50	170			10	(50:5")	SP	: SAND, light brown to orangish brown, dry, very dense, with trace medium to coarse grained well rounded gravels.		126.2	6.4	18			GS
55	165			11	50:5"		: At 55 feet: abundant medium to coarse grained well rounded gravels.			15.0				
60	160			12	50:6"		: At 60 feet: trace fine to medium grained gravels.			14.8	28			GS
65	155			13	(50:5")				117.7	8.0				DS



BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.3

LOG OF EXPLORATION: DH-3

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	222'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Rotary Wash	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 28+50	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	94.5 feet
START DATE:	10/05/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/05/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
70														
	150													
				14	(50:4")				122.2	8.4	22			GS
				15	83					10.9	26			GS
75														
				16	(50:4")	SC/ SM	: Clayey to Silty SAND, dark brown to brown, dry, very dense, slighlty plastic, fine grained.		113.6	15.3	38			GS
	145													
				17	(50:5")				105.9	24.2	41			GS
80														
				18	50:3"					14.2			NP	PI
	140													
85														
				19	50:6"					14.8				
	135													
90														
	130													
				20	62	CH	: CLAY, light brown to brown, dry, hard, plastic			19.2				P.P.= 4.5, 4.0, 4.0
95							: Bottom of Drill Hole at a Depth of 94.5 feet							

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.3

LOG OF EXPLORATION: DH-4

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	179'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 50+25	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	36.5 feet
START DATE:	10/04/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/04/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0						SM	: ALLUVIUM (Qal) Silty SAND, light brown to dark brown, dry to moist, with abundant organic material, and trace fine to medium grained subangular to subrounded gravels.							
	175													
5				1	(7)		: At 5 feet: loose.		100.1	8.7				
	170													
10				2	(12)				109.2	4.9				
	165													
15				3	(14)		: At 15 feet: loose to medium dense.		117.1	7.5	33			GS
	160													
20				4	(13)		: At 20 feet: trace caliche and white mottling.		107.1	8.4	40			GS, DS
	155													
25				5	(18)				109.3	11.6				



BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.4

LOG OF EXPLORATION: DH-4

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	179'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 50+25	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	36.5 feet
START DATE:	10/04/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/04/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
				5	(18)		: At 25 feet: medium dense, lacking organics.		109.3	11.6				
	150													
30				6	(21)				116.9	10.1				
	145													
35				7	(21)	CL	: CLAY, dark greenish brown, moist, very stiff, slightly plastic, with trace white mottling, and caliche.		110.2	15.8	69	30	16	PI, GS, UC
							: Bottom of Drill Hole at a Depth of 36.5 Feet							

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.4

LOG OF EXPLORATION: DH-4A

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	179'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 50+25	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	51.5 feet
START DATE:	7/19/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/19/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0						SM	: ALLUVIUM (Qal) Silty SAND, light brown to dark brown, dry to moist, with abundant organic material, and trace fine to medium grained subangular to subrounded gravels.							
5	175						: At 5 feet: loose.							
10	170													
15	165						: At 15 feet: loose to medium dense.							
20	160						: At 20 feet: trace caliche and white mottling.							
25	155						: At 25 feet: medium dense, lacking organics.							
30	150													

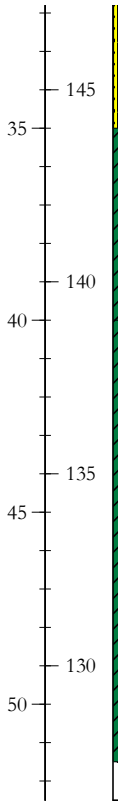
BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.5

LOG OF EXPLORATION: DH-4A

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	179'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 50+25	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	51.5 feet
START DATE:	7/19/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/19/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
35	145					CL	: CLAY, dark greenish brown, moist, very stiff, slightly plastic, with trace white mottling, and caliche.							
40	140			S1	16	CL	: Sandy CLAY, dark brown, moist, very stiff, with fine to coarse sand.			15.5	73	31	15	PI, GS
45	135			S2	18					14.2	64	29	14	PI, GS
50	130			S3	17					13.4	32	32	17	PI, GS
							: Bottom of Drill Hole at a Depth of 51.5 feet							

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.5

LOG OF EXPLORATION: DH-5

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	199'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 54+40	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	16.5 feet
START DATE:	10/06/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/06/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	195					GP/ GW	: COLLUVIUM (Qcol) Sandy GRAVEL, light brown to tan, dry, with abundant medium grained subangular to angular gravels.							
5				1	(34)	CL	: CASITAS FORMATION (Qca) Silty SAND, light brown to greenish brown, dry, medium dense, with trace fine pores, white and tan mottling, and fine grained subangular gravels.		106.0	11.1		42	23	PI
	190			2	(72)		: At 7.5 feet: very dense, with trace black and tannish brown mottling.		109.0	6.1				Soil Chem
10				3	(50:5")									
	185													
15				4	(81)									
							: Bottom of Drill Hole at a Depth of 16.5 feet.							

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.6

LOG OF EXPLORATION: DH-6

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	183'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-A (Brown)	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	51.5 feet
START DATE:	10/06/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/06/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	180			B1		CL	: ALLUVIUM (Qal) Sandy CLAY, light brownish tan, dry, slightly plastic, with abundant fine to coarse grained subrounded to rounded gravels, with trace organics.							Curve, Soil Chem
5	175			1	(9)		At 5 feet: soft, plastic, trace tan mottling, and fine to medium grained subangular gravels.		96.8	7.3				DS
10	170			2	(23)		At 10 feet: slightly plastic, stiff to very stiff, trace caliche.		93.1	20.4		29	10	PI
15	165			3	(13)		At 15 feet: stiff, increase in mottling, trace fine to coarse grained subangular gravels.		103.7	13.8				
20	160			4	(16)	SM	: Silty SAND, brown to dark brown, moist, medium dense, with trace fines, and fine to coarse grained subrounded to rounded gravels.		105.3	10.2	36			GS
25	155			5	(12)	CL	: Silty to Sandy CLAY, dark brown to tannish brown mottled greenish tan, dry, firm to stiff, slightly plastic, with abundant caliche and trace fine to coarse grained subrounded to rounded gravels.		114.3	11.7				
30				6	10					18.2				

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.7

LOG OF EXPLORATION: DH-6

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	183'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-A (Brown)	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	51.5 feet
START DATE:	10/06/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/06/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
35	150			7	8	SP / SW	: SAND, light brown to brown, dry, loose, with trace fine to medium grained subangular gravels, greenish tan mottling, caliche, and fines.			12.8				
40	145			8	11	CL	: CLAY, dark brown, moist, firm, non-plastic.			16.5				
45	140			9	14	SC/ SM	: Clayey to Silty SAND, dark brown to brown, dry, loose to medium dense, with abundant fine to medium grained subangular to subrounded gravels, and trace thin interbedded lenses of clay.			8.2				
50	135			10	14					7.3				
							: Bottom of Drill Hole at a Depth of 51.5 feet							

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The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.7

LOG OF EXPLORATION: DH-7

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	183'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-A (Brown)	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	23.5 feet
START DATE:	10/06/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/06/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	180					CL/ ML	: ALLUVIUM (Qal) Silty CLAY / Clayey SILT, light brown to tan, slightly plastic, dry, with trace fine grained angular gravels, coarse sands, and organics.							
5	175			1	(10)		: At 5 feet: dark brown to green, soft, with trace light green mottling and caliche.		90.7	9.5		29	8	PI
10	170			2	(18)	SM	: Silty SAND, dark greenish brown, dry, medium dense, with abundant white and tan caliche, and trace fine to medium grained subangular to angular gravels.		105.9	13.3				
15	165			3	(11)		: At 15 feet: loose.		102.7	15.1				
20				4	(26)		: At 20 feet: medium to coarse grained gravel.							
	160			5	56		: Clayey GRAVEL, brown, dry, very dense, slightly plastic, with fine grained sands, and fine to coarse grained subrounded gravels.							
							: Bottom of Drill Hole at a Depth of 23.5 feet							

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PLATE NO.: A-1.8

LOG OF EXPLORATION: DH-8

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	221'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 170+65	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	11.5 feet
START DATE:	10/06/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/06/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	220					SM	: ALLUVIUM (Qal) Silty SAND, light brown to brownish tan, dry, with abundant medium to fine grained subangular to angular gravels.							
5	215			1	(28)	SP /SW	: SAND, light brown to tanish orange brown, dry, medium dense, with abundant fine to coarse grained subangular to angular gravels, organics, and trace black and brown mottling and white caliche.		104.7	10.2	42			At 5': GS
				2	(7)	CL/ ML	: Silty CLAY/ Clayey SILT, brown to dark brown, dry, slighlty plastic to non-plastic, very loose to loose, with trace white caliche and tannish brown mottling.		92.9	9.7				
10	210			3	(10)		: At 10 feet: dry to moist, with trace reddish brown mottling.							
							: Bottom of Drill Hole at a Depth of 11.5 feet.							

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PLATE NO.: A-1.9

LOG OF EXPLORATION: DH-9

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	278'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 310+00 (vault)	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	21.5 feet
START DATE:	10/07/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/Cuttings
END DATE	10/07/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	275			B1		SM	: ALLUVIUM (Qal) Silty SAND, dark brown, moist, with abundant fine to medium grained subangular to angular gravels, and organic material.							
5				1	(9)	CL/ ML	: Silty CLAY/ Clayey SILT, dark brown, dry to moist, slightly plastic, soft to firm, with abundant caliche, tan mottling, fine to medium grained subangular to angular gravles, and trace organic material.		103.3	11.8				At 5': soil chem
10	270			2	(21)		: At 10 feet: firm to stiff, increase in caliche and mottling, lacking trace organics.		89.8	14.8		30	8	PI, DS
15	265			3	43	SM/ SC	: CASITAS FORMATION (Qca) Sandy SILT/ Silty SAND, light brown to brownish green, dry, stiff to very stiff, with abundant fine to coarse grained subangular to angular gravels.				25			GS
20	260			4	(50:4")		: Bottom of Drill Hole at a Depth of 20.5 feet.							Boulder at about 18 feet Coarse sandstone gravel (or fine cobble) jammed in sampling shoe at 20 feet.

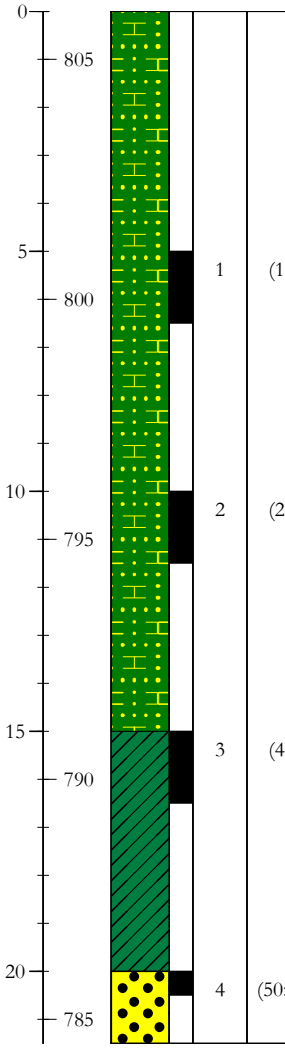
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PLATE NO.: A-1.10

LOG OF EXPLORATION: DH-10

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	806'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-B	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	20.5 feet
START DATE:	10/07/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/07/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



Depth	Elevation	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	805				CL/ ML	: ALLUVIUM (Qal) / COLLUVIUM (Qc) Silty CLAY/ Clayey SILT, dark brown to brown mottled light green, dry to moist, with trace organics.							
5	800		1	(15)		: At 5 feet: stiff, lacking mottling.		108.2	6.3		26	9	PI, DS
10	795		2	(24)		: At 10 feet: very stiff, lacking trace organics.		111.7	7.9				
15	790		3	(41)	CL	: CLAY, dark brown to brown mottled dark greenish grey, dry, non-plastic, very stiff to hard, with abundant pores.		115.0	12.1				Stiff drilling at 17 feet
20	785		4	(50:6")	RX	: SESPE FORMATION SANDSTONE, reddish brown to brown, dry, poorly indurated, weak, fine grained.							

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PLATE NO.: A-1.11

LOG OF EXPLORATION: DH-11

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	804'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-B	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	11.5 feet
START DATE:	10/07/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/07/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0				B1		CL/ ML	: ALLUVIUM (Qal) / COLLUVIUM (Qc) Silty CLAY/ Clayey SILT, dark brown to brown mottled ight green, dry to moist, slighlty plastic, with trace fine to medium grained subangular to angular gravels, organics.							Curve, Soil Chem
	800			1	(36)	SP/ SW	: SAND, light brown, dry, medium dense, with fine trace pores.		113.6	4.6	37			GS
5				2	(85)	SM/ SC	: Silty SAND/ Sandy SILT, light brown to tan, dry, very dense, with trace pores.		111.4	3.3				
	795													
10				3	(50:5")		: SESPE FORMATION SANDSTONE, reddish brown to brown, dry, poorly indurated, weak, fine grained.							
							: Bottom of Drill Hole at a Depth of 11.5 feet.							

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PLATE NO.: A-1.12

LOG OF EXPLORATION: DH-12

PROJECT:	VTA-VTA Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	801'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-B	**LOGGED BY:**	Bryan Puleri	**DEPTH OF HOLE:**	20.5 feet
START DATE:	10/07/2021	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/ Cuttings
END DATE	10/07/2021	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	800					CL/ ML	: ALLUVIUM (Qal) / COLLUVIUM (Qc) Silty CLAY/ Clayey SILT, dark brown to brown, dry to moist, slighlty plastic, with trace fine to medium grained subangular to angular gravels, and organics.							
5	795			1	(41)	CL/ ML	: At 5 feet: dense to very dense, trace coarse sands.		120.6	9.1				
				2	(35)		: At 7 feet: trace light green mottling.		118.6	9.8				
10	790			3	(32)		: At 10 feet: abundant pores.		118.1	9.6				
15	785			4	(50:5")	SM/ ML	: Silty SAND/ Sandy SILT, light brownish tan, dry, very dense, with abundant pores.		111.0	2.7				
20	780			5	(50:5")	RX	: SESPE FORMATION SANDSTONE, reddish brown to brown, dry, very dense.							
							: Bottom of Drill Hole at a Depth of 20.5 feet.							

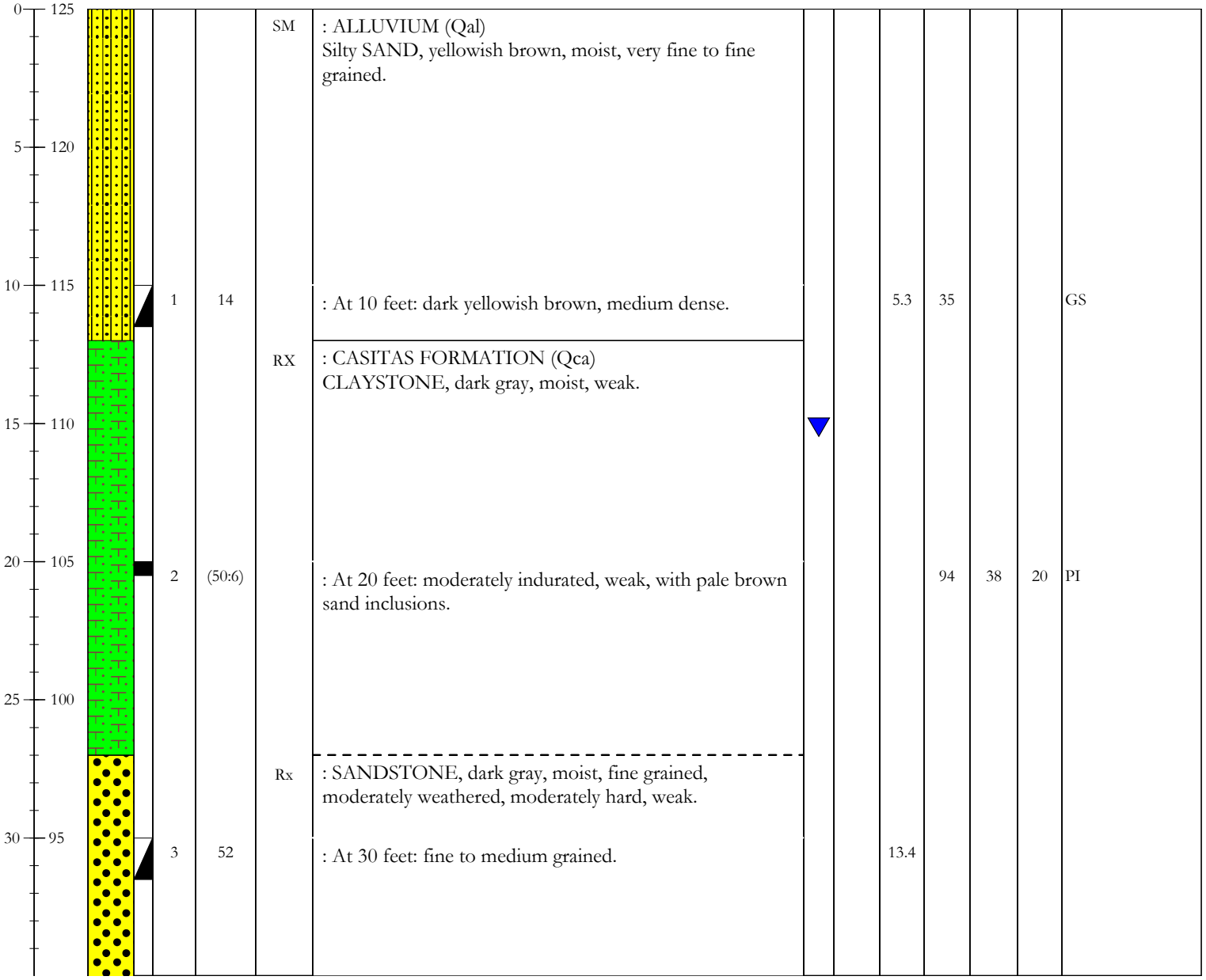
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PLATE NO.: A-1.13

LOG OF EXPLORATION: DH-13

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	125
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Mud Rotary	**DEPTH TO WATER:**	15.3 feet
LOCATION:	Station 34+60	**LOGGED BY:**	Gary Butler	**DEPTH OF HOLE:**	65.5 feet
START DATE:	1/18/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Monitoring Well
END DATE	1/18/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	125					SM	: ALLUVIUM (Qal) Silty SAND, yellowish brown, moist, very fine to fine grained.							
5	120													
10	115			1	14		: At 10 feet: dark yellowish brown, medium dense.			5.3	35			GS
						RX	: CASITAS FORMATION (Qca) CLAYSTONE, dark gray, moist, weak.							
15	110							▼						
20	105			2	(50:6)		: At 20 feet: moderately indurated, weak, with pale brown sand inclusions.				94	38	20	PI
25	100													
						Rx	: SANDSTONE, dark gray, moist, fine grained, moderately weathered, moderately hard, weak.							
30	95			3	52		: At 30 feet: fine to medium grained.			13.4				

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PLATE NO.: A-1.14

LOG OF EXPLORATION: DH-13

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	125
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Mud Rotary	**DEPTH TO WATER:**	15.3 feet
LOCATION:	Station 34+60	**LOGGED BY:**	Gary Butler	**DEPTH OF HOLE:**	65.5 feet
START DATE:	1/18/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Monitoring Well
END DATE	1/18/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
35	90			4	(50:4)		: At 35 feet: with sacttered thin sandstone beds.			12.0	19			Combined sample nos. 4 - 11
				5	50:6									
				6	(50:5)									
40	85			7	76									
				8	(50:4)									
				9	50:3									
				10	(50:5)									
45	80			11	50:6									
50	75			12	50:5		: At 50 feet: with interbedded claystone.			12.7	46	20	3	Combined sample nos. 12 14
55	70													
60	65			13	50:5									
65	60			14	50:4									
							: Bottom of Drill Hole at a Depth of 66 Feet.							



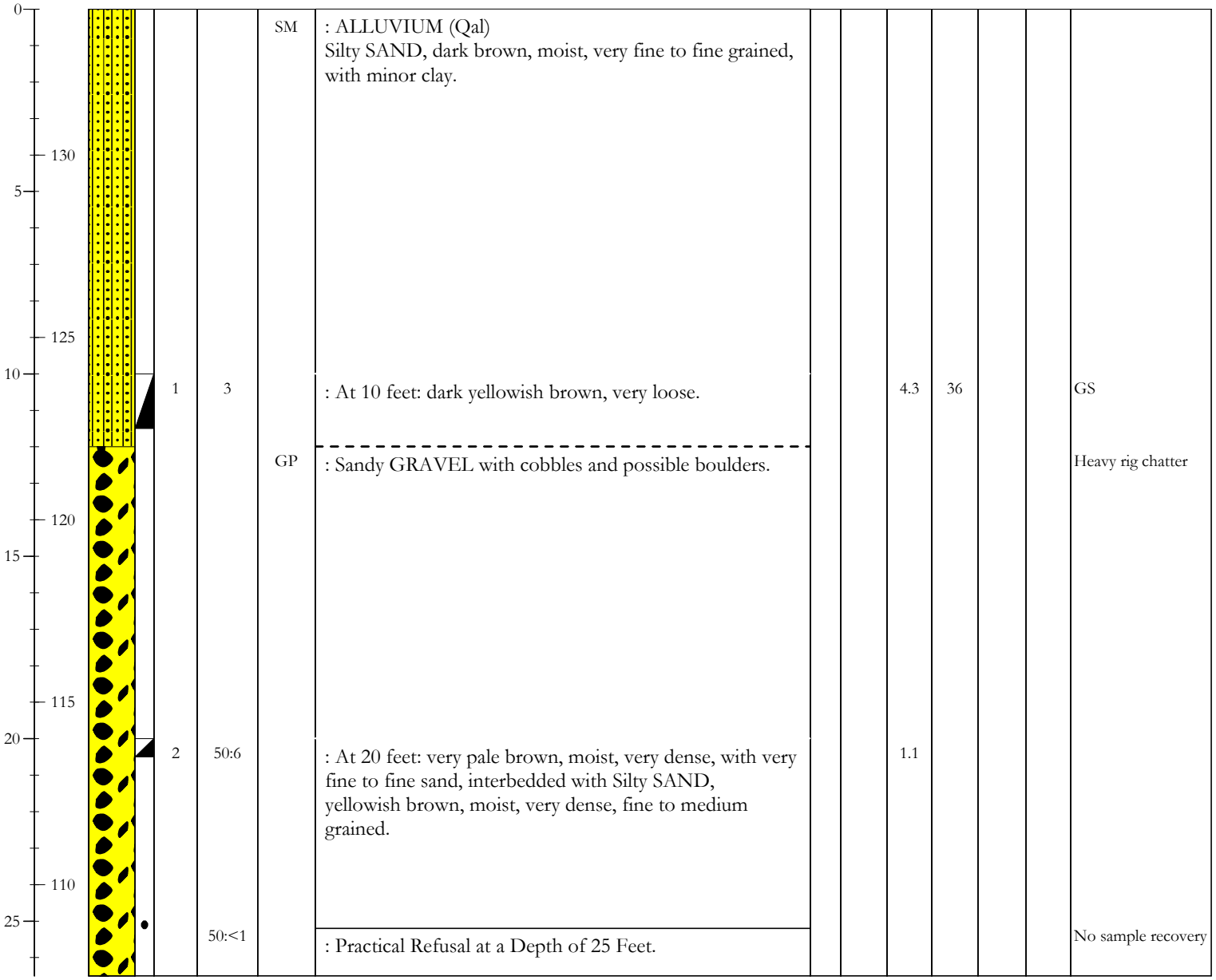
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PLATE NO.: A-1.14

LOG OF EXPLORATION: DH-14

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	134'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station 38+50	**LOGGED BY:**	Gary Butler	**DEPTH OF HOLE:**	25 feet
START DATE:	1/17/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	1/17/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0						SM	: ALLUVIUM (Qal) Silty SAND, dark brown, moist, very fine to fine grained, with minor clay.							
10				1	3		: At 10 feet: dark yellowish brown, very loose.			4.3	36			GS
						GP	: Sandy GRAVEL with cobbles and possible boulders.							Heavy rig chatter
20				2	50:6		: At 20 feet: very pale brown, moist, very dense, with very fine to fine sand, interbedded with Silty SAND, yellowish brown, moist, very dense, fine to medium grained.			1.1				
25					50:<1		: Practical Refusal at a Depth of 25 Feet.							No sample recovery

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PLATE NO.: A-1.15

LOG OF EXPLORATION: DH-14A

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEX Subsurface Expl.	**ELEVATION:**	134'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	3" Sonic Core	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station 38+50	**LOGGED BY:**	Gary Butler	**DEPTH OF HOLE:**	40.5 feet
START DATE:	1/17/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	1/17/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	130					SM	: ALLUVIUM (Qal) Silty SAND, dark brown, moist, very fine to fine grained, with minor clay.							
5	125													
10							: At 10 feet: dark yellowish brown, very loose.							
	120					GP	: Sandy GRAVEL with cobbles and possible boulders.							
15	115													
20							: From 20 to 22 feet: with interbedded Silty SAND, yellowish brown, moist, very dense, fine to medium grained.							
25	110													
	105			S1	95	RX	: CASITAS FORMATION (Qca) SANDSTONE, moderate brown, moist, weak, poorly indurated, fine to medium grained, with trace clay.			11.5	47			GS
30														

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PLATE NO.: A-1.16

LOG OF EXPLORATION: DH-14A

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEX Subsurface Expl.	**ELEVATION:**	134'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	3" Sonic Core	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station 38+50	**LOGGED BY:**	Gary Butler	**DEPTH OF HOLE:**	40.5 feet
START DATE:	1/17/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	1/17/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
35	100		S2		50:5		: At 35 feet: mottled green and reddish brown.			12.6	45			GS
40	95						: Bottom of Drill Hole at a Depth of 40.5 Feet							

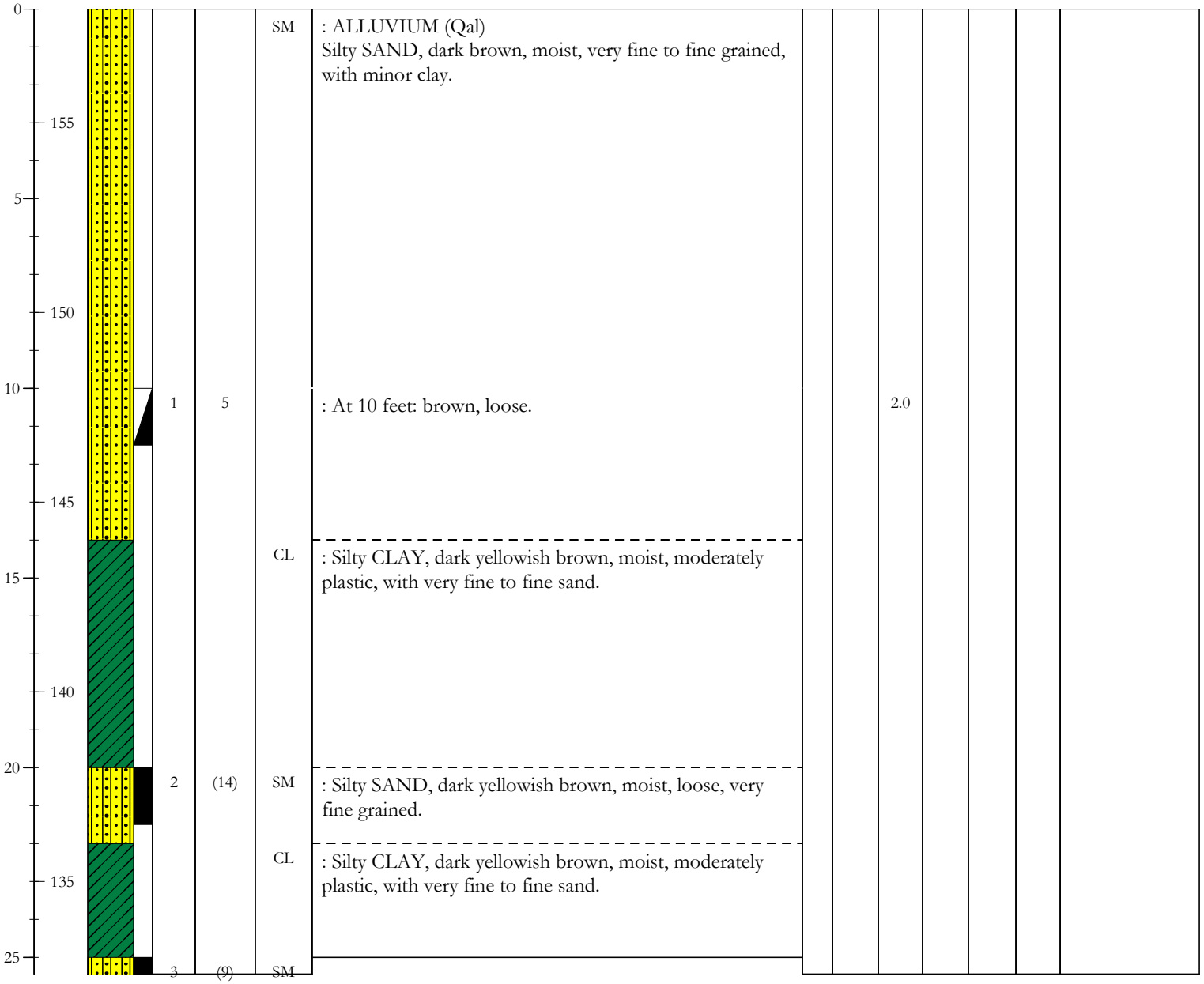
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PLATE NO.: A-1.16

LOG OF EXPLORATION: DH-15

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	158'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station 44+55	**LOGGED BY:**	Gary Butler	**DEPTH OF HOLE:**	37 feet
START DATE:	1/17/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	1/17/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



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PLATE NO.: A-1.17

LOG OF EXPLORATION: DH-15

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	Britton Exploration Inc.	**ELEVATION:**	158'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station 44+55	**LOGGED BY:**	Gary Butler	**DEPTH OF HOLE:**	37 feet
START DATE:	1/17/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	1/17/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
				3	(9)	SM	: CASITAS FORMATION (Qca) Silty SAND, dark yellowish brown, moist, loose, very fine grained.							
				4	(14)					100.8	13.4	55		GS
	130			5	(16)									
30				6	(13)					105.2	13.4			DS
				7	(22)		: At 31 feet: dark brown, medium dense			108.1	15.1	48		GS
	125			8	(26)									
				9	(27)					102.9	12.3			DS
35				10	(32)		: At 35.5 feet: vertical fracture separating brownish yellow and dark brown silty sands.							
	120						: Bottom of Drill Hole at a Depth of 37 feet.							

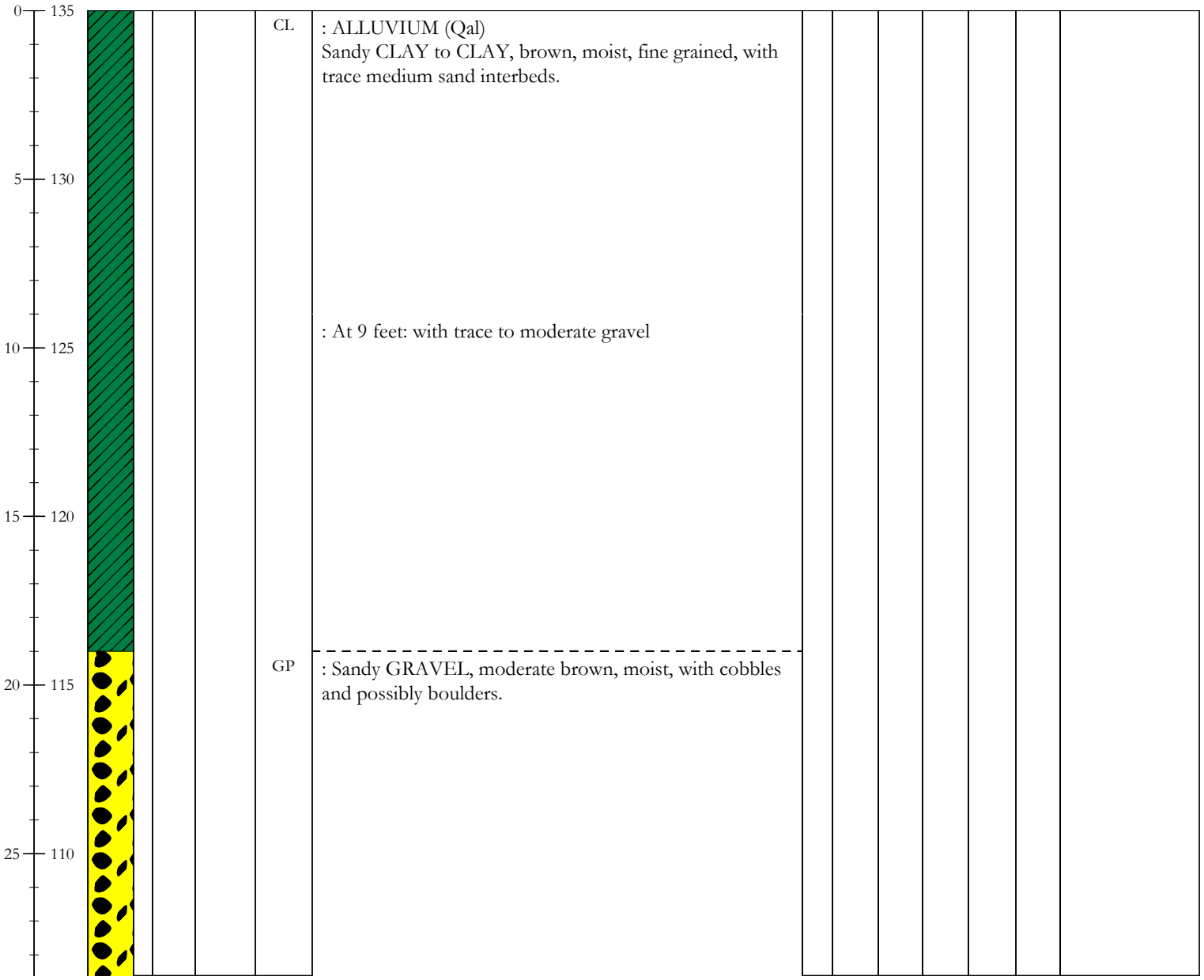
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PLATE NO.: A-1.17

LOG OF EXPLORATION: DH-16

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	138'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Mud Rotary	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 39+00	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	41.5 feet
START DATE:	7/18/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/18/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



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PLATE NO.: A-1.18

LOG OF EXPLORATION: DH-16

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	138'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Mud Rotary	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 39+00	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	41.5 feet
START DATE:	7/18/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/18/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
30	105					CH/ CL	: CASITAS FORMATION (Qca) Silty CLAY to CLAY, grayish brown, moist, hard (soil term), poorly indurated, weak (rock term), slightly weathered, plastic.							
35	100			S1	55					18.7				Soil Chem
40	95			S2	59					21.8	91	38	18	PI, GS
							: Bottom of Drill Hole at a Depth of 41.5 feet							

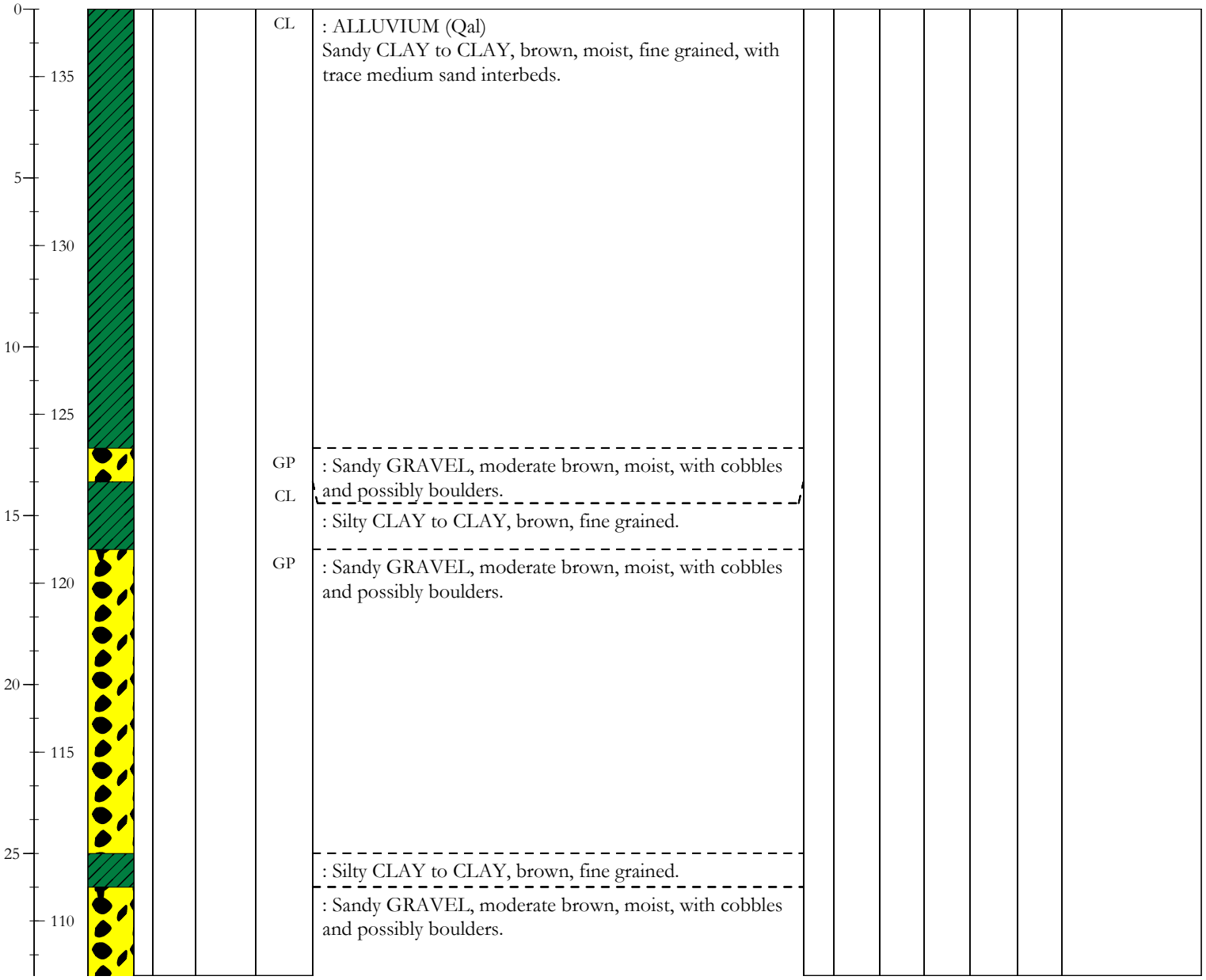
BAJADA Geosciences, Inc.

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PLATE NO.: A-1.18

LOG OF EXPLORATION: DH-17

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	137'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Mud Rotary	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 39+50	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	34.5 feet
START DATE:	7/18/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/18/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



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PLATE NO.: A-1.19

LOG OF EXPLORATION: DH-17

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	137'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Mud Rotary	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 39+50	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	34.5 feet
START DATE:	7/18/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/18/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
30	105					CH	: CASITAS FORMATION (Qca) Silty CLAY to CLAY, grayish brown, moist, hard (soil term), poorly indurated, weak (rock term), slightly weathered, plastic.							
35							: Bottom of Drill Hole at a Depth of 34.5 feet							

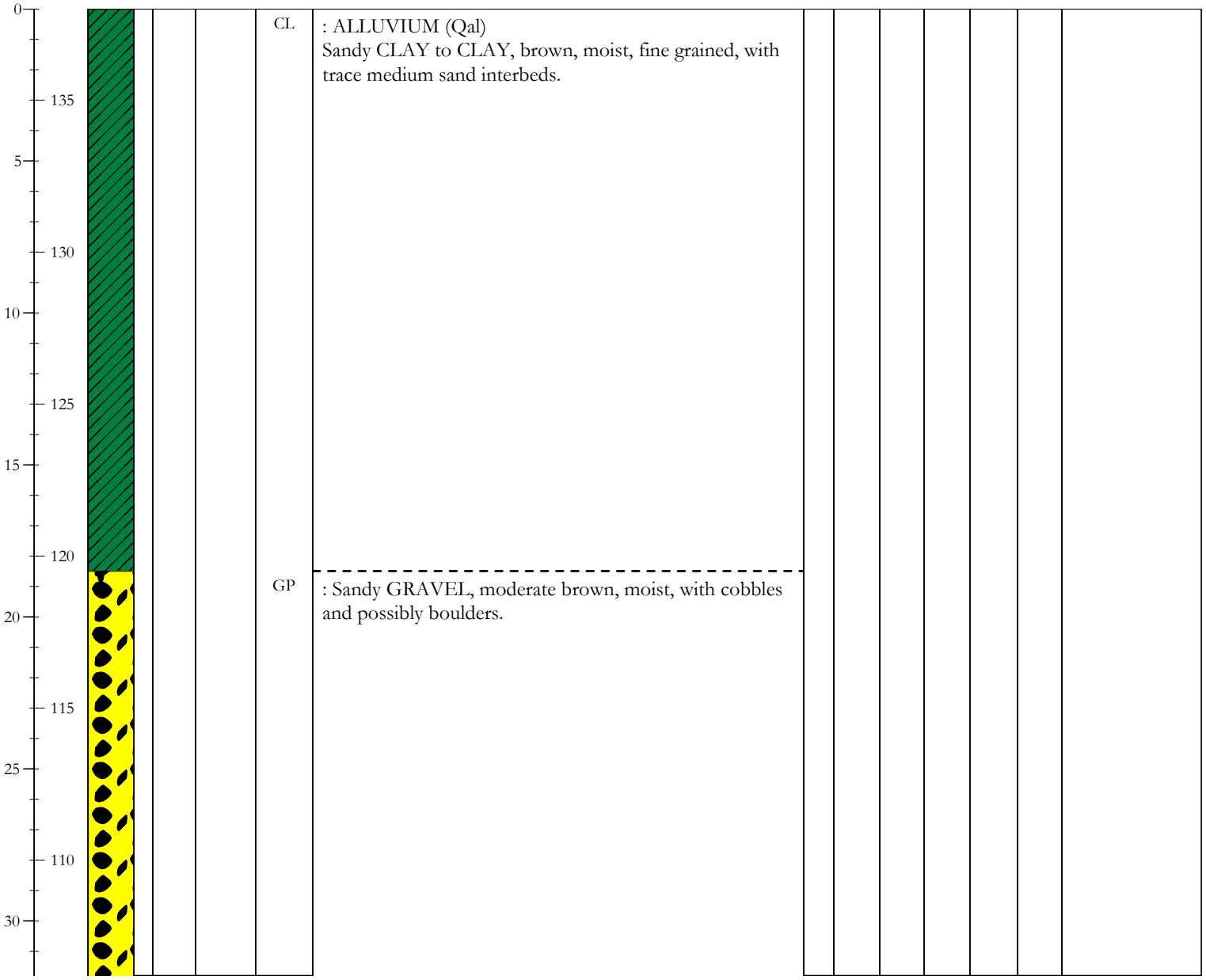
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PLATE NO.: A-1.19

LOG OF EXPLORATION: DH-18

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	138'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Mud Rotary	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 40+00	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	61.5 feet
START DATE:	7/19/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/20/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



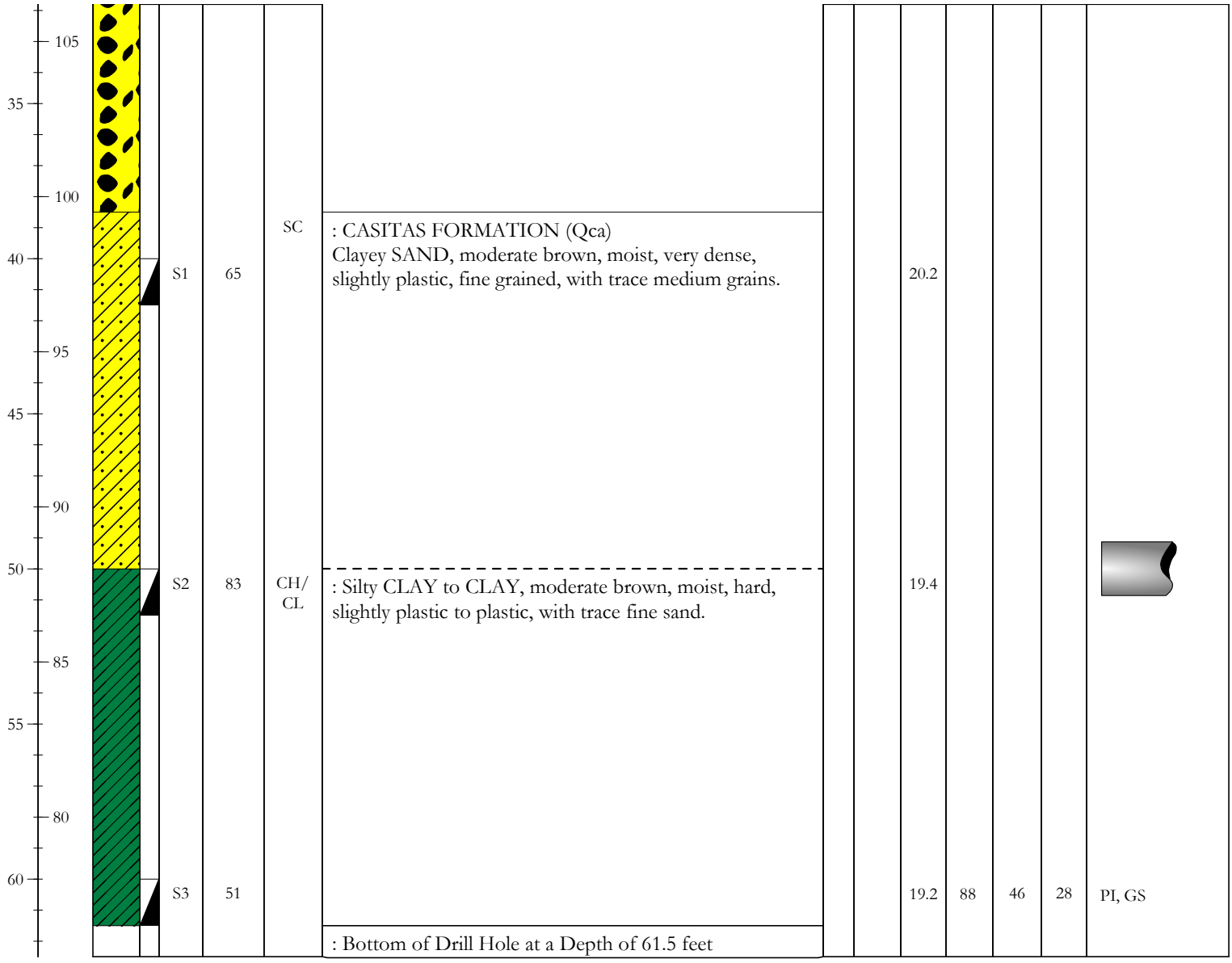
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PLATE NO.: A-1.20

LOG OF EXPLORATION: DH-18

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	138'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Mud Rotary	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 40+00	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	61.5 feet
START DATE:	7/19/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/20/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



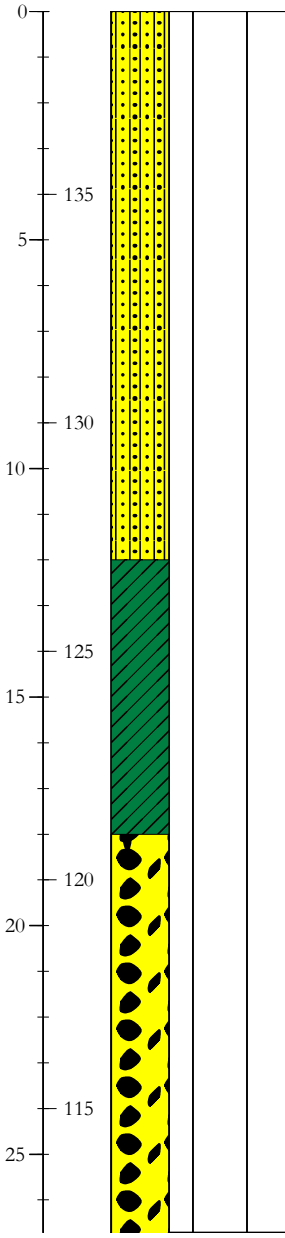
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PLATE NO.: A-1.20

LOG OF EXPLORATION: DH-19

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	139'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 40+50	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	45 feet
START DATE:	7/20/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/20/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0						SM	: ALLUVIUM (Qal) Silty SAND, moderate brown, dry to moist, fine to medium grained with trace to moderate fine to medium subrounded gravel.							
						CL	: Sandy CLAY, moderate brown, moist, plastic, fine grained.							
						GP	: Sandy GRAVEL, moderate brown, moist, with cobbles and possibly boulders.							

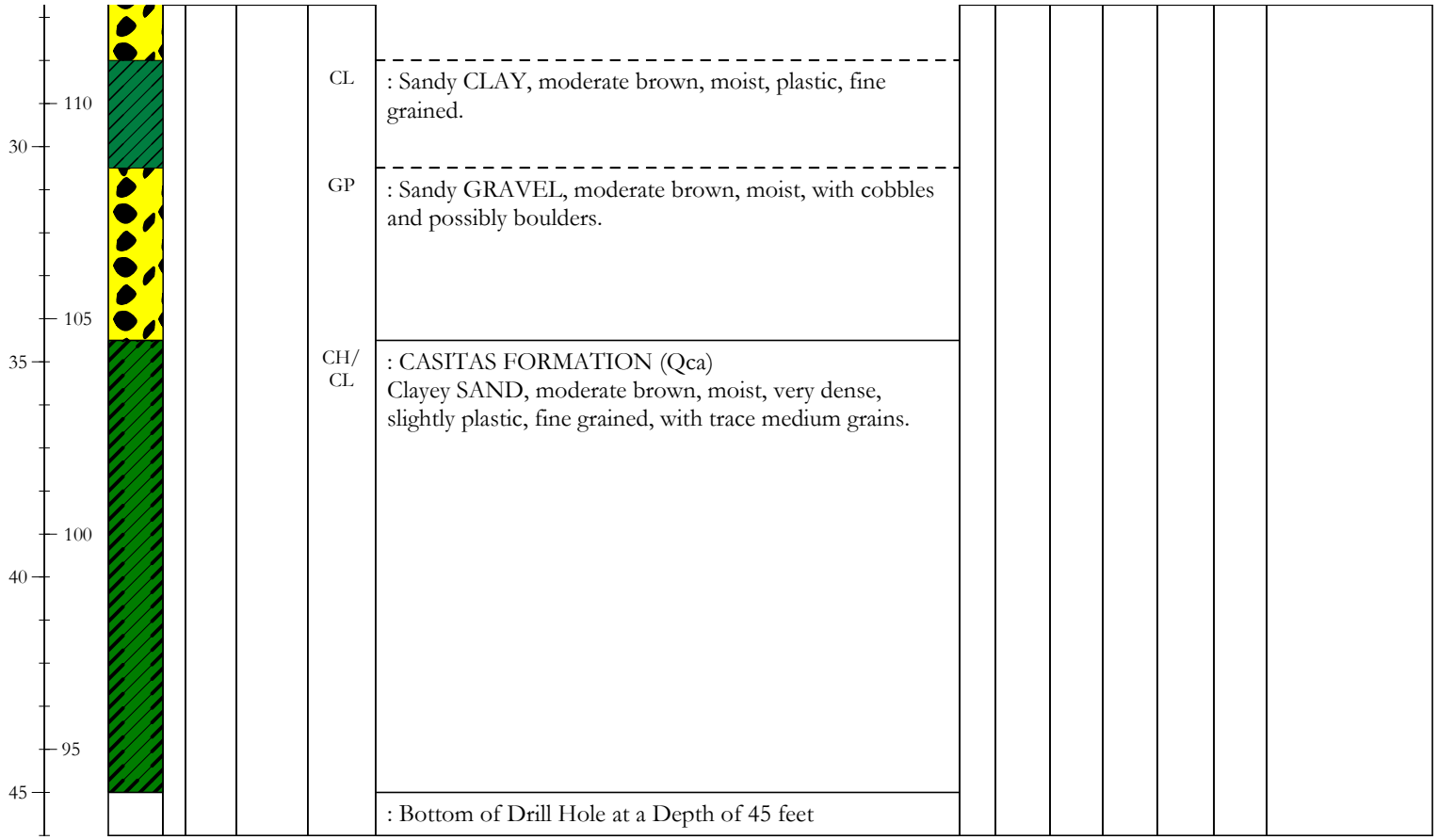
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PLATE NO.: A-1.21

LOG OF EXPLORATION: DH-19

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	139'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 40+50	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	45 feet
START DATE:	7/20/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/20/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



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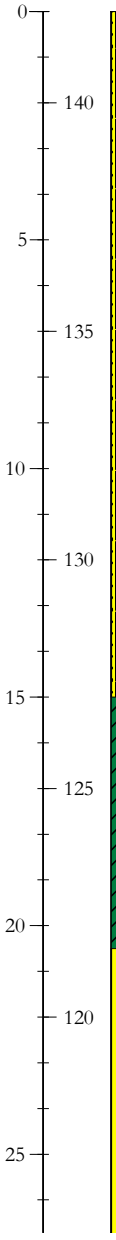
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PLATE NO.: A-1.21

LOG OF EXPLORATION: DH-20

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	142'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	40 Feet
LOCATION:	Station: 41+00	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	51 feet
START DATE:	7/20/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/20/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	140					SM	: ALLUVIUM (Qal) Silty SAND, moderate brown, moist, fine to medium grained.							
5	135													
10	130													
15	125						: At 14 feet: approximately one-foot-thick layer of gravel.							
						CL	: Silty to Sandy CLAY, moderate brown, moist, slightly plastic, fine to medium grained.							
20	120					GP	: Sandy GRAVEL, moderate brown, moist, with cobbles and possibly boulders.							
25														



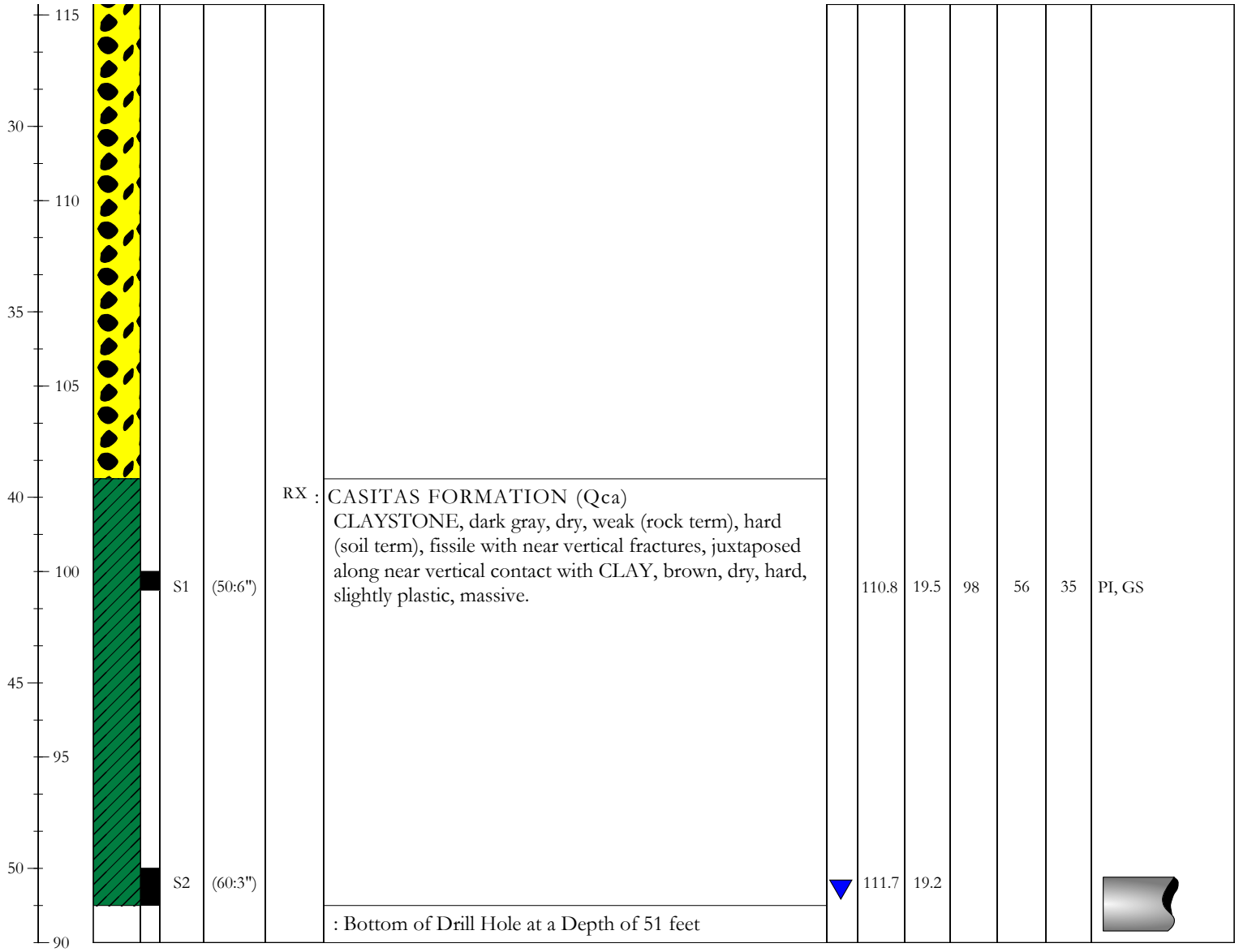
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PLATE NO.: A-1.22

LOG OF EXPLORATION: DH-20

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	142'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	40 Feet
LOCATION:	Station: 41+00	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	51 feet
START DATE:	7/20/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/20/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



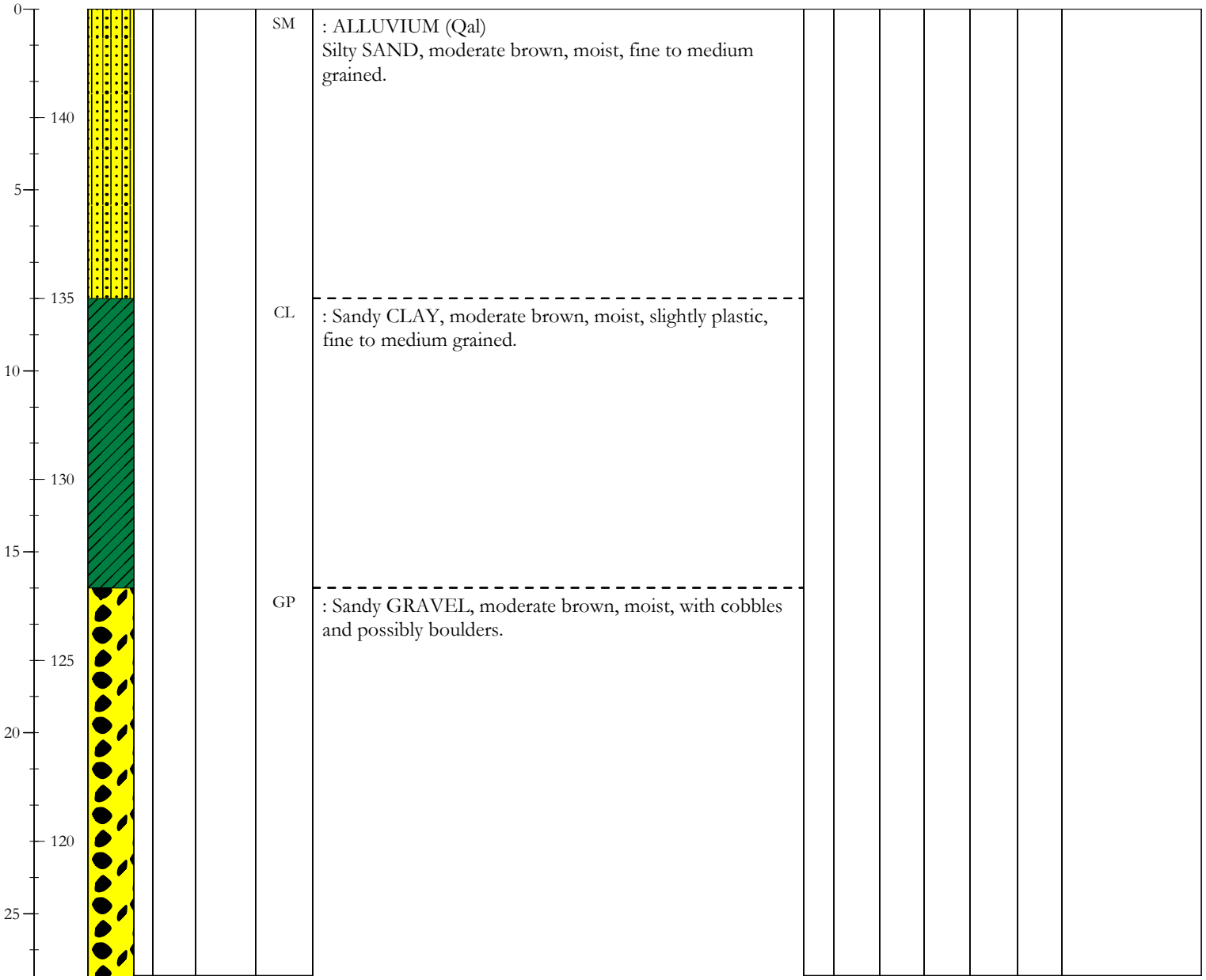
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PLATE NO.: A-1.22

LOG OF EXPLORATION: DH-21

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	143'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 41+50	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	44 feet
START DATE:	7/21/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/21/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



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PLATE NO.: A-1.23

LOG OF EXPLORATION: DH-21

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	143'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	Station: 41+50	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	44 feet
START DATE:	7/21/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/21/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
30	115					CH/ CL	: CASITAS FORMATION (Qca) Clayey SAND, moderate brown, moist, very dense, slightly plastic, fine grained, with trace medium grains.							
35	110													
40	105													
45	100						: Bottom of Drill Hole at a Depth of 44 feet							

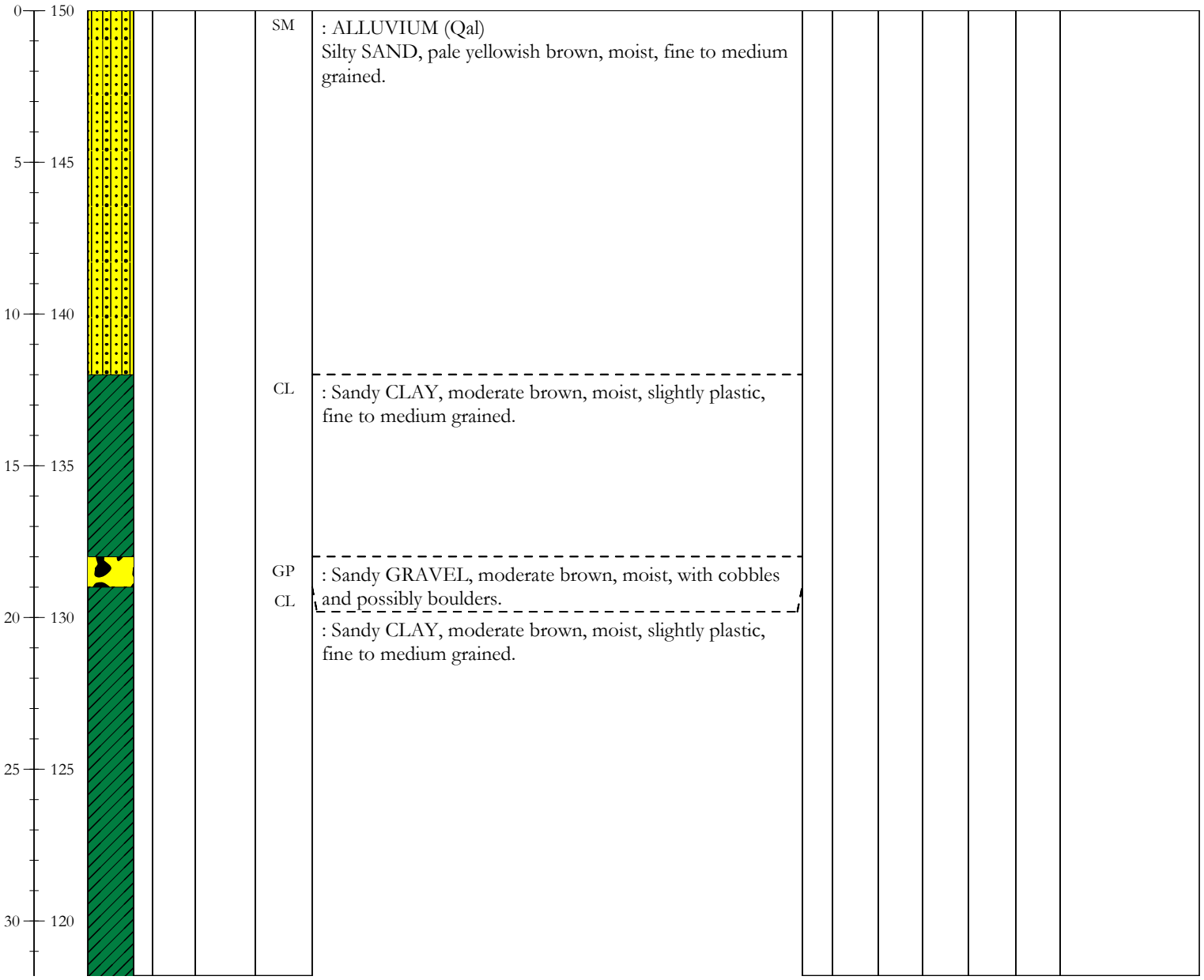
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PLATE NO.: A-1.23

LOG OF EXPLORATION: DH-22

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	150'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	~52 Feet
LOCATION:	Station: 42+90	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	55.5 feet
START DATE:	7/21/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/21/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	150					SM	: ALLUVIUM (Qal) Silty SAND, pale yellowish brown, moist, fine to medium grained.							
						CL	: Sandy CLAY, moderate brown, moist, slightly plastic, fine to medium grained.							
						GP	: Sandy GRAVEL, moderate brown, moist, with cobbles and possibly boulders.							
						CL	: Sandy CLAY, moderate brown, moist, slightly plastic, fine to medium grained.							

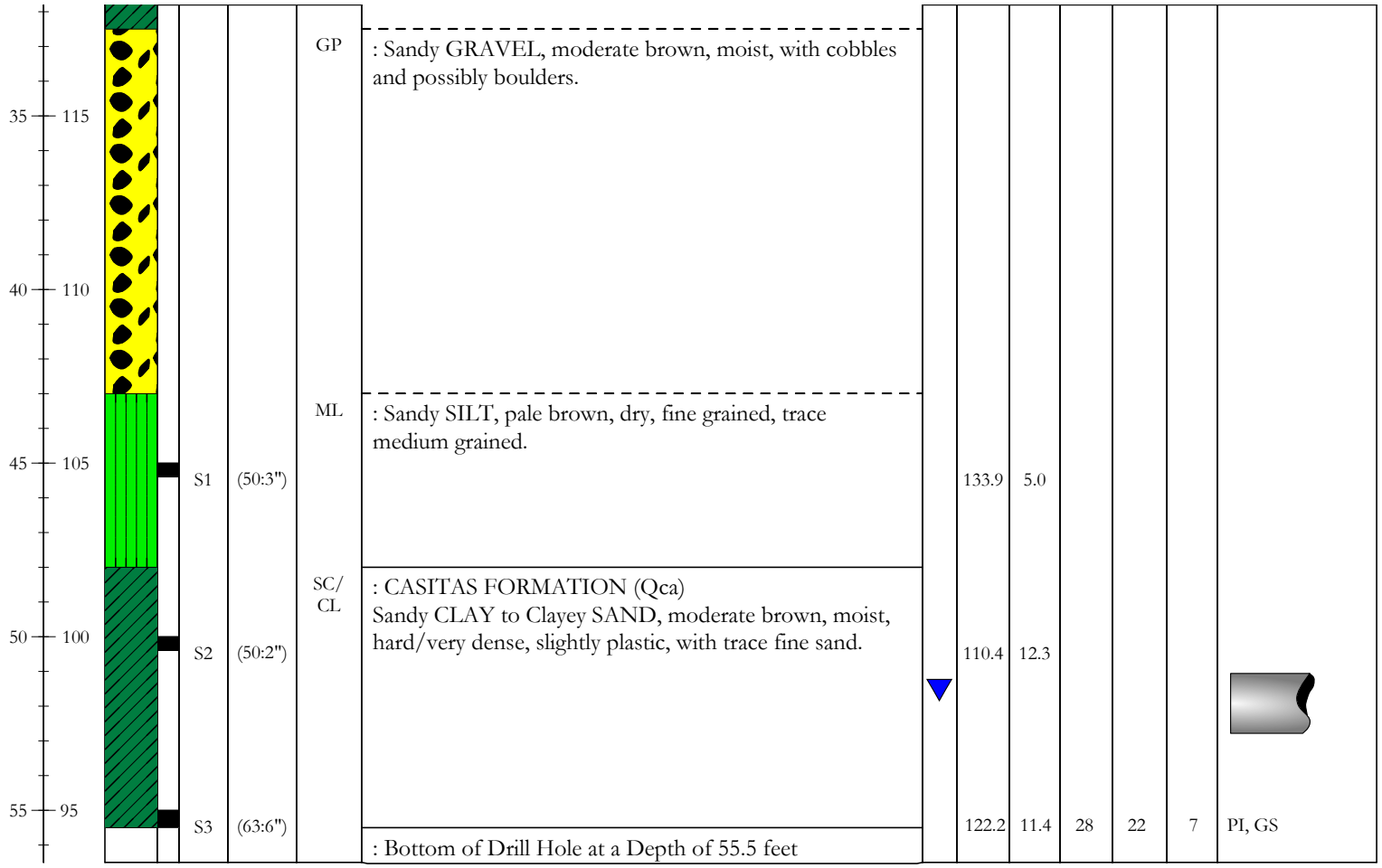
BAJADA Geosciences, Inc.

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PLATE NO.: A-1.24

LOG OF EXPLORATION: DH-22

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	150'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	4" SSA	**DEPTH TO WATER:**	~52 Feet
LOCATION:	Station: 42+90	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	55.5 feet
START DATE:	7/21/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/21/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



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PLATE NO.: A-1.24

LOG OF EXPLORATION: DH-23

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	152'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Rotary Wash	**DEPTH TO WATER:**	~52 Feet
LOCATION:	Station: 43+40	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	60.5 feet
START DATE:	7/21/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/21/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	150					SM	: ALLUVIUM (Qal) Silty SAND, pale yellowish brown, moist, fine to medium grained.							
5	145													
10	140													
15	135					CL	: Sandy CLAY, moderate brown, moist, slightly plastic, fine to medium grained.							
20	130													
25	125													
30														



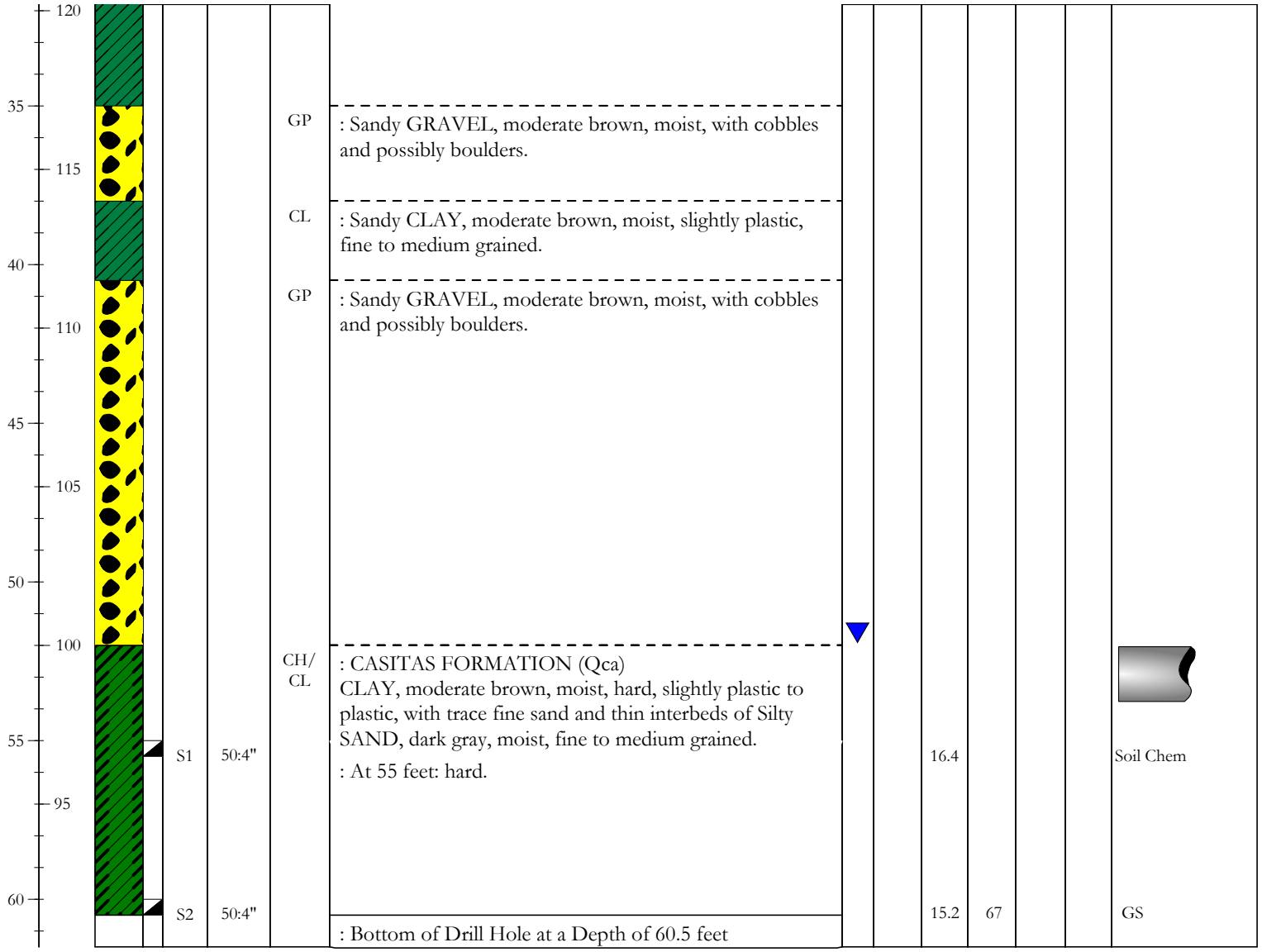
BAJADA Geosciences, Inc.

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PLATE NO.: A-1.25

LOG OF EXPLORATION: DH-23

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	152'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	Rotary Wash	**DEPTH TO WATER:**	~52 Feet
LOCATION:	Station: 43+40	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	60.5 feet
START DATE:	7/21/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout
END DATE	7/21/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



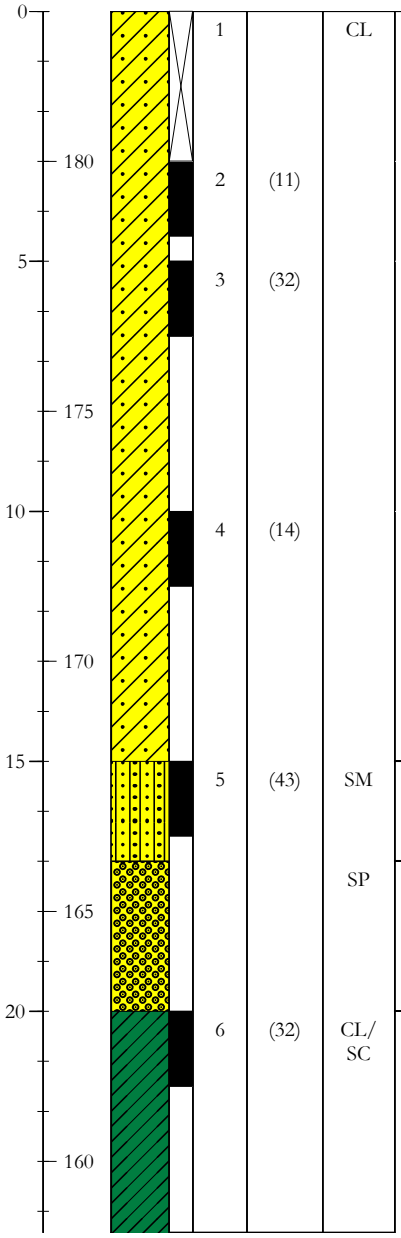
BAJADA Geosciences, Inc.

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PLATE NO.: A-1.25

LOG OF EXPLORATION: DH-24

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	183'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-A (Barnard)	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	36 feet
START DATE:	7/19/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/Cuttings
END DATE	7/19/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		



Depth	Elevation	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0		1		CL	: ALLUVIUM (Qal) Clayey SAND, light brownish tan, moist, slightly plastic, fine to medium grained, with trace organics.							Curve
	180	2	(11)		: At 3 feet: loose.		97.1	8.7				
5		3	(32)		: At 5 feet: medium dense with fine subangular gravels.		99.0	8.5	31			GS
	175											
10		4	(14)		: At 10 feet: slightly plastic, loose to medium dense, trace caliche.		88.6	20.1				DS
	170											
15		5	(43)	SM	: Silty to Clayey SAND, moderate brown, moist, medium dense, fine to medium grained, with fine subangular gravel and trace calcium carbonate.		115.2	6.3	13			GS
				SP	: SAND, moderate yellowish brown, moist, dense, fine to medium grained.		111.0	7.0	18		NP	PI, GS
	165											
20		6	(32)	CL/SC	: Sandy CLAY to Clayey SAND, moderate brown, stiff/medium dense, slightly plastic, fine grained, with trace fine subrounded gravel.							
	160											

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PLATE NO.: A-1.26

LOG OF EXPLORATION: DH-24

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEx Subsurface Expl.	**ELEVATION:**	183'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-A (Barnard)	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	36 feet
START DATE:	7/19/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/Cuttings
END DATE	7/19/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
25				7	(69)	SP	: Gravelly SAND to Sandy GRAVEL, light brown to brown, moist, very dense, fine to medium grained with fine to medium subrounded to subangular gravel.		115.0	6.0				
	155													
30				8	(72)				100.3	9.7				
	150													
35				9	(50:2)		: At 35 feet, with moderate caliche nodules and veining.							
							: Bottom of Drill Hole at a Depth of 36 feet							

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PLATE NO.: A-1.26

LOG OF EXPLORATION: DH-25

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEX Subsurface Expl.	**ELEVATION:**	185'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-A (Barnard)	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	26.5 feet
START DATE:	7/19/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/Cuttings
END DATE	7/19/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
0	185			1		GP	: ALLUVIUM (Qal) Clayey SAND, yellowish brown, moist, fine to coarse sand with fine to medium subrounded to subangular gravels.							
				2	(20)		: At 3 feet: medium dense.		91.0	11.7	22			GS, Soil Chem
5	180			3	(9)	SM	: Silty SAND to Sandy GRAVEL, moderate brown, moist, loose, fine to medium grained with fine to medium subangular to subrounded gravel.		85.8	12.6				
10	175			4	(7)	SC	: Sandy CLAY, brown, moist, soft to firm, slightly plastic, fine to medium grained.		90.3	15.5	66			GS
15	170			5	(25)	SM	: Silty SAND, moderate brown, moist, medium dense, fine to medium grained.		127.2	8.2				

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.27

LOG OF EXPLORATION: DH-25

PROJECT:	VTA-SB Intertie Project	**EXPL. VENDOR:**	GeoEX Subsurface Expl.	**ELEVATION:**	185'
PROJECT NO.:	2101.0113	**EXPL. METHOD:**	8.25" HSA	**DEPTH TO WATER:**	Not Encountered
LOCATION:	BPS-A (Barnard)	**LOGGED BY:**	G. Butler	**DEPTH OF HOLE:**	26.5 feet
START DATE:	7/19/2022	**CHECKED BY:**	J. Bianchin	**BACKFILLED WITH:**	Grout/Cuttings
END DATE	7/19/2022	**HAMMER TYPE:**	140-lb Auto Trip Hammer		

Depth	Elevation	Material Symbol	Sample Type	Sample No.	Blow Count (blows/ft)	USCS	MATERIAL DESCRIPTION	Depth to Water	Dry Unit Weight (pcf)	Moisture Content (%)	% Passing No. 200	Liquid Limit	Plastic Index	Comments
20	165			6	(77)	SC	: Clayey SAND, moderate brown, moist, very dense, fine to medium grained with fine surounded to subangular gravel.		104.4	15.5	33			GS
25	160			7	(34)	SM/ SC	: Silty to Clayey SAND, dark brown, moist, medium dense, fine to medium grained, with trace to moderate caliche veining.		109.6	8.4	28			GS
							: Bottom of Drill Hole at a Depth of 26.5 feet							

BAJADA Geosciences, Inc.

The log and data presented are a simplifaction of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

PLATE NO.: A-1.27

LOG OF EXPLORATION: Expl. No.

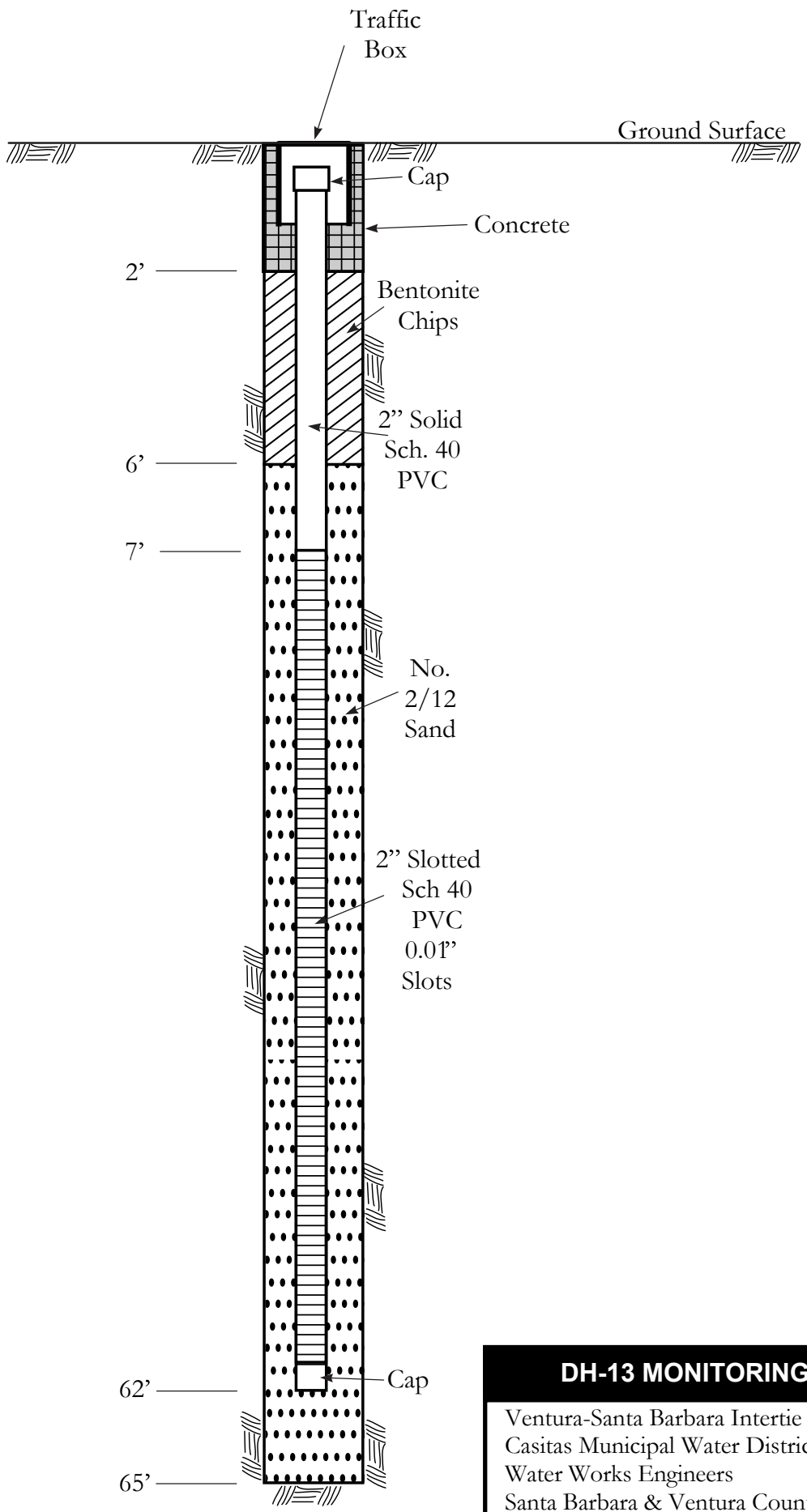
PROJECT:	BGI's Project Name	**EXPL. VENDOR:**	Expl. Subcontractor	**SURFACE ELEVATION:**	Expl. Elevation
PROJECT NO.:	BGI's Project No.	**EXPL. METHOD:**	Method of Expl.	**TOTAL DEPTH OF HOLE:**	Total Depth of Expl.
LOCATION:	General Location	**LOGGED BY:**	BGI's Logger	**DEPTH TO WATER:**	Depth to Water
START DATE:	Date Started Date	**CHECKED BY:**	BGI's Reviewer	**BACKFILLED WITH:**	Backfill Materials
END DATE:	Finished	**HAMMER TYPE:**	Type of Sample Hammer		

Depth (ft)	Material Symbol	Sample	Sample No.	Blow Count (blows/ft)	USCS Symbol	Material Description	Water Table	Unit Dry Weight, pcf	Water Content, %	% Passing No. 200	Liquid Limit	Plasticity Index	Notes & Assigned Laboratory
0			1			SAMPLES/BLOW COUNT SYMBOLS KEY Bulk Soils Sample							CMSS: 2-3/8" ID, 3" OD, Driven
			2	(24)		California modified split spoon sampler (CMSS) Brackets on blow counts indicates CMSS sample							SPT: 1-3/8" ID, 2" OD, Driven
5			3	50:5"		Standard penetration test (SPT) sample and blow count							Blow counts are recorded as the number of blows required for one foot of sampler penetration using a 140-lb hammer falling 30 inches. Typically, sampler is driven 18" and the initial 6" discarded.
						No sample recovery							
						LITHOLOGIC GRAPHICS DESCRIPTIONS FOR SOILS MATERIALS (per ASTM D2487 & D2488)							
10					GW	well graded GRAVEL							Pipeline Depth
					GP	poorly graded GRAVEL							
					GM	silty GRAVEL							
					GC	clayey GRAVEL							
15					SW	well graded SAND							
					SP	poorly graded SAND							Initial water level measurement
					SM	silty SAND							Water level after initial measurement (may not represent stabilized water levels)
					SC	clayey SAND							
20					ML	low plasticity SILT							Lab Abbreviations DS-direct shear; C-consolidation; GS-sieve; EI-Expansion Index; PI-Plasticity; UC-Unconfined; SC-soil chem.; SE-sand equiv.; R-R value; P-curve; PP-pocket penetrometer.
					MH	high plasticity SILT							
					CL	lean CLAY							
					CH	fat CLAY							
25					PT	organic soils or peat							
					OL	organic SILTS or CLAYS with low plasticity							
					OH	organic SILTS or CLAYS with high plasticity							
30					RX	ROCK							

The log and data presented are a simplification of actual conditions encountered at the given location and time of exploration. Subsurface conditions may differ at other locations and with the passage of time.

BAJADA GEOSCIENCES, INC.

PLATE NO.: A-2.1



Not to Scale

DH-13 MONITORING WELL DETAILS

Ventura-Santa Barbara Intertie Project
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.
A-3.1

BAJADA Geosciences, Inc.

Project no.
2101.0113

APPENDIX B

Laboratory Testing

APPENDIX B
LABORATORY TESTING

Laboratory Analyses

Laboratory tests were performed on selected bulk soil samples to estimate engineering characteristics of the various earth materials encountered. Testing was performed under procedures described in one of the following references:

- ASTM Standards for Soil Testing, latest revision;
- Lambe, T. William, Soil Testing for Engineers, Wiley, New York, 1951;
- Laboratory Soils Testing, U.S. Army, Office of the Chief of Engineers, Engineering Manual No. 1110-2-1906, November 30, 1970.

In-Situ Moisture Density Relations

Dry density estimates and/or moisture content evaluations were performed on selected soil samples collected during this study. Tests were performed using standard test methods ASTM D2216 for moisture content or ASTM D2937 for dry unit weights. The results are presented on the respective Log of Drill holes.

Grain Size Distribution

Grain size distribution was determined for forty-five seven selected soil samples in accordance with standard test method ASTM D422. Of those tests, fifteen were performed as full hydrometer tests in accordance with standard test method ASTM D7928. The grain size distribution data are shown on the attached plates labeled *Particle Size Distribution*.

Maximum Density & Optimum Moisture Content

Maximum density and optimum moisture content were evaluated on four selected bulk soil sample in accordance with standard test method ASTM D1557. Results of that test are presented on the attached plate labeled *Compaction Test Report*.

Plasticity Index Tests

Plasticity index tests were performed on twenty selected soil samples in accordance with standard test method ASTM D4318. Results of that test are presented on attached plates labeled *Plasticity Chart and Data*.

Unconfined Compression Tests

Unconfined compression tests were performed on three selected sample in accordance with standard test method ASTM D2166. Results of that test are presented on attached plates labeled *Unconfined Compression Test*.

Direct Shear Tests

Direct shear tests were performed on ten selected sample in accordance with standard test method ASTM D3080. Results of that test are presented on attached plates labeled *Direct Shear Test.*

Soil Chemistry Tests for Corrosion

Eight selected soil samples were tested to evaluate sulfate and chloride contents, pH, and resistivity. Tests were performed in accordance with standard test methods ASTM G51 and G75, and California Test Method 417 and 422. Test results are presented on the attached plate labeled *Evaluation for Soil Corrosion.*

Materials Testing, Inc.

8798 Airport Road
Redding, California 96002
(530) 222-1116, fax 222-1611

865 Cotting Lane, Suite A
Vacaville, California 95688
(707) 447-4025, fax 447-4143

Client: BAJADA Geosciences, Inc.
28301 Inwood Road
Shingletown, CA 96088

Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California

Client No.: 3237-079
Figure No.: 0300-001
Date: 08/11/2022
Page No.: 1 of 3
Submitted by: KC Engineering
Date Sampled: 07/27/2022

Density of Soil in Place by the Drive-Cylinder Method (ASTM D2937) and Liquid Limit, Plastic Limit & Plasticity Index of Soils (ASTM D4318)

Sample #	Description	Dry Density p.c.f.	Moisture Content %	Liquid Limit	Plastic Limit	Plastic Index
DH-4A, S1 @ 40.0'	Reddish Brown Clay with Sand	---	15.5	31	16	15
DH-4A, S2 @ 45.0'	Brown Sandy Clay	---	14.2	29	15	14
DH-4A, S3 @ 50.0'	Brown Sandy Clay	---	13.4	32	15	17
DH-14A, S1 @ 28.0'	Dark Grayish Brown Clayey Sand (visual)	---	11.5	---	---	---
DH-14A, S2 @ 35.0'	Dark Grayish Brown Clayey Sand (visual)	---	12.6	---	---	---
DH-16, S1 @ 35.0'	Brown Sandy Clay (visual)	---	18.7	---	---	---
DH-16, S2 @ 40.0'	Reddish Brown Clay	---	21.8	38	20	18
DH-18, S1 @ 40.0'	Brown Sandy Clay (visual)	---	20.2	---	---	---
DH-18, S2 @ 50.0'	Brown Sandy Clay (visual)	---	19.4	---	---	---
DH-18, S3 @ 60.0'	Brown Clay	---	19.2	46	18	28
DH-20, S1 @ 42.0'	Reddish Brown Clay (visual)	110.8	19.5	56	21	35
DH-20, S2 @ 50.0'	Dark Reddish Gray Clay (visual)	111.7	19.2	---	---	---

Tested by John Hubbard.
The samples were tested according to the referenced standard test procedures and relate only to the items inspected or tested.
Results are not transferable and shall not be reproduced, except in full, without written permission from MTI.

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Client: BAJADA Geosciences, Inc.
28301 Inwood Road
Shingletown, CA 96088

Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California

Client No.: 3237-079
Figure No.: 0300-001
Date: 08/11/2022
Page No.: 2 of 3
Submitted by: KC Engineering
Date Sampled: 07/27/2022

Density of Soil in Place by the Drive-Cylinder Method (ASTM D2937) and Liquid Limit, Plastic Limit & Plasticity Index of Soils (ASTM D4318)

Sample #	Description	Dry Density p.c.f.	Moisture Content %	Liquid Limit	Plastic Limit	Plastic Index
DH-22, S1 @ 45.0'	Yellowish Brown Sandy Clay (visual)	133.9	5.0	---	---	---
DH-22, S2 @ 50.0'	Dark Brown Sandy Clay (visual)	110.4	12.3	---	---	---
DH-22, S3 @ 55.0'	Dark Reddish Brown Silty Clayey Sand	122.2	11.4	22	15	7
DH-23, S1 @ 55.0'	Brown Sandy Clay (visual)	---	16.4	---	---	---
DH-23, S2 @ 60.0'	Dark Reddish Brown Sandy Clay (visual)	---	15.2	---	---	---
DH-24 (A-1), S1 @ 1.0'-5.0'	Dark Brown Sandy Clay (visual)	112.0	13.3	---	---	---
DH-24 (A-1), S2 @ 3.0'	Yellowish Brown Clayey Sand (visual)	97.1	8.7	---	---	---
DH-24 (A-1), S3 @ 5.0'	Dark Brown Clayey Sand with Gravel (visual)	99.0	8.5	---	---	---
DH-24 (A-1), S4 @ 10.0'	Yellowish Brown Sandy Clay (visual)	88.6	20.1	---	---	---
DH-24 (A-1), S5 @ 15.0'	Yellowish Brown Silty Sand with Gravel (visual)	115.2	6.3	---	---	---
DH-24 (A-1), S7 @ 25.0'	Yellowish Brown Clayey Sand with Gravel (visual)	115.0	6.0	---	---	---
DH-24 (A-1), S8 @ 30.0'	Yellowish Brown Silty Sand with Gravel (visual)	111.0	7.0	---	---	NP

Tested by John Hubbard.

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Client: BAJADA Geosciences, Inc.
28301 Inwood Road
Shingletown, CA 96088

Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California

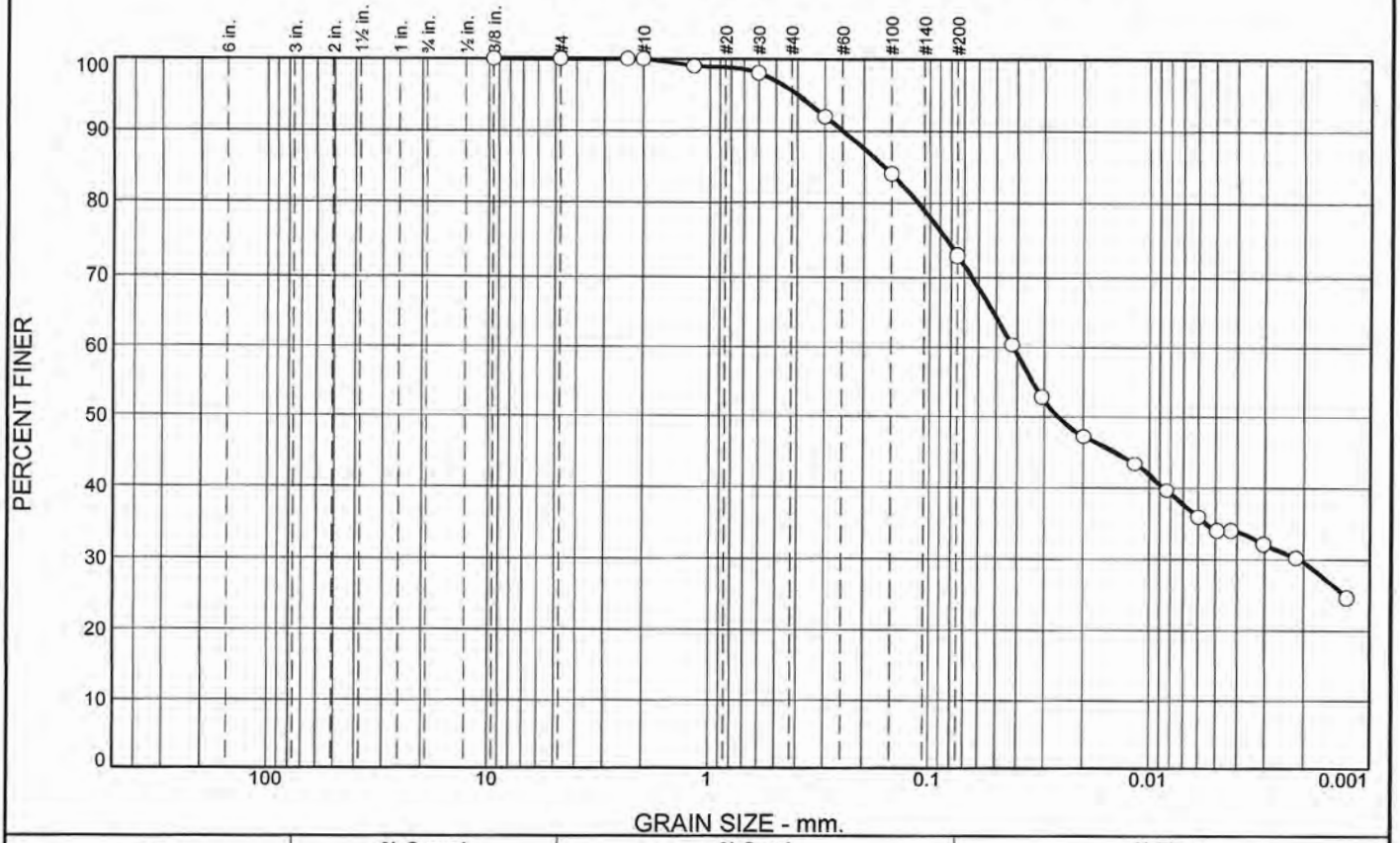
Client No.: 3237-079
Figure No.: 0300-001
Date: 08/11/2022
Page No.: 3 of 3
Submitted by: KC Engineering
Date Sampled: 07/27/2022

Density of Soil in Place by the Drive-Cylinder Method (ASTM D2937) and Liquid Limit, Plastic Limit & Plasticity Index of Soils (ASTM D4318)

Sample #	Description	Dry Density p.c.f.	Moisture Content %	Liquid Limit	Plastic Limit	Plastic Index
DH-24 (A-1), S9 @ 35.0'	Yellowish Brown Sandy Clay (visual)	100.3	9.7	---	---	---
DH-25 (A-2), S2 @ 3.0'	Yellowish Brown Clayey Sand with Gravel (visual)	91.0	11.7	---	---	---
DH-25 (A-2), S3 @ 5.0'	Yellowish Brown Clayey Sand (visual)	85.8	12.6	---	---	---
DH-25 (A-2), S4 @ 10.0'	Brown Sandy Clay (visual)	90.3	15.5	---	---	---
DH-25 (A-2), S5 @ 15.0'	Yellowish Brown Sandy Clay (visual)	127.2	8.2	---	---	---
DH-25 (A-2), S6 @ 20.0'	Yellowish Brown Clayey Sand with Gravel (visual)	104.4	15.5	---	---	---
DH-25 (A-2), S7 @ 25.0'	Brown Clayey Sand with Gravel (visual)	109.6	8.4	---	---	---

Tested by John Hubbard.
The samples were tested according to the referenced standard test procedures and relate only to the items inspected or tested.
Results are not transferable and shall not be reproduced, except in full, without written permission from MTI.

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	4	23	39	34

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	100		
#8	100		
#10	100		
#16	99		
#30	98		
#50	92		
#100	84		
#200	73		

* (no specification provided)

Material Description

Reddish Brown Clay with Sand

Atterberg Limits

PL= 16 LL= 31 PI= 15

Coefficients

D_{90}= 0.2493 D_{85}= 0.1621 D_{60}= 0.0415
D_{50}= 0.0260 D_{30}= 0.0021 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(9)

Remarks

Material Tested in Accordance with ASTM D422.

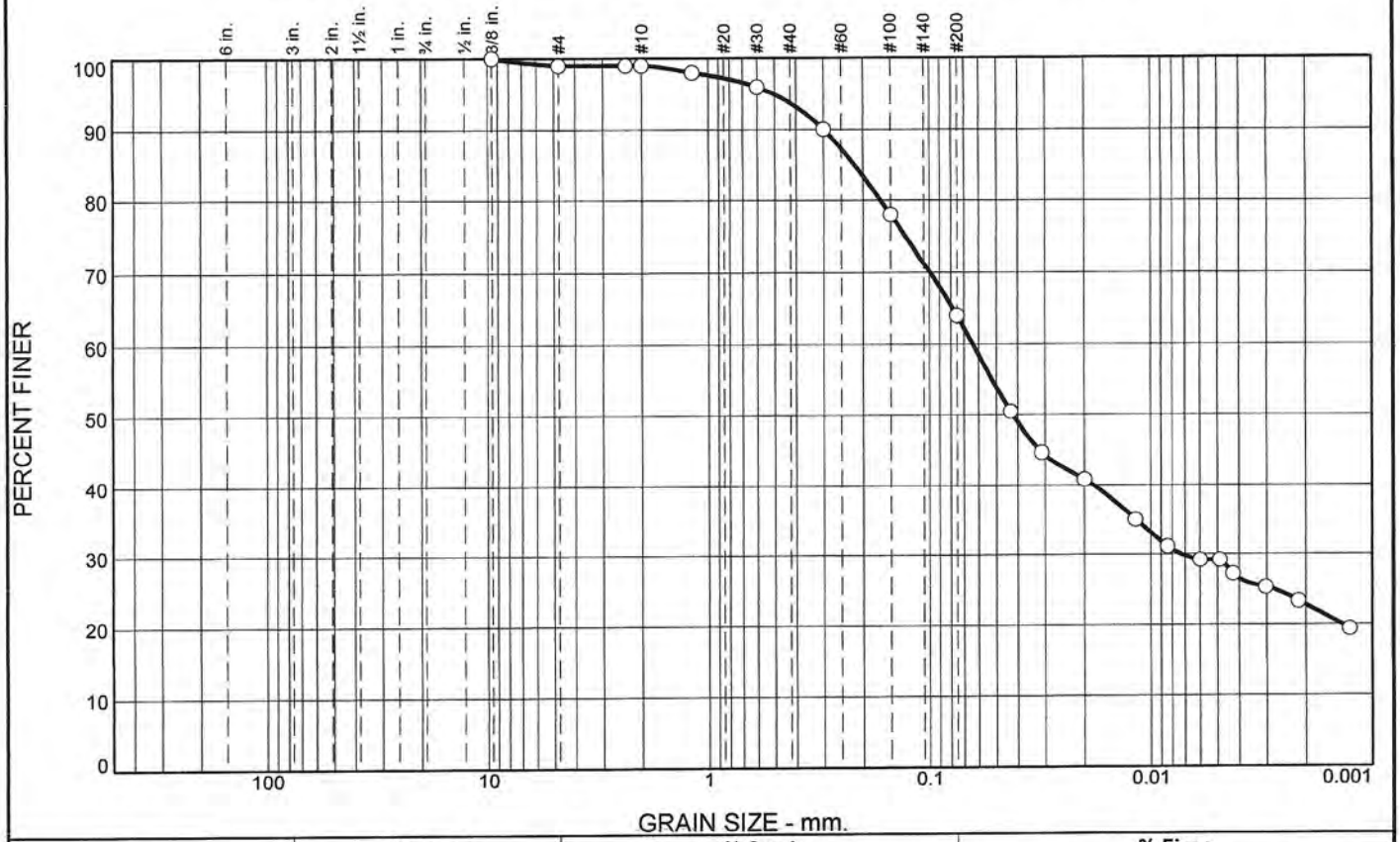
Location: DH-4A, S1
Sample Number: 1 **Depth:** 40.0' **Date:** 08/11/2022

MATERIALS TESTING M T I INCORPORATED

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-002

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	0	5	30	35	29

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	99		
#8	99		
#10	99		
#16	98		
#30	96		
#50	90		
#100	78		
#200	64		

* (no specification provided)

Material Description

Brown Sandy Clay

Atterberg Limits

PL= 15 LL= 29 PI= 14

Coefficients

D_{90}= 0.3000 D_{85}= 0.2187 D_{60}= 0.0636
D_{50}= 0.0420 D_{30}= 0.0074 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(6)

Remarks

Material Tested in Accordance with ASTM D422.

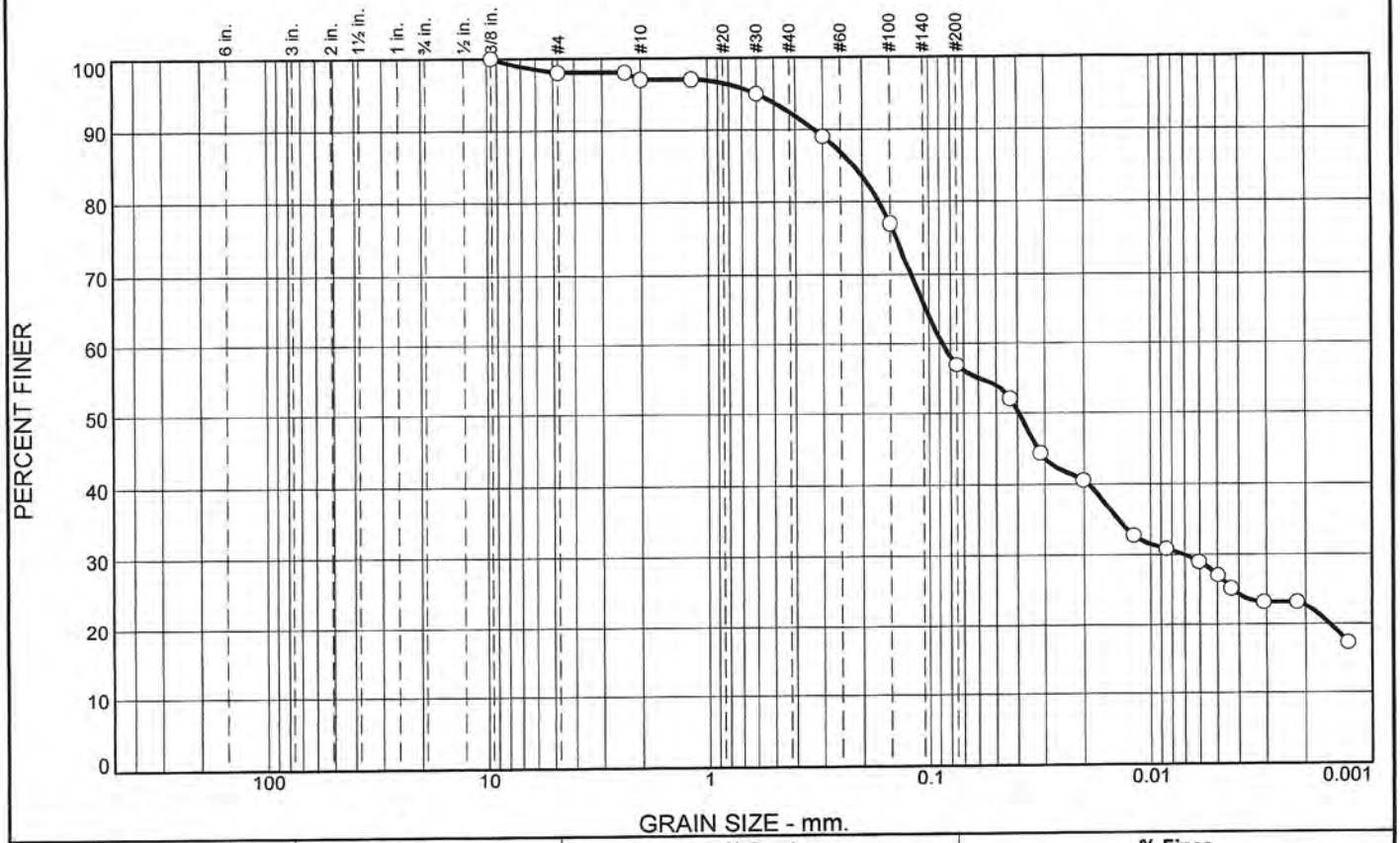
Location: DH-4A, S2
Sample Number: 2 **Depth:** 45.0' **Date:** 08/11/2022

MATERIALS TESTING M T I INCORPORATED

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-003

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	2	1	5	35	30	27

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	98		
#8	98		
#10	97		
#16	97		
#30	95		
#50	89		
#100	77		
#200	57		

* (no specification provided)

Material Description

Brown Sandy Clay

Atterberg Limits

PL= 15 LL= 32 PI= 17

Coefficients

D_{90}= 0.3296 D_{85}= 0.2190 D_{60}= 0.0869
D_{50}= 0.0394 D_{30}= 0.0071 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(6)

Remarks

Material Tested in Accordance with ASTM D422.

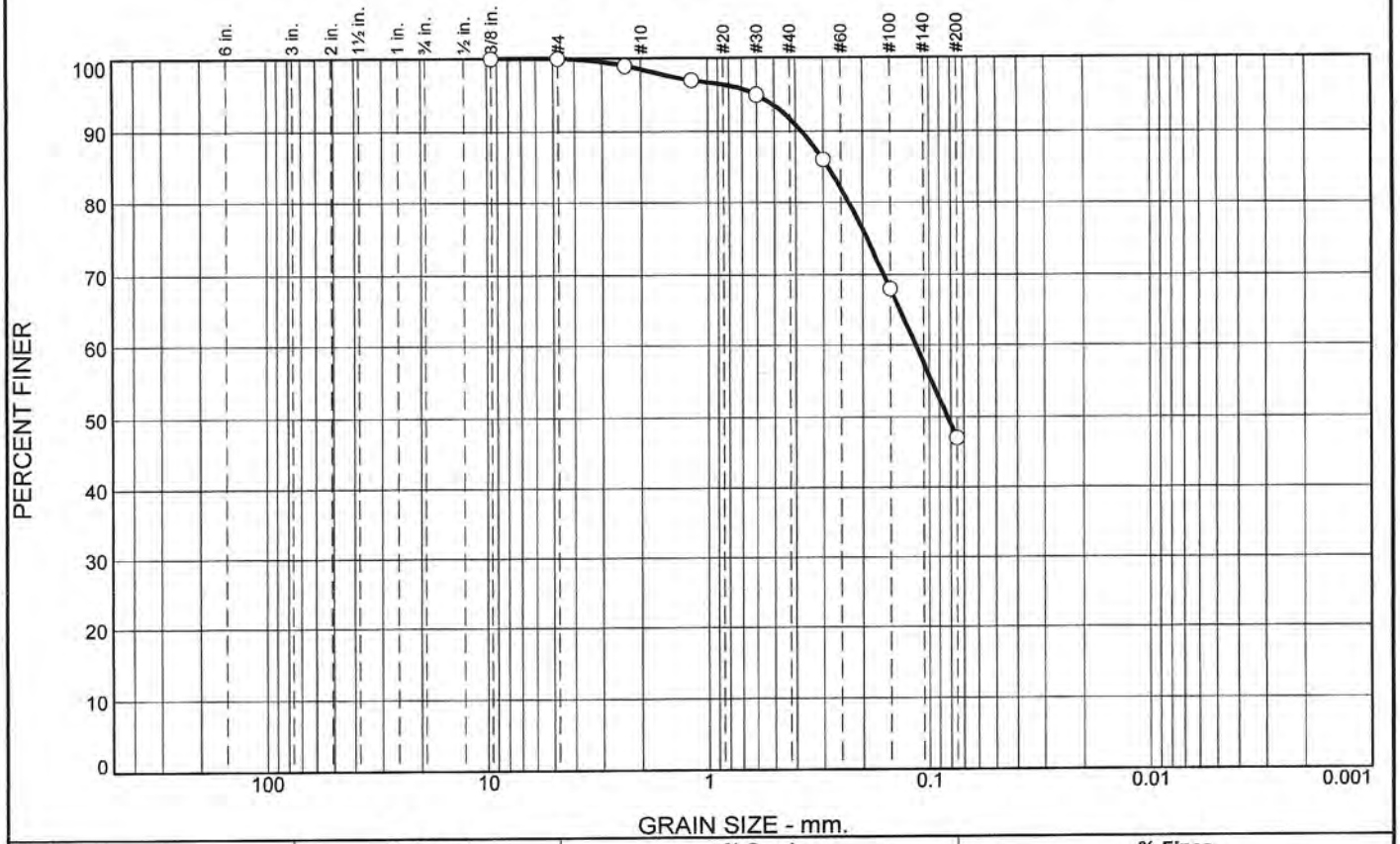
Location: DH-4A, S3
Sample Number: 3 **Depth:** 50.0' **Date:** 08/11/2022

MATERIALS TESTING M T I CORPORATES

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-004

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	7	45	47	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	100		
#8	99		
#16	97		
#30	95		
#50	86		
#100	68		
#200	47		

* (no specification provided)

Material Description

Dark Grayish Brown Clayey Sand (visual)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3757 D_{85}= 0.2859 D_{60}= 0.1148
D_{50}= 0.0827 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

Material Tested in Accordance with ASTM D6913.

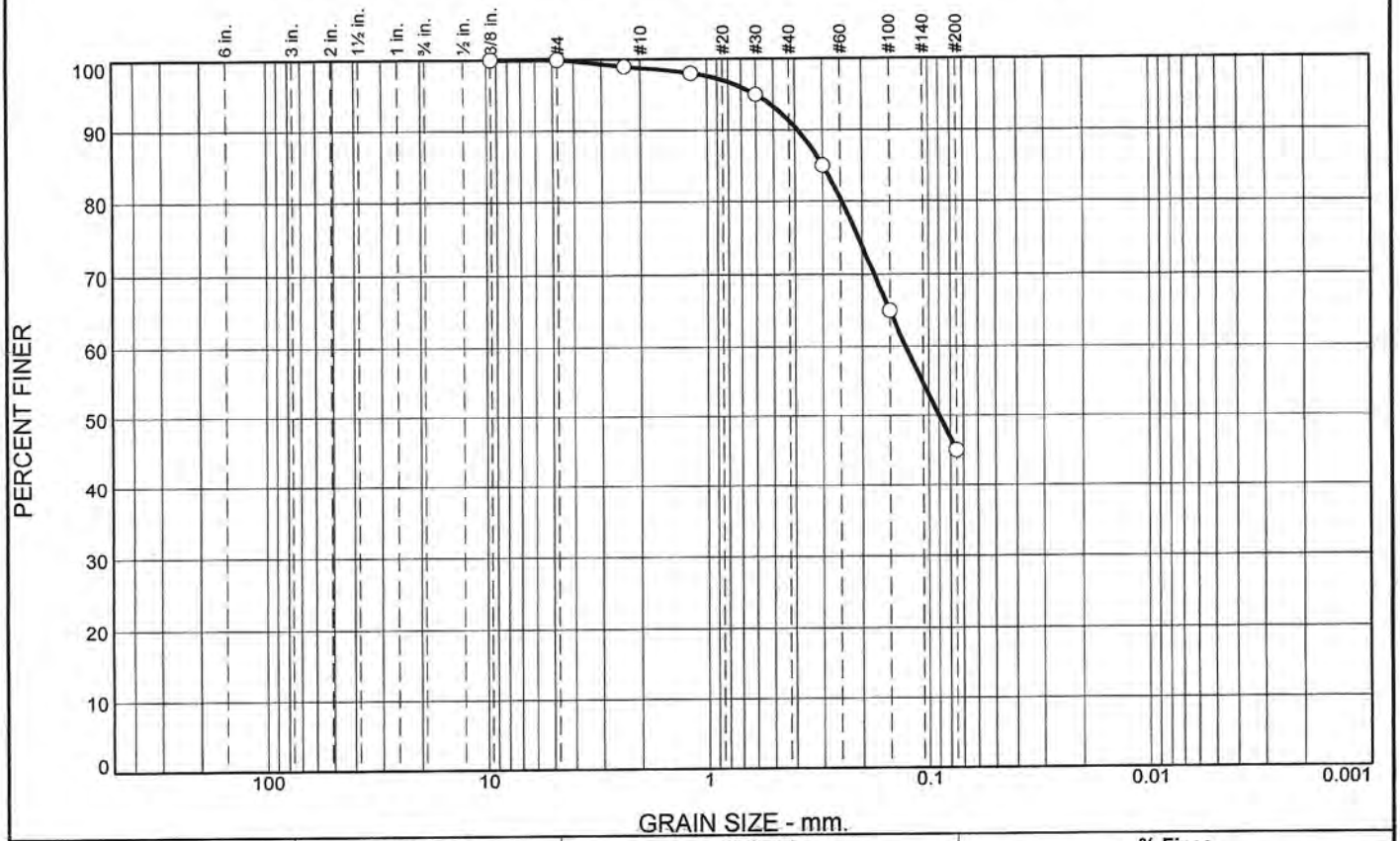
Location: DH-14A, S1
Sample Number: 4 **Depth:** 28.0' **Date:** 08/11/2022

MATERIALS TESTING M T I INCORPORATED

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-005

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	8	46	45	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	100		
#8	99		
#16	98		
#30	95		
#50	85		
#100	65		
#200	45		

* (no specification provided)

Material Description

Dark Grayish Brown Clayey Sand (visual)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3890 D_{85}= 0.3000 D_{60}= 0.1270
D_{50}= 0.0896 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

Material Tested in Accordance with ASTM D6913.

Location: DH-14A, S2
Sample Number: 5 **Depth:** 35.0'

Date: 08/11/2022

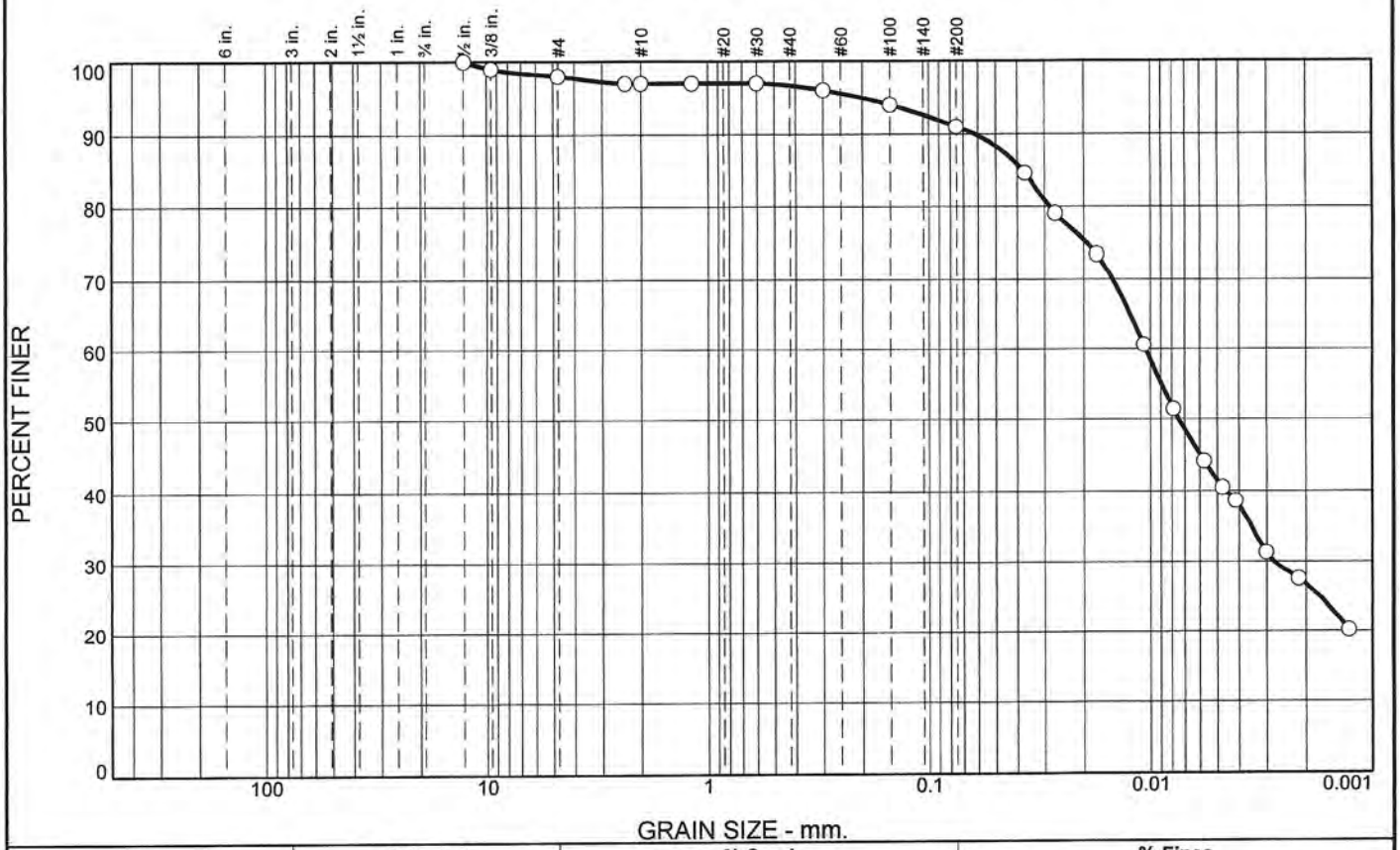
MATERIALS TESTING M T I INCORPORATED

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079

Figure 0300-006

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	2	1	0	6	50	41

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100		
3/8"	99		
#4	98		
#8	97		
#10	97		
#16	97		
#30	97		
#50	96		
#100	94		
#200	91		

* (no specification provided)

Material Description

Reddish Brown Clay

Atterberg Limits

PL= 20 LL= 38 PI= 18

Coefficients

D_{90}= 0.0624 D_{85}= 0.0379 D_{60}= 0.0105
D_{50}= 0.0075 D_{30}= 0.0028 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(17)

Remarks

Material Tested in Accordance with ASTM D422.

Location: DH-16, S2
Sample Number: 7 **Depth:** 40.0'

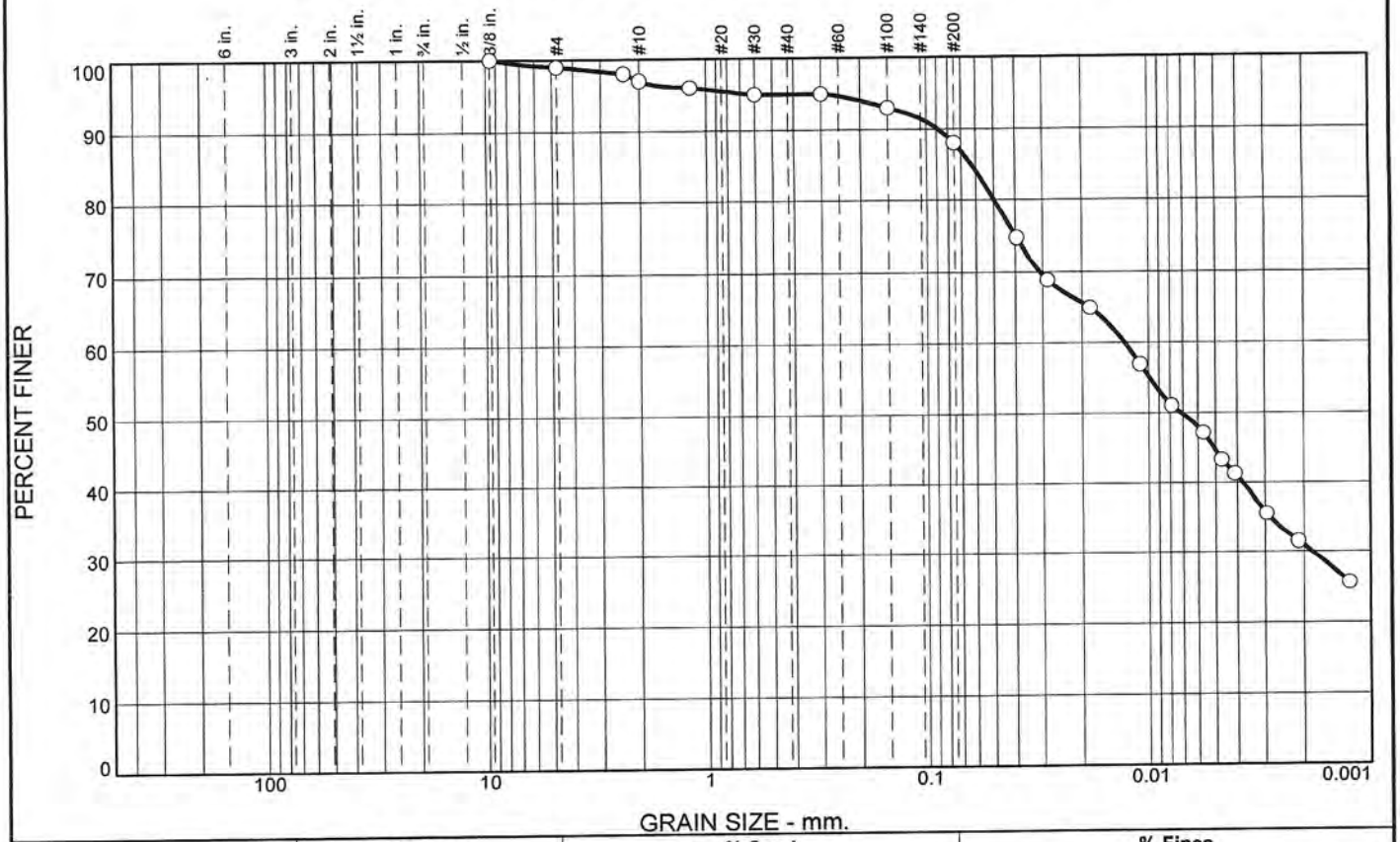
Date: 08/11/2022

MATERIALS TESTING M T I INCORPORATED

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-007

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	2	2	7	44	44

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	99		
#8	98		
#10	97		
#16	96		
#30	95		
#50	95		
#100	93		
#200	88		

* (no specification provided)

Material Description

Brown Clay

Atterberg Limits

PL= 18 LL= 46 PI= 28

Coefficients

D_{90}= 0.0883 D_{85}= 0.0630 D_{60}= 0.0128
D_{50}= 0.0071 D_{30}= 0.0018 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(25)

Remarks

Material Tested in Accordance with ASTM D422.

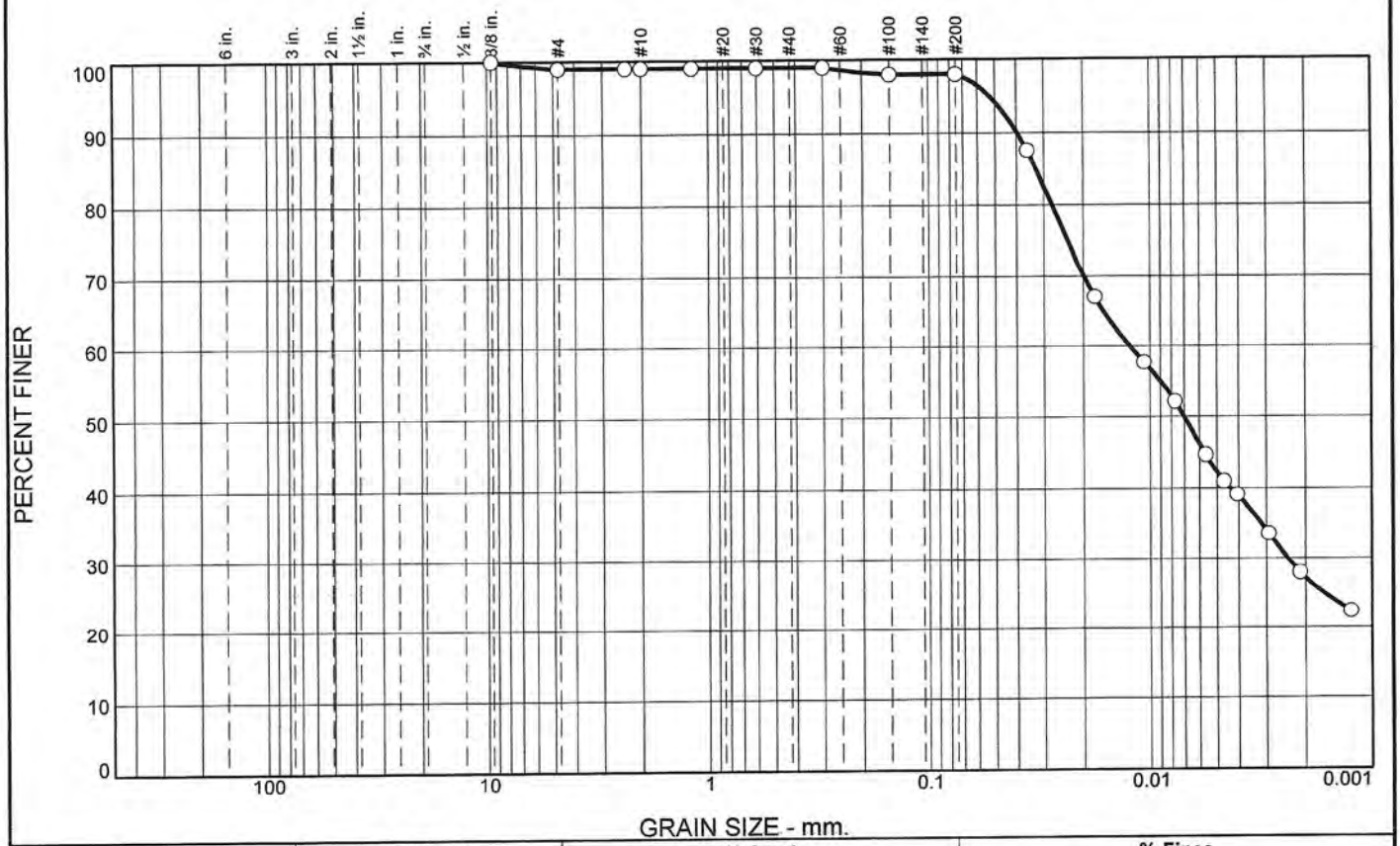
Location: DH-18, S3
Sample Number: 10 **Depth:** 60.0'

Date: 08/11/2022

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-008

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	0	0	1	56	42

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	99		
#8	99		
#10	99		
#16	99		
#30	99		
#50	99		
#100	98		
#200	98		

* (no specification provided)

Material Description

Reddish Brown Clay

Atterberg Limits

PL= 21 LL= 56 PI= 35

Coefficients

D_{90}= 0.0397 D_{85}= 0.0326 D_{60}= 0.0124
D_{50}= 0.0070 D_{30}= 0.0024 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(38)

Remarks

Material Tested in Accordance with ASTM D422.

Location: DH-20, S1
Sample Number: 11 **Depth:** 42.0'

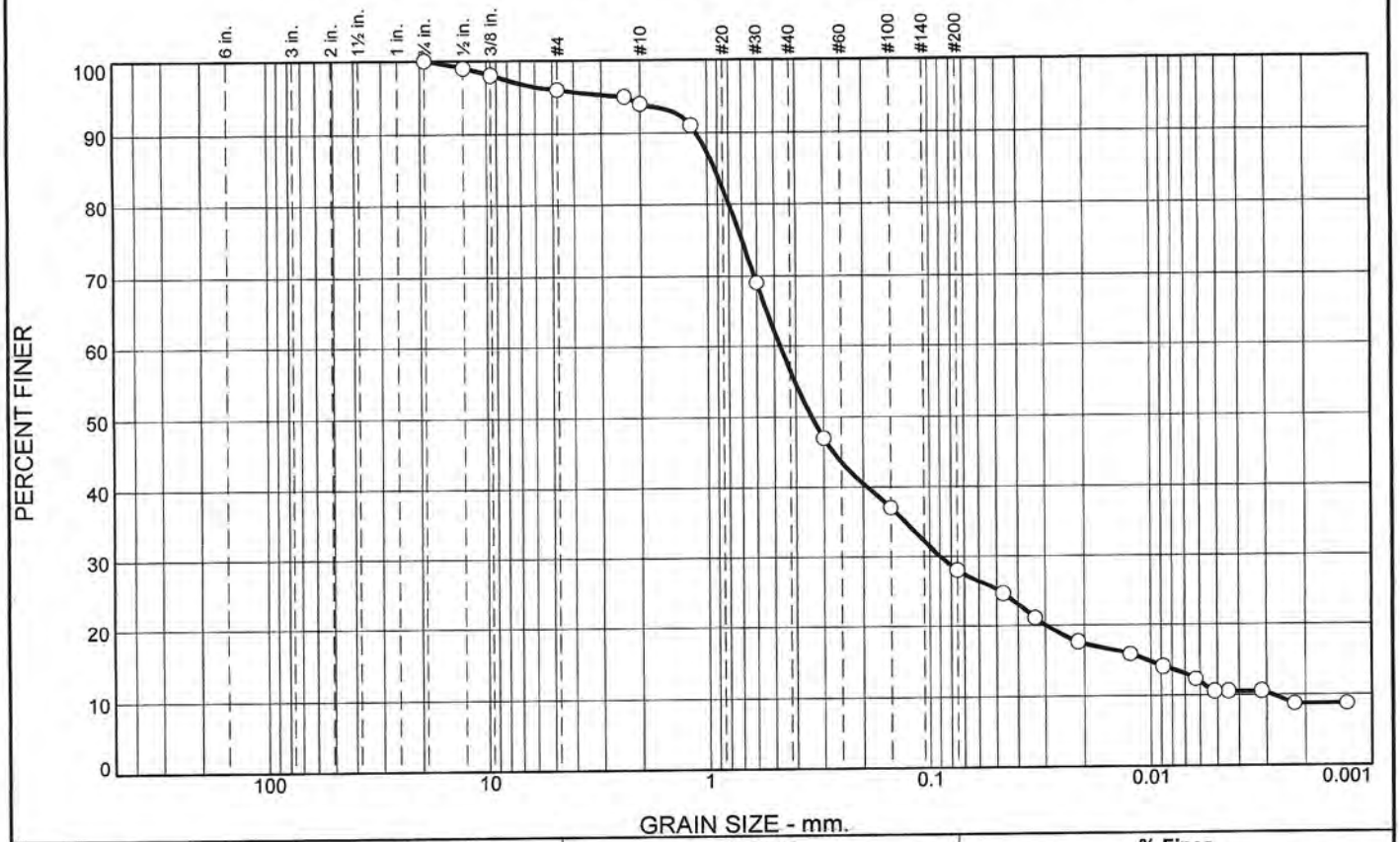
Date: 08/11/2022

MATERIALS TESTING M T I INCORPORATED

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-009

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	4	2	37	29	18	10

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
1/2"	99		
3/8"	98		
#4	96		
#8	95		
#10	94		
#16	91		
#30	69		
#50	47		
#100	37		
#200	28		

* (no specification provided)

Material Description

Dark Reddish Brown Silty Clayey Sand

Atterberg Limits

PL= 15 LL= 22 PI= 7

Coefficients

D_{90}= 1.1175 D_{85}= 0.9238 D_{60}= 0.4703
D_{50}= 0.3400 D_{30}= 0.0900 D_{15}= 0.0107
D_{10}= 0.0028 C_u= 165.62 C_c= 6.07

Classification

USCS= SC-SM AASHTO= A-2-4(0)

Remarks

Material Tested in Accordance with ASTM D422.

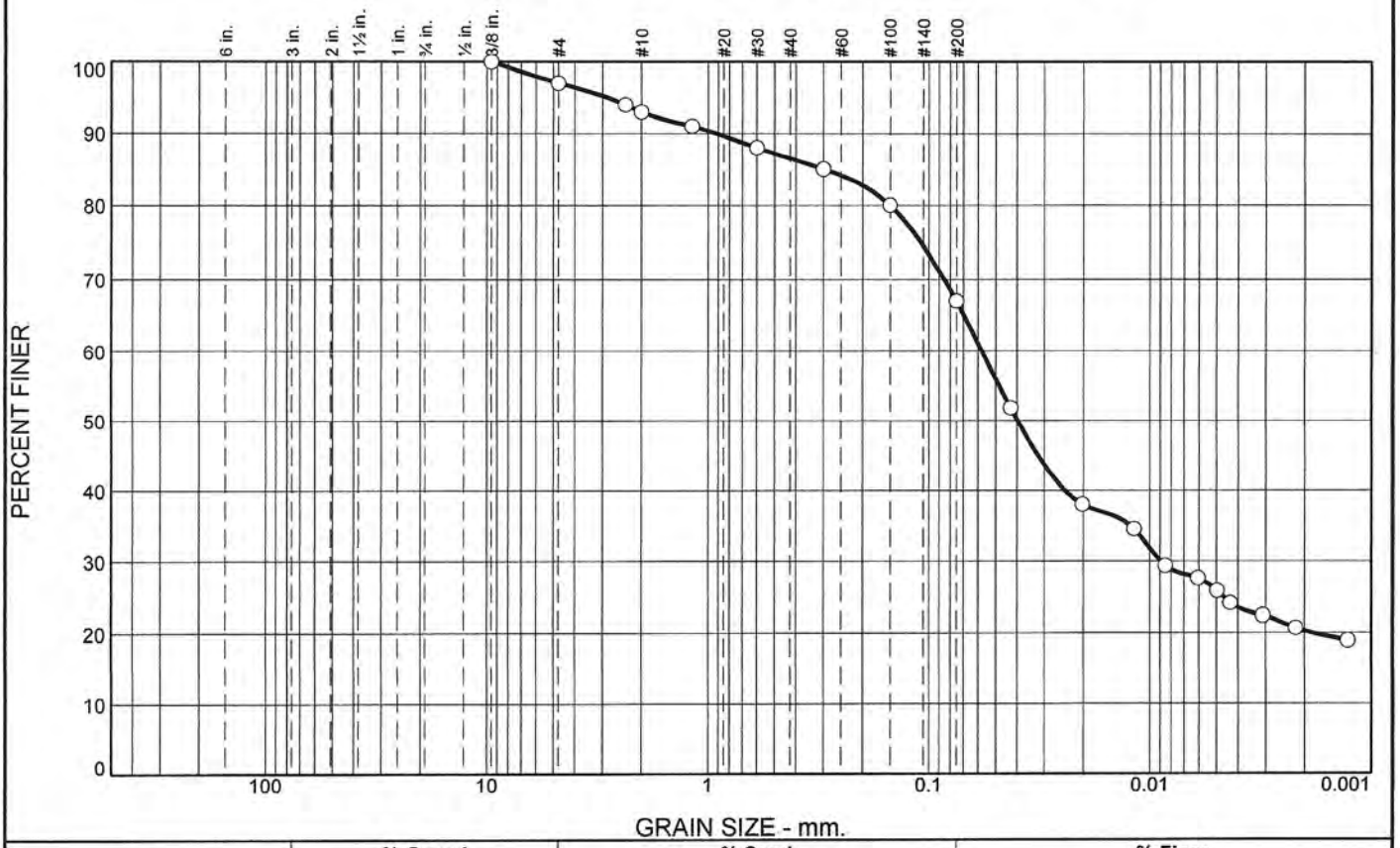
Location: DH-22, S3
Sample Number: 15 **Depth:** 55.0' **Date:** 08/11/2022

MATERIALS TESTING INCORPORATED M T I

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-010

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	3	4	6	20	41	26

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	97		
#8	94		
#10	93		
#16	91		
#30	88		
#50	85		
#100	80		
#200	67		

* (no specification provided)

Material Description

Dark Reddish Brown Sandy Clay (visual)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.9216 D_{85}= 0.3000 D_{60}= 0.0576
D_{50}= 0.0398 D_{30}= 0.0090 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

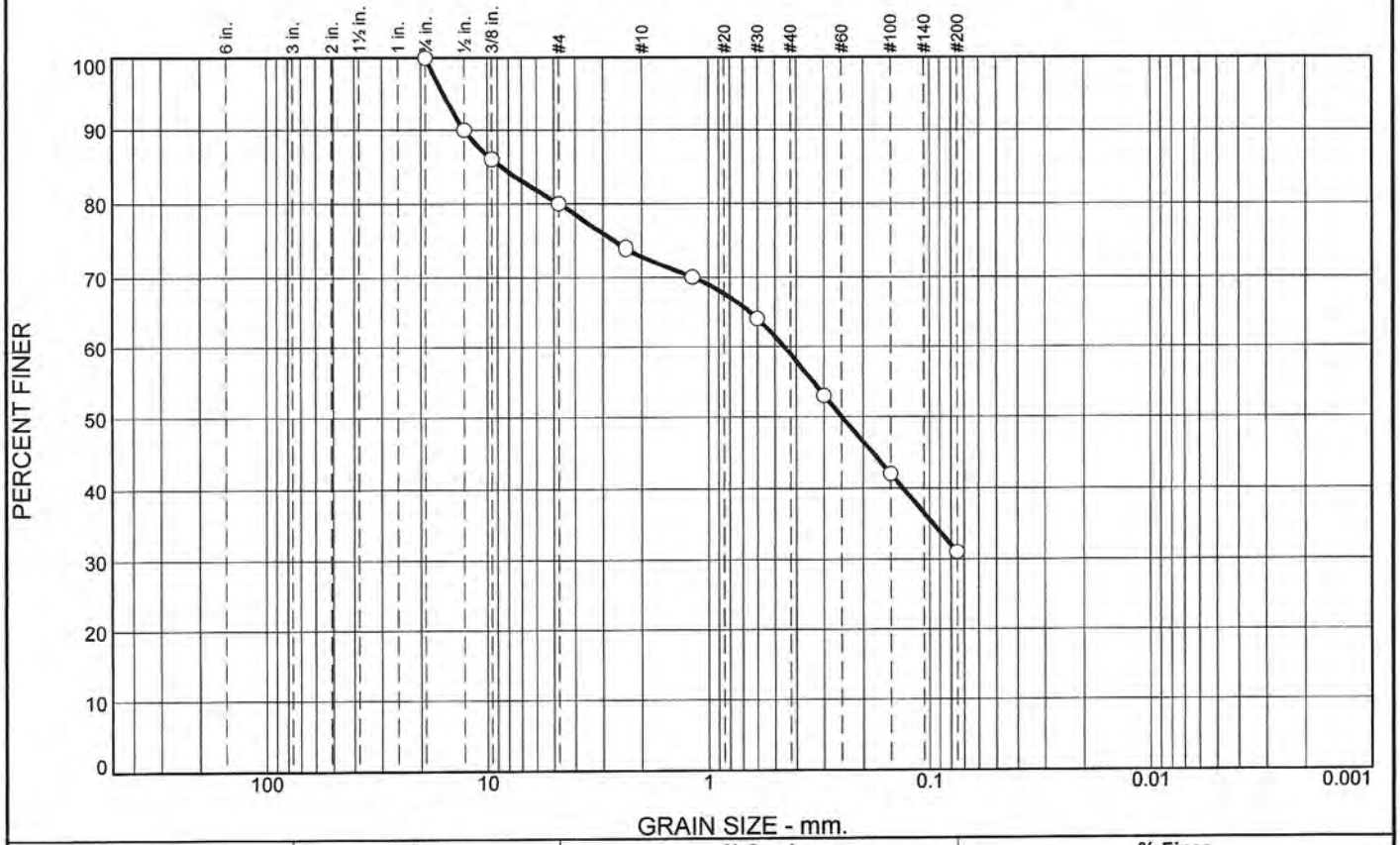
Material Tested in Accordance with ASTM D422.

Location: DH-23, S2
Sample Number: 17 **Depth:** 60.0' **Date:** 08/11/2022

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-011

Tested By: John Hubbard

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	20	7	14	28	31	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
1/2"	90		
3/8"	86		
#4	80		
#8	74		
#16	70		
#30	64		
#50	53		
#100	42		
#200	31		

* (no specification provided)

Material Description

Dark Brown Clayey Sand with Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 12.7000 D_{85}= 8.6332 D_{60}= 0.4560
D_{50}= 0.2497 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

Material Tested in Accordance with ASTM D6913.

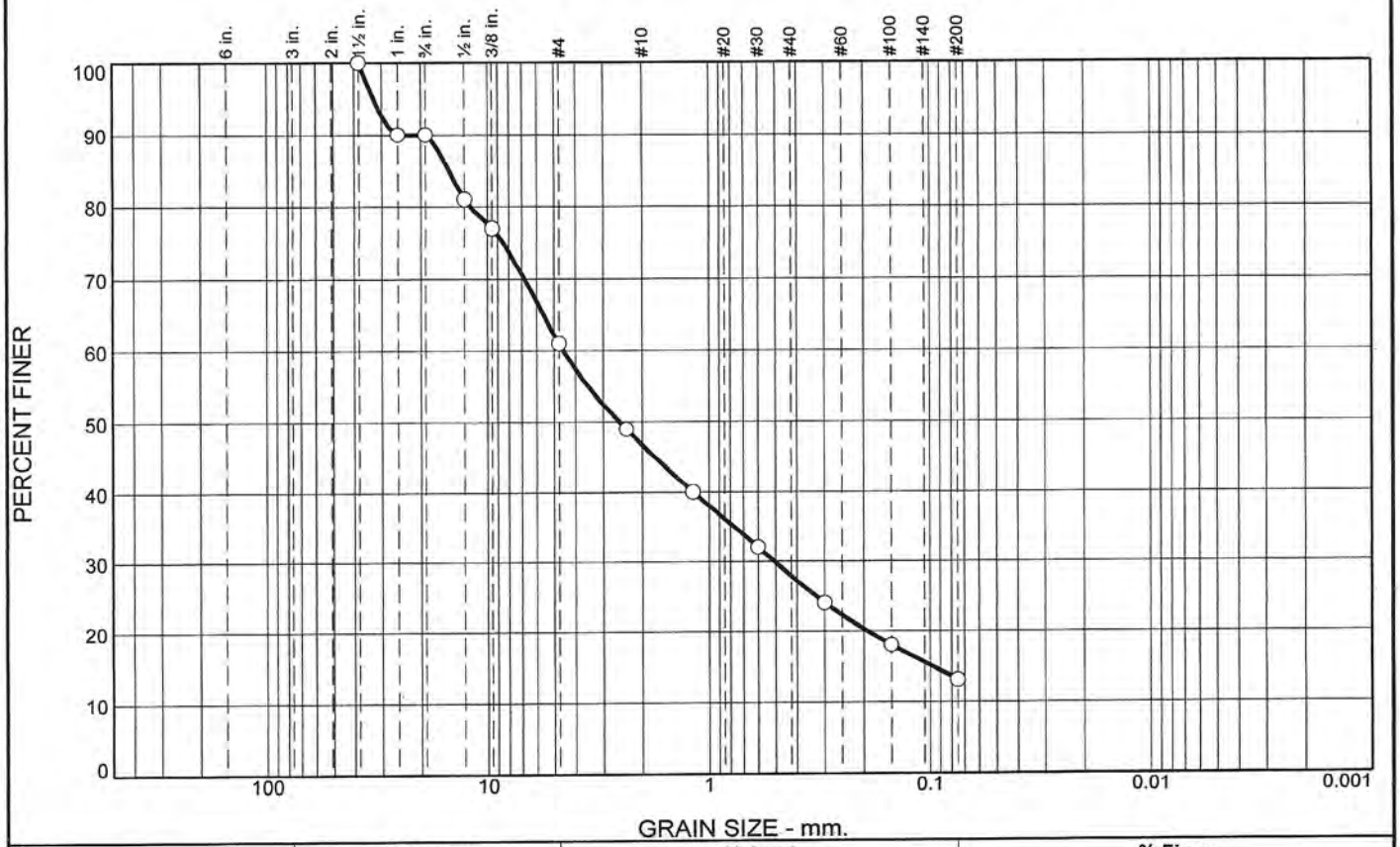
Location: DH-24 (A1), S3
Sample Number: 20 **Depth:** 5.0'

Date: 08/11/2022

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-012

Tested By: Jack Bianchin

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	10	29	14	19	15	13	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 1/2"	100		
1"	90		
3/4"	90		
1/2"	81		
3/8"	77		
#4	61		
#8	49		
#16	40		
#30	32		
#50	24		
#100	18		
#200	13		

* (no specification provided)

Material Description

Yellowish Brown Silty Sand with Gravel (visual)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 25.4000 D_{85}= 14.9137 D_{60}= 4.5441
D_{50}= 2.5361 D_{30}= 0.5078 D_{15}= 0.0995
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

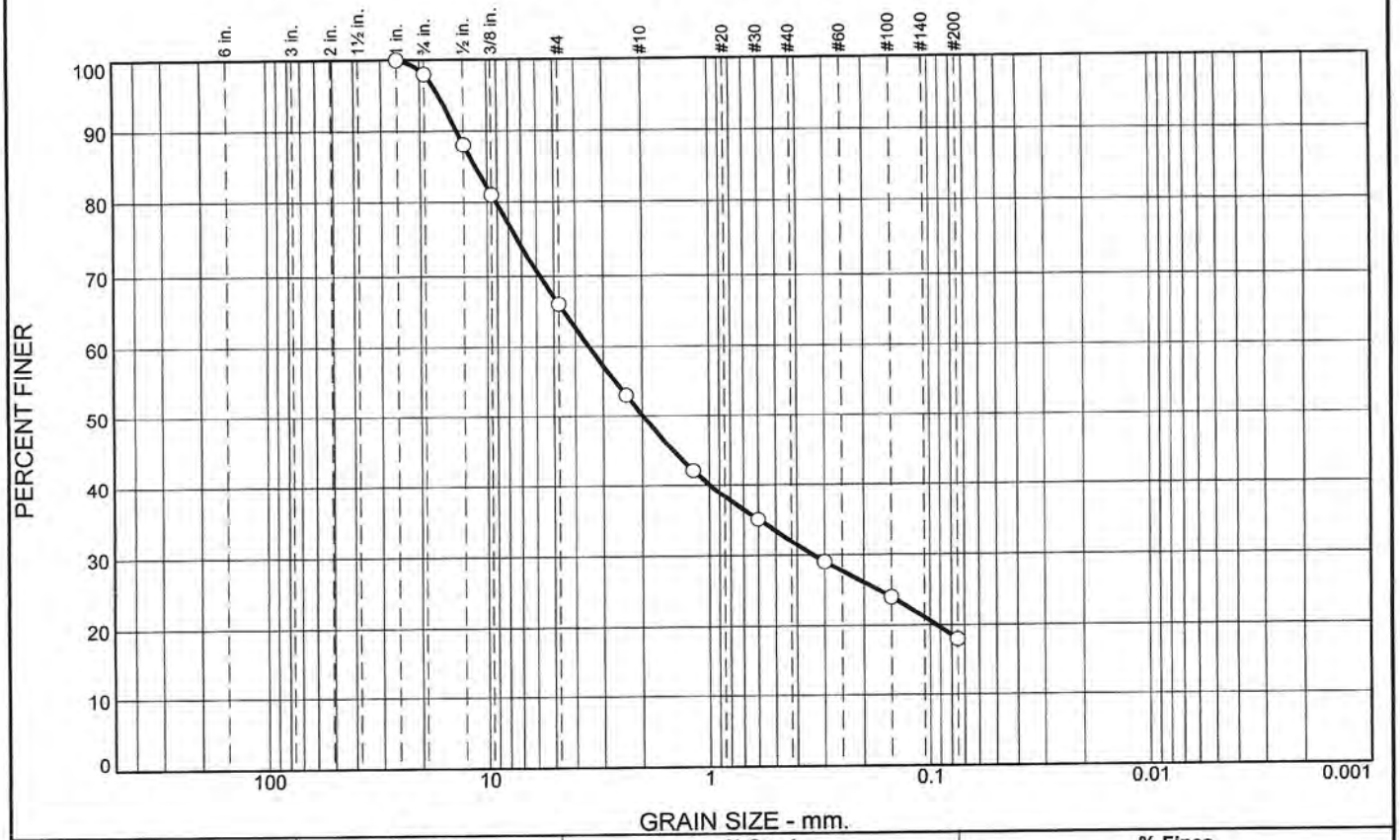
Material Tested in Accordance with ASTM D6913.

Location: DH-24 (A1), S5
Sample Number: 22 **Depth:** 15.0' **Date:** 08/11/2022

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-013

Tested By: Jack Bianchin

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	2	32	16	18	14	18	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	98		
1/2"	88		
3/8"	81		
#4	66		
#8	53		
#16	42		
#30	35		
#50	29		
#100	24		
#200	18		

* (no specification provided)

Material Description

Yellowish Brown Silty Sand with Gravel (visual)

Atterberg Limits

PL= --- LL= --- PI= NP

Coefficients

D_{90}= 13.6547 D_{85}= 11.2955 D_{60}= 3.4789
D_{50}= 1.9860 D_{30}= 0.3402 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Material Tested in Accordance with ASTM D6913.

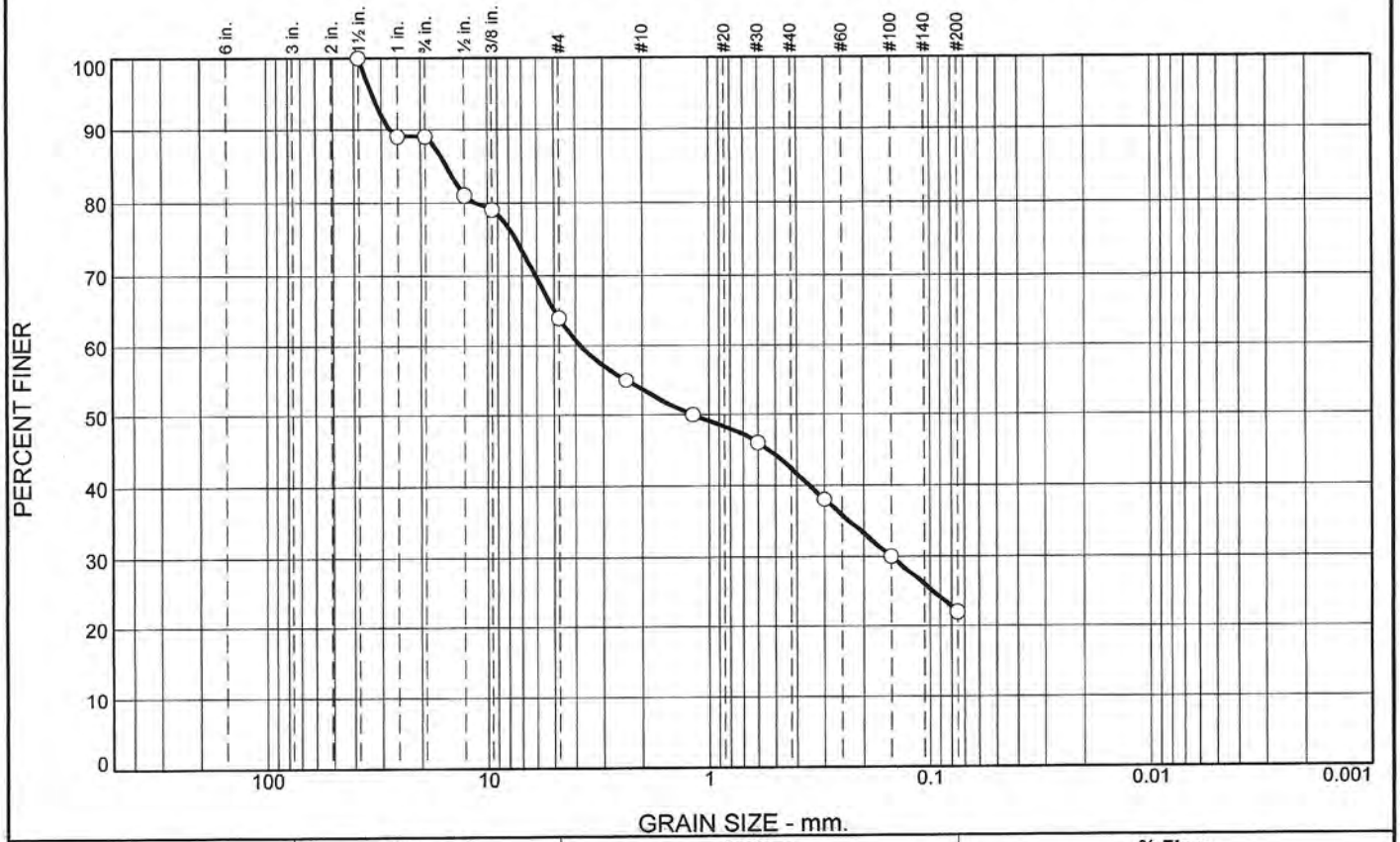
Location: DH-24 (A1), S8
Sample Number: 25 **Depth:** 30.0' **Date:** 08/11/2022

MATERIALS TESTING INCORPORATED

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-014

Tested By: Jack Bianchin

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	11	25	10	12	20	22	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100		
1"	89		
3/4"	89		
1/2"	81		
3/8"	79		
#4	64		
#8	55		
#16	50		
#30	46		
#50	38		
#100	30		
#200	22		

* (no specification provided)

Material Description

Yellowish Brown Clayey Sand with Gravel (visual)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 27.5019 D_{85}= 15.3246 D_{60}= 3.8004
D_{50}= 1.1800 D_{30}= 0.1500 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

Material Tested in Accordance with ASTM D6913.

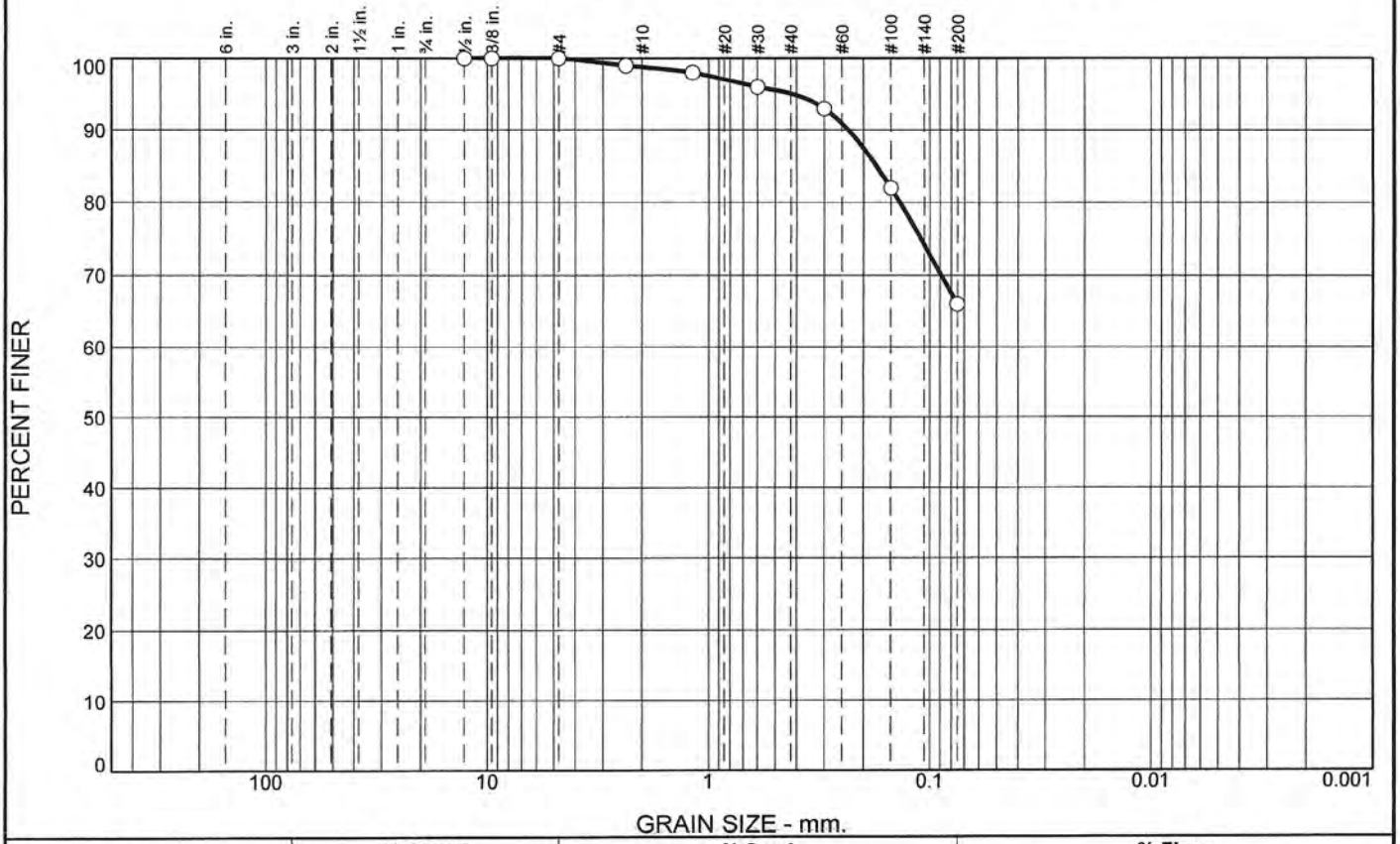
Location: DH-25 (A2), S2
Sample Number: 27 **Depth:** 3.0'

Date: 08/11/2022

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-015

Tested By: Jack Bianchin

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	4	29	66	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100		
3/8"	100		
#4	100		
#8	99		
#16	98		
#30	96		
#50	93		
#100	82		
#200	66		

* (no specification provided)

Material Description

Brown Sandy Clay (visual)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2338 D_{85}= 0.1742 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Material Tested in Accordance with ASTM D6913.

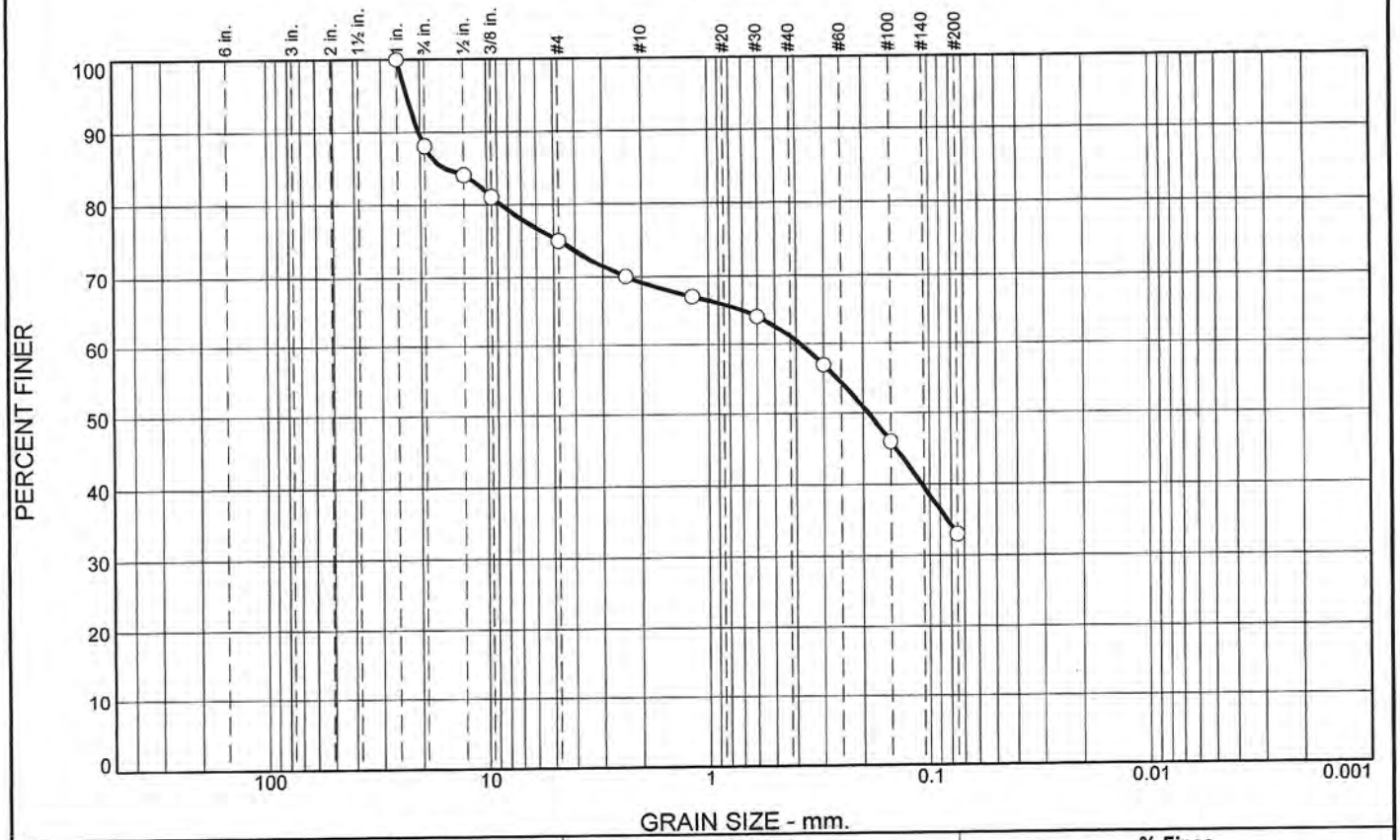
Location: DH-25 (A2), S4
Sample Number: 29 **Depth:** 10.0' **Date:** 08/11/2022

MATERIALS TESTING INCORPORATED M T I

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-016

Tested By: Jack Bianchin

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	12	13	6	8	28	33	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	88		
1/2"	84		
3/8"	81		
#4	75		
#8	70		
#16	67		
#30	64		
#50	57		
#100	46		
#200	33		

* (no specification provided)

Material Description

Yellowish Brown Clayey Sand with Gravel (visual)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 20.2958 D_{85}= 15.6815 D_{60}= 0.3833
D_{50}= 0.1890 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

Material Tested in Accordance with ASTM D6913.

Location: DH-25 (A2), S6
Sample Number: 31 **Depth:** 20.0'

Date: 08/11/2022

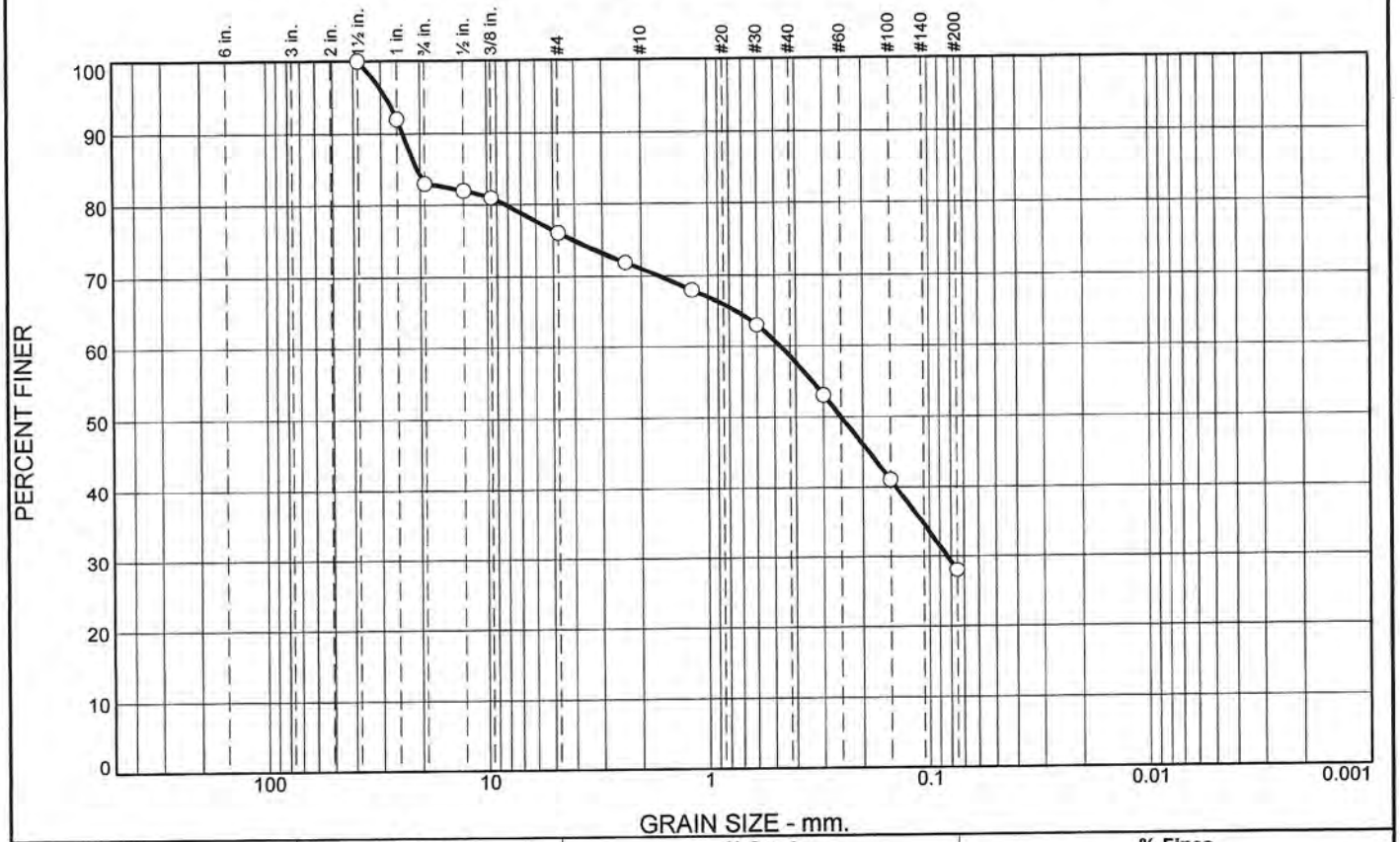
MATERIALS TESTING M T I INCORPORATED

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079

Figure 0300-017

Tested By: Jack Bianchin

PARTICLE SIZE DISTRIBUTION REPORT



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	17	7	5	12	31	28	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100		
1"	92		
3/4"	83		
1/2"	82		
3/8"	81		
#4	76		
#8	72		
#16	68		
#30	63		
#50	53		
#100	41		
#200	28		

* (no specification provided)

Material Description

Brown Clayey Sand with Gravel (visual)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 23.9003 D_{85}= 20.6022 D_{60}= 0.4708
D_{50}= 0.2508 D_{30}= 0.0833 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

Material Tested in Accordance with ASTM D6913.

Location: DH-25 (A2), S7
Sample Number: 32 **Depth:** 25.0'

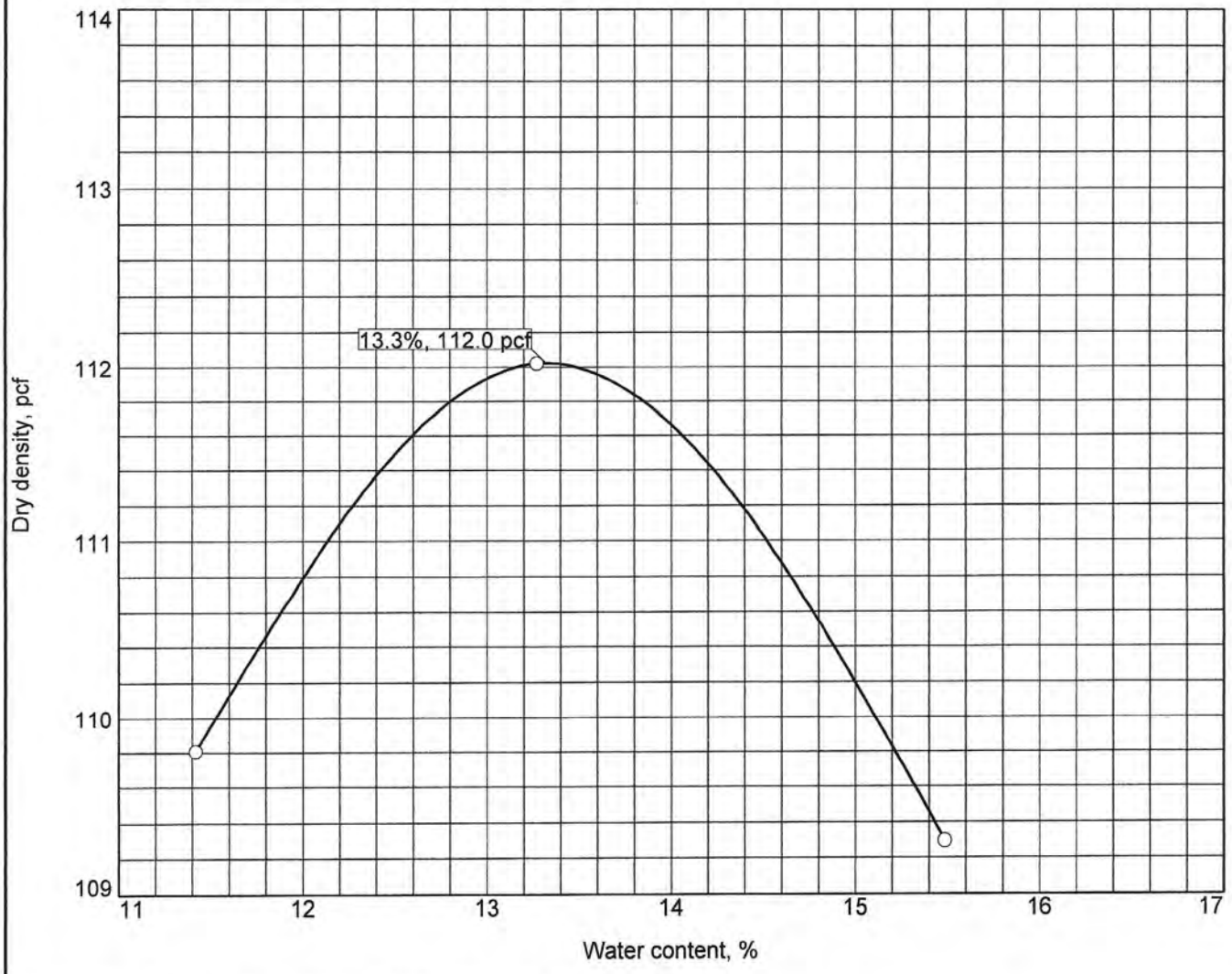
Date: 08/11/2022

MATERIALS TESTING M T I INCORPORATED

Client: BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Project No: 3237-079 **Figure** 0300-018

Tested By: Jack Bianchin

LABORATORY PROCTOR TEST REPORT



Test specification: ASTM D1557-12 Method C Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
1.0'-5.0'				2.65			0.2	

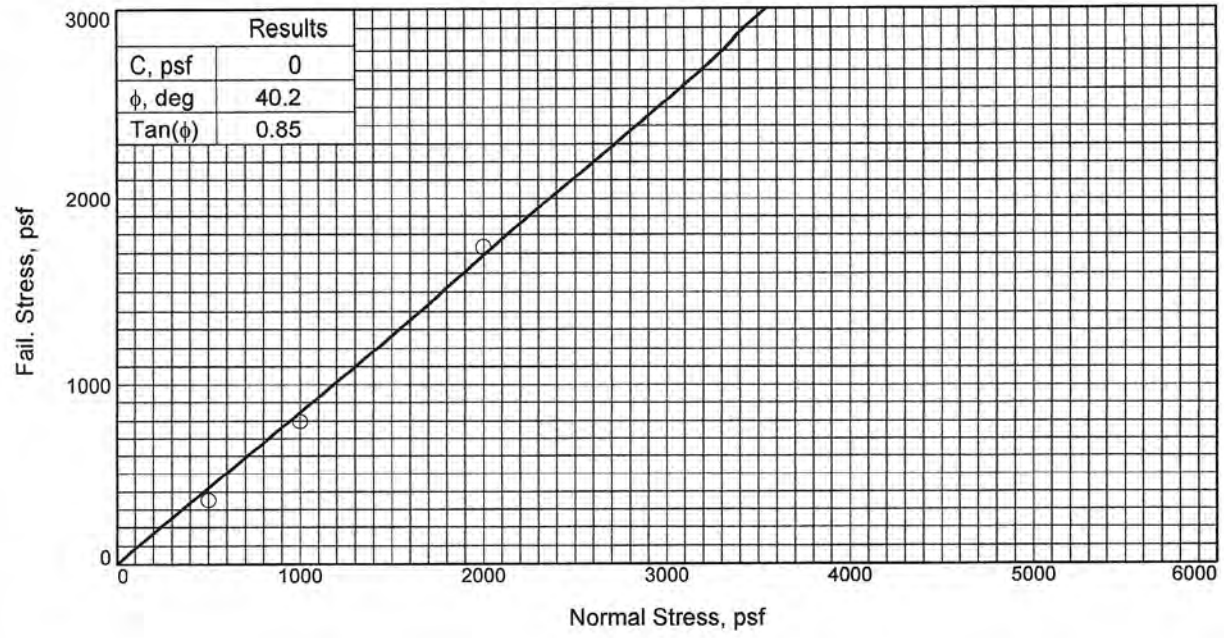
TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 112.0 pcf Optimum moisture = 13.3 %	Dark Brown Sandy Clay (visual)

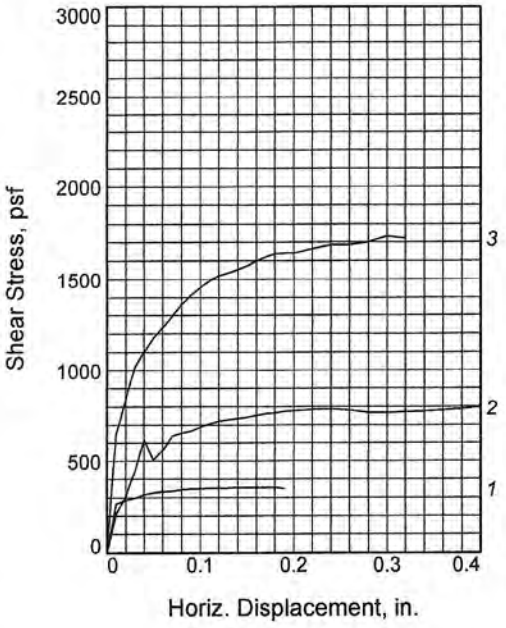
Project No. 3237-079 **Client:** BAJADA Geosciences, Inc.
Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
○ **Location:** DH-24 (A1), S1 **Sample Number:** 18

Remarks:
Curve #1
08/11/2022

Figure 0300-019

Tested By: Travis Fiscus





Sample No.		1	2	3
Initial	Water Content, %	20.1	20.1	20.1
	Dry Density, pcf	86.9	90.9	89.3
	Saturation, %	57.7	63.3	61.0
	Void Ratio	0.9386	0.8548	0.8876
	Diameter, in.	2.41	2.41	2.41
	Height, in.	0.90	1.00	1.00
At Test	Water Content, %	29.8	20.0	21.4
	Dry Density, pcf	80.7	84.9	77.2
	Saturation, %	73.8	54.9	48.9
	Void Ratio	1.0885	0.9861	1.1837
	Diameter, in.	2.41	2.41	2.41
	Height, in.	0.97	1.07	1.16
Normal Stress, psf		500	1000	2000
Fail. Stress, psf		354	795	1733
Displacement, in.		0.14	0.40	0.30
Ult. Stress, psf				
Displacement, in.				
Strain rate, in./min.		0.002	0.002	0.002

Sample Type: Tube
Description: Yellowish Brown Sandy Clay (visual)

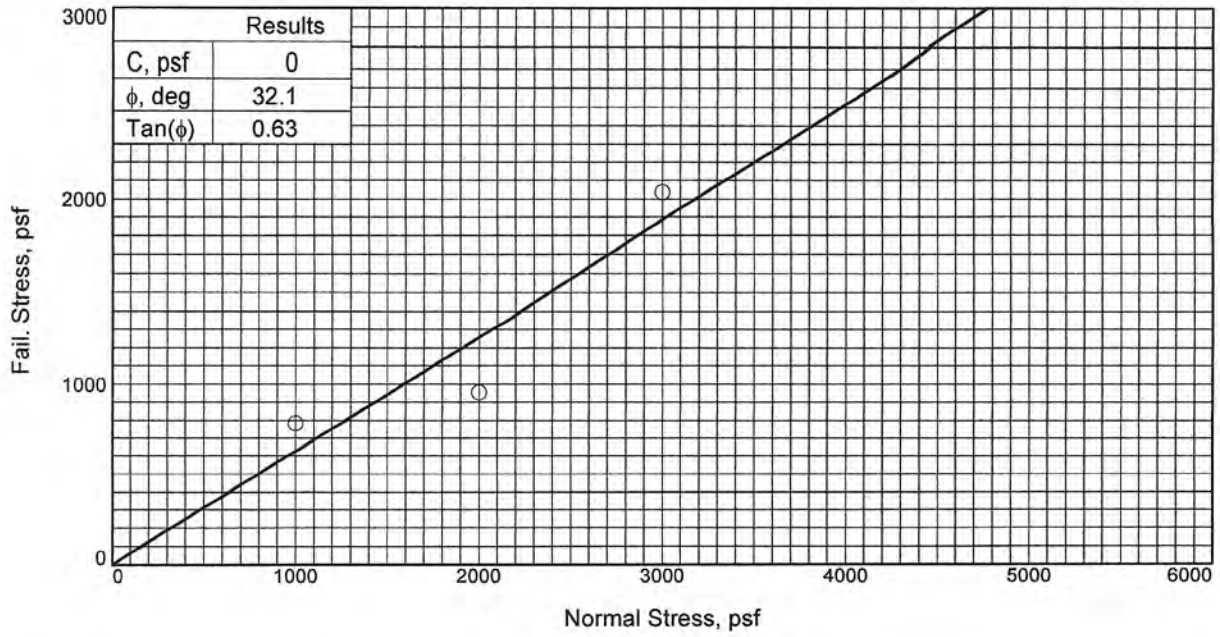
Specific Gravity= 2.70
Remarks: Material Tested in Accordance with ASTM D3080.

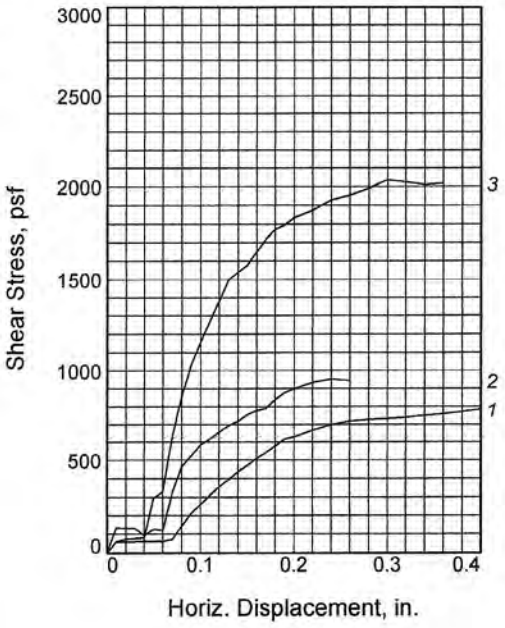
Figure 0300-020

Client: BAJADA Geosciences, Inc.

Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Location: DH-24 (A1), S4
Sample Number: 21 **Depth:** 10.0'
Proj. No.: 3237-079 **Date Sampled:** 08/11/2022

Tested By: Andy King





Sample No.		1	2	3
Initial	Water Content, %	12.6	12.6	12.6
	Dry Density, pcf	82.8	79.8	78.7
	Saturation, %	33.4	31.0	30.3
	Void Ratio	0.9984	1.0743	1.1009
	Diameter, in.	2.41	2.41	2.41
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	31.5	23.8	24.6
	Dry Density, pcf	79.0	70.4	70.9
	Saturation, %	76.3	46.8	48.8
	Void Ratio	1.0953	1.3485	1.3330
	Diameter, in.	2.41	2.41	2.41
	Height, in.	1.05	1.13	1.11
Normal Stress, psf		1000	2000	3000
Fail. Stress, psf		783	953	2036
Displacement, in.		0.40	0.24	0.30
Ult. Stress, psf				
Displacement, in.				
Strain rate, in./min.		0.002	0.002	0.002

Sample Type: Tube
Description: Yellowish Brown Clayey Sand (visual)

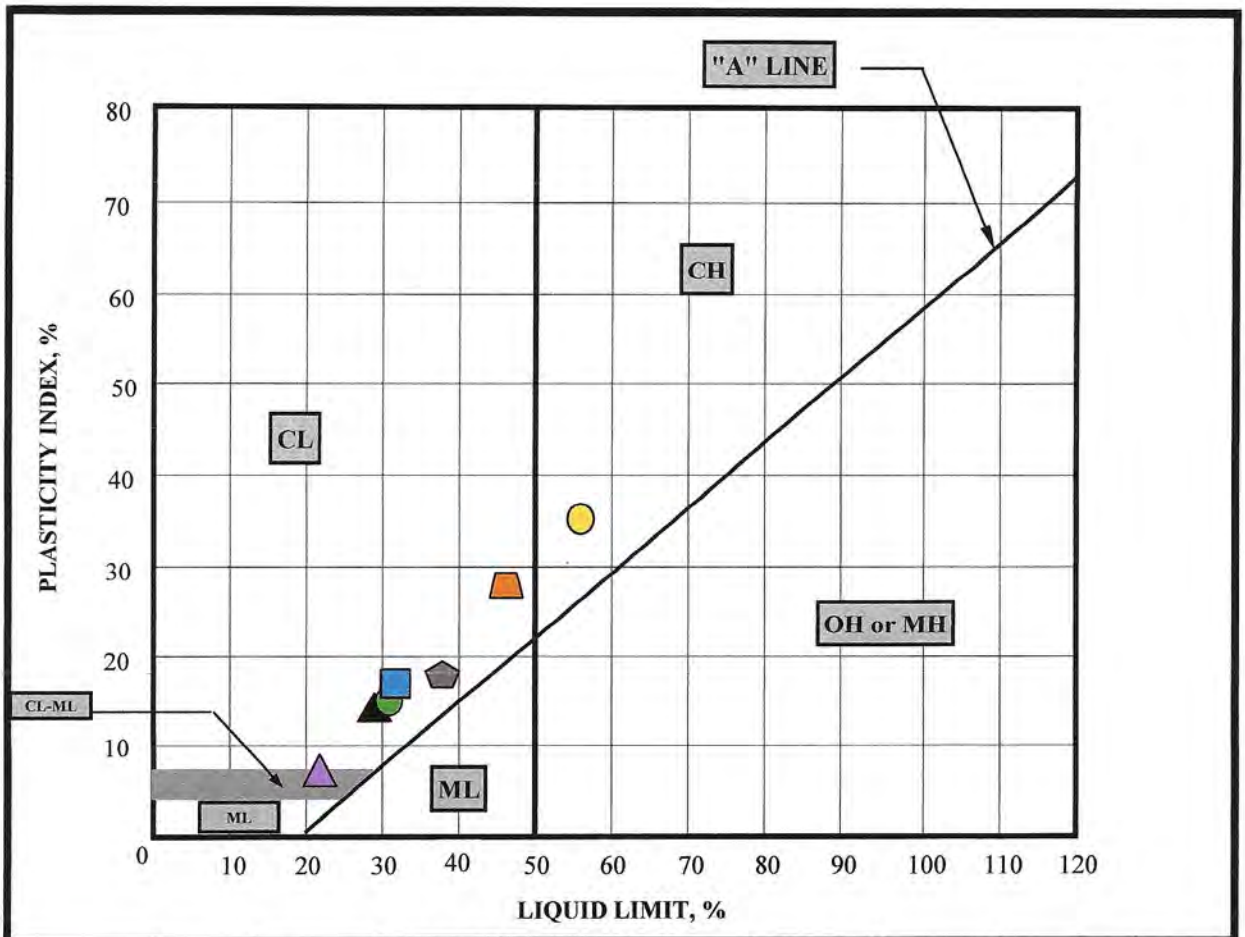
Specific Gravity= 2.65
Remarks: Material Tested in Accordance with ASTM D3080.

Figure 0300-021

Client: BAJADA Geosciences, Inc.

Project: SB-VTA Tie-In Pipeline #2101.0113
SB & Ventura Counties, California
Location: DH-25 (A-2), S3
Sample Number: 28 **Depth:** 5.0'
Proj. No.: 3237-079 **Date Sampled:** 08/11/2022

Tested By: John Hubbard



KEY SYMBOL	SAMPLE NUMBER	DEPTH	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	LIQUIDITY INDEX	UNIFIED SOIL CLASSIFICATION SYMBOL
●	DH-4A, S1	40.0'	N/A	31	16	15	N/A	CL
▲	DH-4, S2	45.0'	N/A	29	15	14	N/A	CL
■	DH-4A, S3	50.0'	N/A	32	15	17	N/A	CL
⬟	DH-16, S2	40.0'	N/A	38	20	18	N/A	CL
⬟	DH-18,S3	60.0'	N/A	46	18	28	N/A	CL
●	DH-20, S1	42.0'	N/A	56	21	35	N/A	CH
▲	DH-22, S3	55.0'	N/A	22	15	7	N/A	SC-SM
■	A-1, S2	3.0'	N/A	---	---	NP	N/A	SM

Note: NP - Non Plastic

Note: Atterberg Limits tested in accordance with ASTM D4318.

Materials Testing, Inc.

PLASTICITY CHART AND DATA

SB-VTA Tie-In Pipeline #2101.0113

SB & Ventura Counties, California

Project No:	Date:	Figure No:
3237-079	8/11/2022	0300-022

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 08/10/2022
Date Submitted 08/05/2022

To: Andy King
K.C. Engineerig
8798 Airport Rd.
Redding, CA 96002

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager RA

The reported analysis was requested for the following location:
Location : 3237 BAJADA SB-VTA Site ID : A2 S2 @ 3.
Thank you for your business.

* For future reference to this analysis please use SUN # 87914-182824.

EVALUATION FOR SOIL CORROSION

Soil pH	6.87		
Minimum Resistivity	3.22 ohm-cm (x1000)		
Chloride	2.2 ppm	0.00022	%
Sulfate-SO4	26.3ppm	0.00263	%

METHODS
pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate-SO4 ASTM C1580, Chloride CA DOT Test #422m

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 08/10/2022
Date Submitted 08/05/2022

To: Andy King
K.C. Engineerig
8798 Airport Rd.
Redding, CA 96002

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 3237 BAJADA SB-VTA Site ID : DH-16 S1 @ 35.
Thank you for your business.

* For future reference to this analysis please use SUN # 87914-182825.

EVALUATION FOR SOIL CORROSION

Soil pH	7.41		
Minimum Resistivity	0.62 ohm-cm (x1000)		
Chloride	15.4 ppm	0.00154	%
Sulfate-SO4	419.7ppm	0.04197	%

METHODS
pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate-SO4 ASTM C1580, Chloride CA DOT Test #422m

Sunland Analytical
11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 08/10/2022
Date Submitted 08/05/2022

To: Andy King
K.C. Engineerig
8798 Airport Rd.
Redding, CA 96002

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 3237 BAJADA SB-VTA Site ID : DH-23 S1 @ 55.
Thank you for your business.

* For future reference to this analysis please use SUN # 87914-182826.

EVALUATION FOR SOIL CORROSION

Soil pH	8.12		
Minimum Resistivity	1.37 ohm-cm (x1000)		
Chloride	8.4 ppm	0.00084	%
Sulfate-SO4	39.3ppm	0.00393	%

METHODS
pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate-SO4 ASTM C1580, Chloride CA DOT Test #422m

APPENDIX C

Geophysical Surveys



APPENDIX C
GEOPHYSICAL SURVEYS

Geophysical surveys were performed on a section of the proposed pipeline alignment extending between about Stations 35+90 and 49+25, as shown on Plate 3.2. The geophysical surveys were performed by GeoVision Geophysical Services of Corona, California on May 24, 2022. GeoVision's report of methods used and results of those surveys is attached.

REVISED GEOPHYSICAL REPORT

ELECTRICAL RESISTIVITY SURVEY

Ventura County, California

GEO*Vision* Project No. 22168

Prepared for

Bajada Geosciences, Inc.

1300 Market Street

Suite 201

Redding, CA 96001

Prepared by

GEO*Vision* Geophysical Services

1124 Olympic Drive

Corona, CA 92881

Report 22168-01 Revision 1

June 9, 2022

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1 INTRODUCTION

An electrical resistivity tomography survey was conducted along a single line in Ventura County, California on May 24, 2022. The purpose of this investigation was to image the resistivity profile of the upper 100 feet below the ground surface (if possible) and infer geologic conditions based on the electrical resistivity structure. In particular, identification of a potential paleochannel of gravels, cobbles, and boulders was the primary target for this investigation.

The geology in the vicinity of the geophysical survey was expected to consist of alluvium overlying nonmarine, well-consolidated siltstone and silt, sandstone and sand, and conglomerate and gravel that make up the Casitas Formation (Minor and Brandt, 2015). The geophysical survey line was located near the Rincon Creek Fault, a reverse fault that dips to the south.

The location of the line was selected by Bajada Geosciences, Inc. The position of the geophysical line was marked by GEOVision personnel using survey paint, and GPS data points collected at its endpoints. The survey line is shown in Figure 1, which uses a geologic base layer to illustrate an interpretation of the Rincon Creek Fault relative to our line. A summary of the GPS data including line length and line end coordinates is included as Table 1.

This report includes a discussion of equipment and field procedures, methodology, data processing, and results of the geophysical survey. Geophysical techniques used during the investigation are discussed in Section 2. Equipment and field procedures are described in Section 3. Data processing is discussed in Section 4. A discussion of the results of the geophysical survey is presented in Section 5. Technical references are included in Section 6 and our professional certification is presented in Section 7.

2 METHODOLOGY

Electrical resistivity tomography (ERT) involves the measurement of the apparent resistivity of subsurface soil and rock as a function of depth and/or position. The ERT method can identify variations in subsurface geologic features where contrasts in the resistivities are present. Changes in the electrical properties of the subsurface are non-unique indicators of geologic conditions (Dahlin, 1996). Variations in subsurface moisture content, porosity, permeability, and soil or rock type (i.e., lithology) affect electrical resistivity measurements. Cultural features (man-made features such as fences, power lines, pipelines, and buried debris) can influence resistivity measurements and are considered potential sources of noise.

During a resistivity survey, electrical current is applied to a pair of electrodes (a dipole), and the potential difference (voltage) is measured between one or more pairs of potential electrodes. For a 2-D resistivity survey, the current and potential electrodes are generally arranged in a linear array. Common array types include pole-pole, dipole-dipole, Schlumberger, Wenner, and gradient arrays. The apparent resistivity is the resistivity of a homogenous and isotropic half-space that would yield the measured resistivity for a given input current and potential difference for a given arrangement of electrodes. It is calculated by dividing the measured potential difference by the input current and multiplying by a geometric factor calculated for the array.

Apparent resistivity is typically modeled via an inversion algorithm to generate a geoelectric section of the subsurface directly beneath the profile (Loke and Barker, 1996). The inversion process involves creating a hypothetical earth model of cells with infinite length perpendicular to the line, calculating the theoretical resistivity of this model, and iteratively adjusting the resistivity of the cells to minimize error between the calculated and observed (field) resistivity data. The final result of the inversion process is a resistivity model of the subsurface that fits the observed data with input error and smoothness constraints.

Depth of investigation for the ERT method is a complex function involving receiver array length and the electrical properties of the subsurface materials (Oldenburg and Li, 1999). In general, for 2D electrical resistivity surveys, resolution and depth of investigation are inversely proportional. High resolution is typically obtained by using relatively small electrode spacing. However, using small electrode spacing reduces investigation depth. Conversely, large electrode separation will typically provide greater depth of investigation but sacrifices resolution.

3 EQUIPMENT AND FIELD PROCEDURES

ERT equipment used during this investigation consisted of an Advanced Geosciences, Inc. SuperSting R8/IP transceiver, stainless-steel electrode stakes, and multi-core electrode cables with Mueller-style takeouts. The 400-volt transmitter is capable of outputting current levels of up to 2 amperes at 200 watts. It was powered by 12V deep-cycle marine batteries. The instrument can record up to eight channels simultaneously and switching between up to 112 electrode pairs to function as current or potential dipoles.

A 12-foot geophone electrode spacing was used for the ERT survey. The 112-switching capability meant that the system could collect a single "live" spread up to 1,332 feet in length.

A contact resistance test was performed to monitor the resistance values between each pair of electrodes. Dipoles with anomalously high contact resistances were checked (ensuring adequate coupling of the electrode to the soil and verifying clean metal-metal contact between the multicore cable and electrode) and the contact resistance test repeated. If anomalously high contact resistance readings persisted, the electrode location was adjusted and/or a salt-water solution was applied to the electrodes in question. Contact resistance values were deemed satisfactory for this investigation when below 1,000 ohms.

Operation of the AGI SuperSting was partially automated. Prior to taking measurements, a sequence file was loaded to the instrument. This file specifies which pairs of electrodes to function as the current dipole, and which pairs of electrodes to function as potential difference dipoles for each measurement. The instrument read this sequence file and commenced with the automatic data collection. For each line of the sequence, multiple measurements were performed and the standard deviation between those measurements was calculated. If that standard deviation value exceeded a percentage programmed by the operator (for this project, 5%), that measurement was repeated up to two times. If the standard deviation after two repeats did not improve below the programmed threshold, the reading was stored and flagged for later evaluation during data processing. Typically, the standard deviation was within the 5% threshold, and the instrument stored the reading and advanced to the next line of the sequence file.

During the measurement cycle, the instrument displayed the sequence number, current applied, voltage differential recorded at each dipole, and the standard deviation between repeat measurements. The operator monitored these values for anomalously low current values, negative recorded voltages, and high standard deviation values that may indicate potential problems for the geophysical survey. If a problem was identified during data collection, the operator paused the measurement cycle and inspected the electrode array for problems such as loose electrodes, disconnected electrodes, or nearby cultural features that may impact the recorded apparent resistivity values.

Three resistivity arrays were collected along the ERT profile: strong gradient, dipole-dipole, and inverse-Schlumberger. These arrays have different strengths and weaknesses. For example, the dipole-dipole array has superior resolution and ability to image smaller isolated targets but weaker signal strength (more prone to noisy data). The strong gradient array collects fewer data points but has superior signal strength. The inverse-Schlumberger array is a balance between the dipole-dipole and gradient arrays in terms of noise vs. signal strength, but often displays results with a clear vertical bias (increased vertical stretching and smoothing).

4 DATA PROCESSING & MODELING

Raw resistivity data were first evaluated in pseudosection format *(*i.e., station versus "n" spacing). Note that pseudo-sections are not cross-sections or earth models as the dipole-dipole pseudosection plotting method is not a depth representation (Edwards, 1977), but it is a useful means of evaluating data graphically. The pseudosection was analyzed for individual data points with high reported error (RMS error between measurements). Data with extremely high (>10%) variance between measurements were automatically discarded. Points interpreted as outliers beyond the trends observed in the geophysical data as expected for the geologic environment were manually evaluated and removed. Due to physical and geometric constraints, a single spurious point would not represent an accurate apparent resistivity value for a measurement point. These spurious points can be identified on the raw pseudosections and removed. This does not include all outlier data. For example, if a zone of anomalously high apparent resistivity values is observed in the data, those points would not be removed prior to inversion. Other data points with lower error were discarded if they did not appear to match the geoelectric section – a spurious high resistivity value surrounded by conductive measurements, for example. When patterns of "noisy" data were determined to be associated with a single electrode location, all data associated with that electrode location was reviewed in greater detail. It is uncommon, but possible, for an electrode to become loose or unplugged after preliminary testing but during data collection, and all subsequent data collected using that electrode to be in error.

After data processing, the averaged apparent resistivity data were input into EarthImager2D (AGI) for two-dimensional modeling. An ASCII formatted station file summarizing the electrode geometry, project stationing, and elevation is imported prior to inversion. The final model cross-sections for the ERT survey are derived from smooth-model inversion results of the inverse-Schlumberger array data. Strong gradient array data were also evaluated. Smooth-model inversion mathematically back-calculates (or "inverts") the measured data to determine a subsurface resistivity structure. The results of the smooth-model inversion are intentionally gradational, rather than showing abrupt, blocky changes in the subsurface. The smooth-model algorithm includes accurate modeling of two-dimensional topography along with subsurface resistivity (MacInnes and Zonge, 1996).

These inversion results should not be considered unique solutions, as some ambiguity remains in any mathematical representation of geology. The inversion assumes a 2D earth with bodies having a significant (homogenous) lateral extent outside of the 2D cross-sectional plane. For 3D structure this inversion will be in error. In addition, the ERT method will detect anomalies that are off-line or out of the plane from the transect but without the ability to determine where those out of plane anomalies originate.

Inversion output was saved as an ASCII format XYZ file containing position, elevation, and resistivity. The data were imported into Surfer mapping system where the resistivity models were converted to a log format, gridded, contoured, and annotated for presentation. Results are presented as color cross sections showing the resistivity distribution derived from the smooth-model inversion process. Profile distance is shown across the base of the cross section, and elevation is labeled along the side. A 4x vertical exaggeration is presented to match the cross sections provided by Bajada Geosciences during the proposal stage. Additional masking of data along the edges of the cross-section is performed, beyond the limits of the geometric locations of the data points.

5 RESULTS

The primary purpose of the geophysical survey was to identify the horizontal and vertical extents of a potential paleochannel feature crossing the survey profile using the electrical resistivity tomography method. Pore fluid is the primary control for the resistivity of earth materials, based on: (A) the amount of pore fluid present, (B) the resistivity of that fluid, and (C) the arrangement of pore space between grains. In general, coarser-grained materials are expected to be more resistive than fine-grained materials. A paleochannel feature backfilled with gravels, cobbles, and boulder would be expected to be more resistive than fine-grained soils, but alluvial materials can be extremely variable.

The interpretation of geophysical anomalies is inherently ambiguous as any given anomaly could be caused by several possible sources (Kearey and Brooks, 1991). An important task in interpretation is to decrease the ambiguity by using all external constraints on the nature and form of the anomalous body. Such constraints include geologic information derived from surface outcrops, boreholes, and from other complementary techniques. Bajada provided boring logs for DH-14, and DH-15 which are located within our survey transect and were used to constrain the geophysical interpretation. DH-14 is described by alluvium with clay to a depth of 12 feet below the ground surface (BGS) where gravel and cobbles were encountered. This was interlayered with fine sand at a depth of 20 feet BGS. Total depth of the borehole was 25 feet. No groundwater or bedrock was encountered. DH-15 is described as alluvium with clay to a depth of 14 feet BGS where fine sand is encountered, interbedded with clay layers. No coarse-grained materials similar as described in DH-14 were encountered in DH-15, nor was groundwater or bedrock to its total recorded depth of 37 feet BGS.

The results of the smooth-model tomographic inversion of the inverse Schlumberger array data are presented as Figure 2. The dipole-dipole data, though noisy, are presented as Figure 3. The strong gradient data are presented as Figure 4. All data sets were evaluated during interpretation of the results though the inverse Schlumberger model is used for description of the results below. In tomographic models, sharp layer contacts are not clearly defined and thus ranges of resistivity are used to interpret possible rock conditions and competency. A color bar is used to describe modeled resistivities from the tomographic modeling process.

Modeled resistivity is a function of the array type and discrepancy between different geometric arrays and final modeled resistivity values is typical. Please note that while the resistivity inversion modeling process is intended to calculate the model resistivity for a discrete depth and location along the profile (a “cell” in XY model space) the resistivity is calculated from a *bulk* measurement containing the entire resistivity structure of materials beneath the electrode pairs used to calculate that resistivity value. In other words, materials above a geoelectric unit can have a strong impact on the calculated resistivity values of the geoelectric unit below. The caveats of tomographic smoothing across resistivity gradients still applies. These factors yield resistivity anomalies that are larger in breadth than their geologic (or man-made) source, and the amplitudes of the resistivity contrasts will be distorted based on the volume of material sampled.

Tomographic inversion techniques will typically model a gradual increase in resistivity with depth even if an abrupt contact is present. Therefore, if gradients are not present, tomographic inversion routines will overestimate and underestimate resistivity above and below a layer contact, respectively. Gradients can, however, be common in geologic environments with weathering zones and multiple types of rock, or areas with differential compaction and fill

materials. Given these smoothed models, and the inherent limitations of geophysics, we recommend that all of our depth estimates, thickness calculations, velocity and resistivity values be considered to be valid only to +/- 25% of the reported value. I.e., a layer interpreted at a depth of 10ft could fall within a range of 7.5 – 12.5ft. This highlights the loss of resolution of geophysical methods at depth: a layer interpreted at a depth of 100ft could fall within the range of 75 – 125ft.

The single ERT line was long enough to image depths of 200 feet or more under ideal conditions (for the resistivity method, resistive soils). The relatively conductive materials at depth limit the amount of (coherent) signal returned, and the sensitivity of the model to changes in the deeper geo-electric structure indicates that the depth of the model should be approximately 80-100 feet. After removal of noisy data from the dipole-dipole data set, the depth of investigation for that model was limited to 50-80 feet BGS.

The color scheme used on the electrical resistivity images is a semi-log scale to enhance the contrast between high and low resistivities, but the actual degree of contrast is quite small. The color scheme consists of blue-green, yellow-orange, and red-magenta representing low, intermediate, and high resistivity, respectively. The red tones (80+ ohm-meters) are interpreted as coarser-grained materials such as gravel, cobbles and boulders with some fines present in the pore spaces. The intermediate yellow-orange tones (55-80 ohm meters) are interpreted as sandy materials. Blue tones (resistivity < 20 ohm-m) are interpreted as saturated materials and/or more conductive bedrock. High-porosity, saturated fine-grained materials such as siltstone, mudstones, etc. will typically be relatively conductive (less resistive). In addition, higher concentrations of dissolved solids or minerals within pore spaces can lower resistivity of sediments.

The geo-electric section is interpreted as a 3-4 layered model: A thin moderate-resistive zone (alluvium) is underlain slightly-more resistive materials interpreted as sands and silt sands. There is zone of more resistive (80+ ohm-meters) materials interpreted as coarser-grain sediments such as gravel, cobbles, and boulders between the start of our ERT profile and approximate station 600 feet. This lateral change in resistivity is diffuse due to the relatively small degree of contrast between resistivity of the alluvium and paleochannel sediments. An alternative interpretation would be that two smaller primary paleochannel features are present, between the start of our line and profile distance 100 feet, and another between 300-500 feet along the line.

Depth and thickness of the potential paleochannel(s) is difficult given the inherent smoothness of resistivity models and lack of resistivity contrast within the geo-electric section. Comparing the dipole-dipole model with the borehole log DH-14, we can expect the resistivity range associated with the described paleo-channel deposits to be at least 30 feet thick at DH-14, and 50 feet thick at their interpreted deepest point near profile station 450 feet.

The apparent lateral discontinuity of the conductive layer at depth is consistent with an ERT line intersecting a fault which acts as a groundwater barrier and/or a fault where finer-grained materials are upthrown on the western end of line. The exact orientation of our line relative to the Rincon Creek Fault is uncertain, as there are differing approximations of its location. As described above, if our survey profile is sub-parallel to 2D geologic structure, then the lateral change in the geo-electric response could be caused by an out-of-plane geologic structure or lithologic change. The apparent conductive feature extending to the surface at profile station 725 feet may be caused by some surface or near-surface conductive cultural feature (such as a pipe, utility, buried concrete structure, etc.) influencing the inversion result.

6 REFERENCES

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7 CERTIFICATION

All geophysical data, analysis, interpretations, conclusions, and recommendations in this document have been prepared under the supervision of and reviewed by a **GEO***Vision* California Professional Geophysicist.

Prepared by

JB Shawver



June 9, 2022

JB Shawver — Date

Geophysicist

GEO*Vision* Geophysical Services

This geophysical investigation was conducted under the supervision of a California Professional Geophysicist using industry-standard methods and equipment. A high degree of professionalism was maintained during the project from the field investigation and data acquisition, through data processing interpretation and reporting. Original field data files, field notes and observations, and other pertinent information are maintained in the project files and are available for the client to review for a period of at least one year.

A professional geophysicist's certification of interpreted geophysical conditions comprises a declaration of his/her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations or ordinances.

Name	Direction	Location	Northing	Easting	Latitude	Longitude
			California State Plane Zone 5, US Survey Feet	California State Plane Zone 5, US Survey Feet	WGS 84	WGS 84
Line 1	West	0ft	1966926	6118758	34.38830	-119.4681
	East	1332ft	1966416	6119977	34.38695	-119.4641

Table 1 - Surface Geophysical Line Geometry

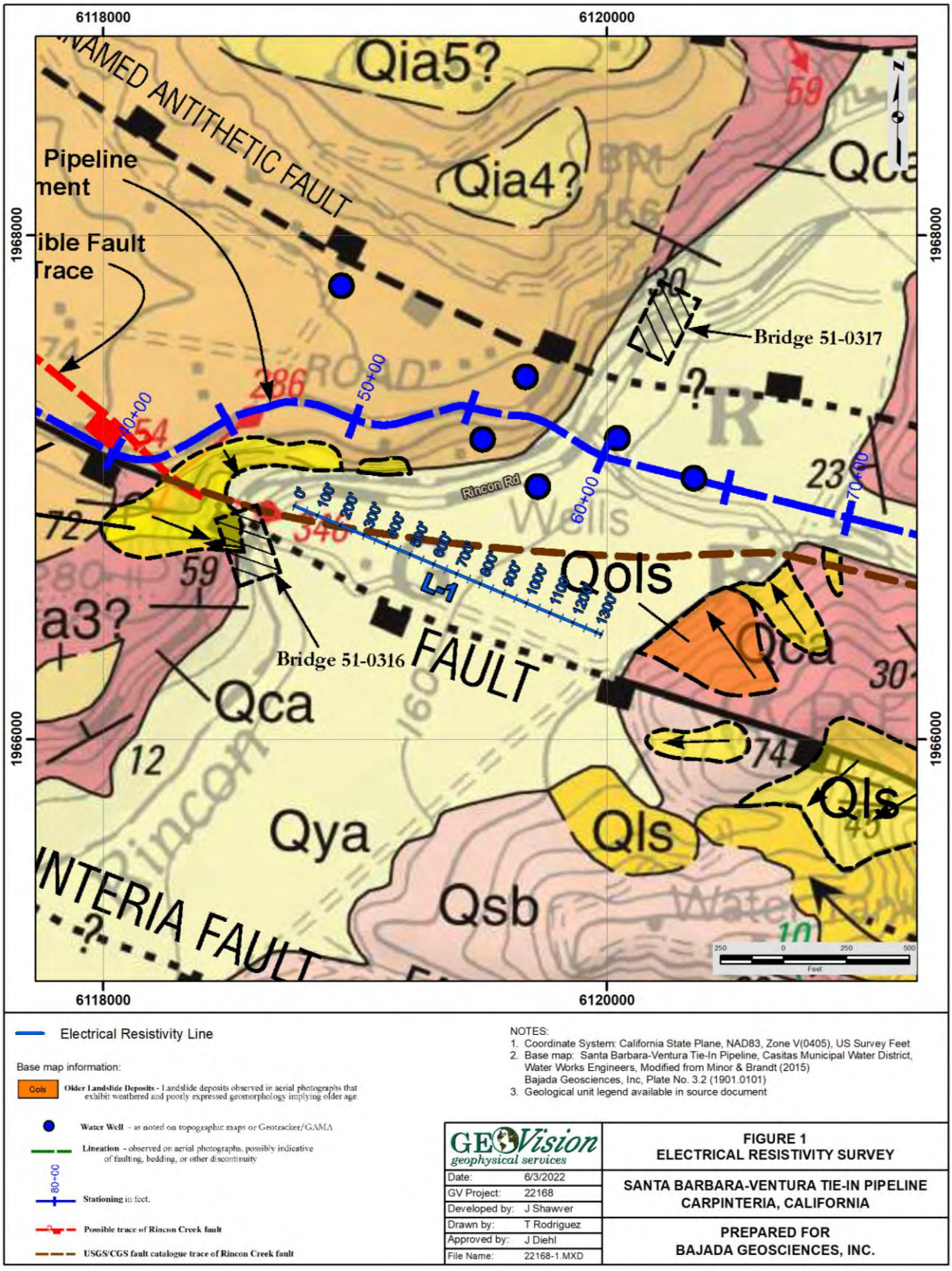


Figure 1: Line Location Map on 2015 Geologic Base Layer with Client Markup

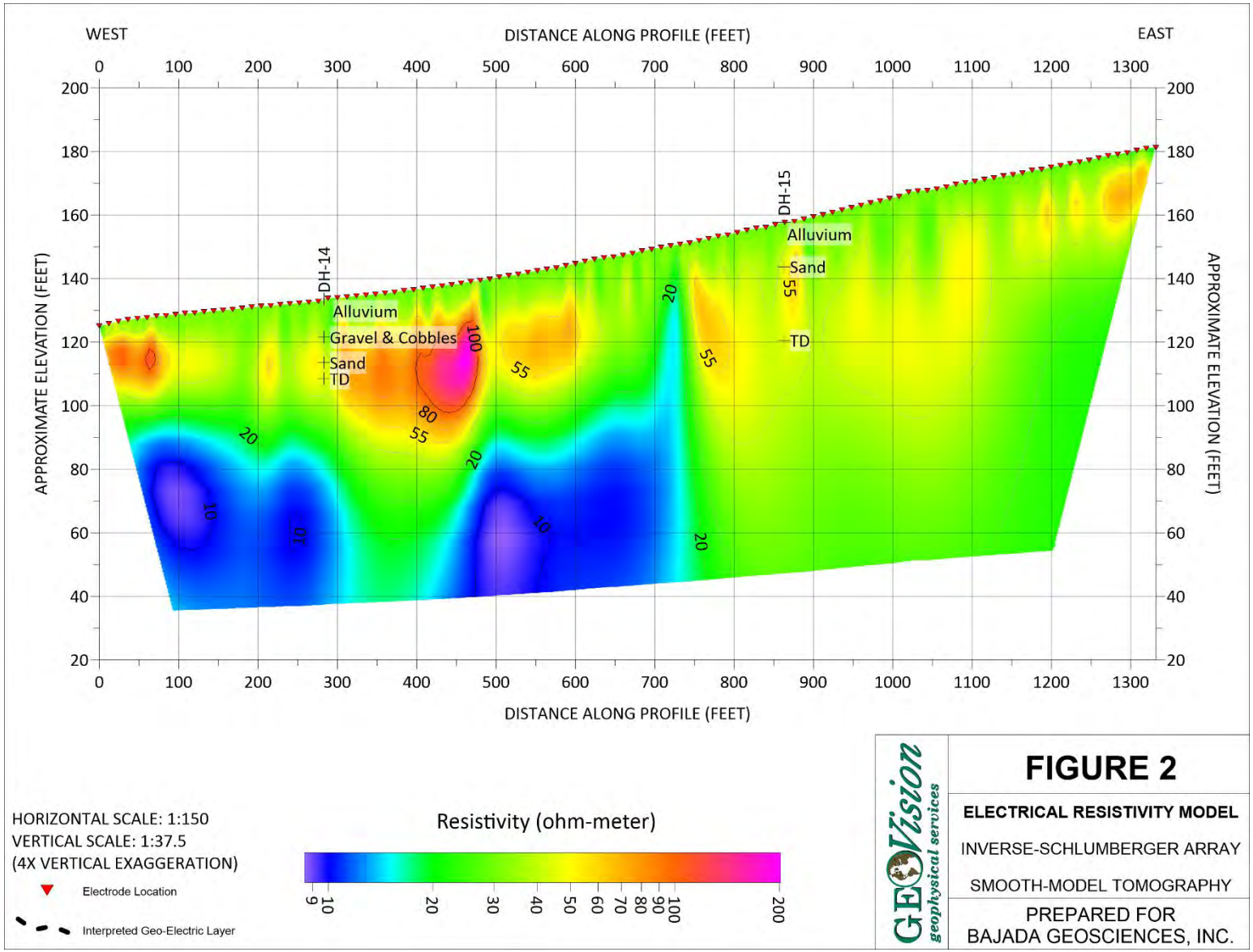


Figure 2: Electrical Resistivity Tomography Model – Inverse Schlumberger Array

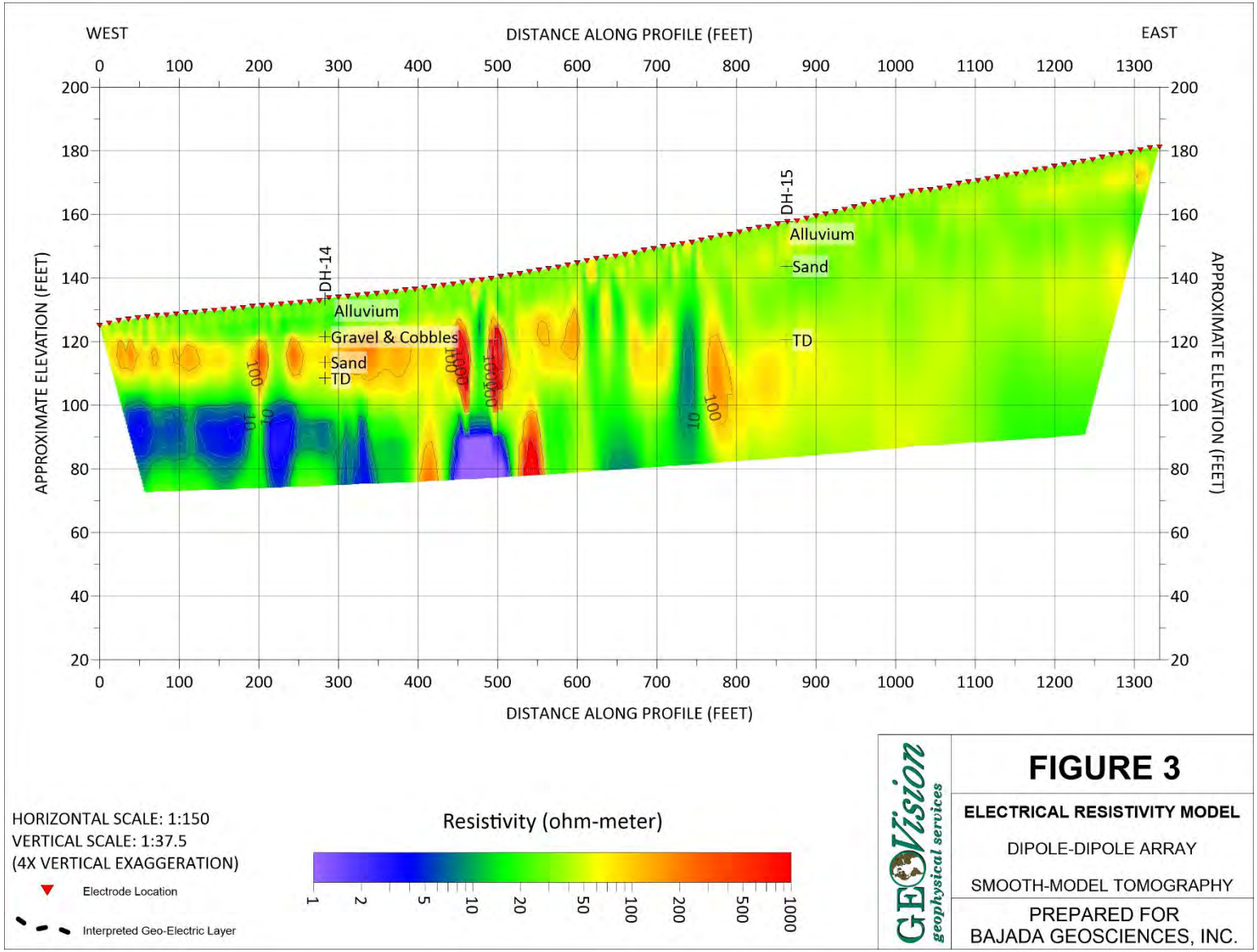


Figure 3: Electrical Resistivity Tomography Model – Dipole-Dipole Array

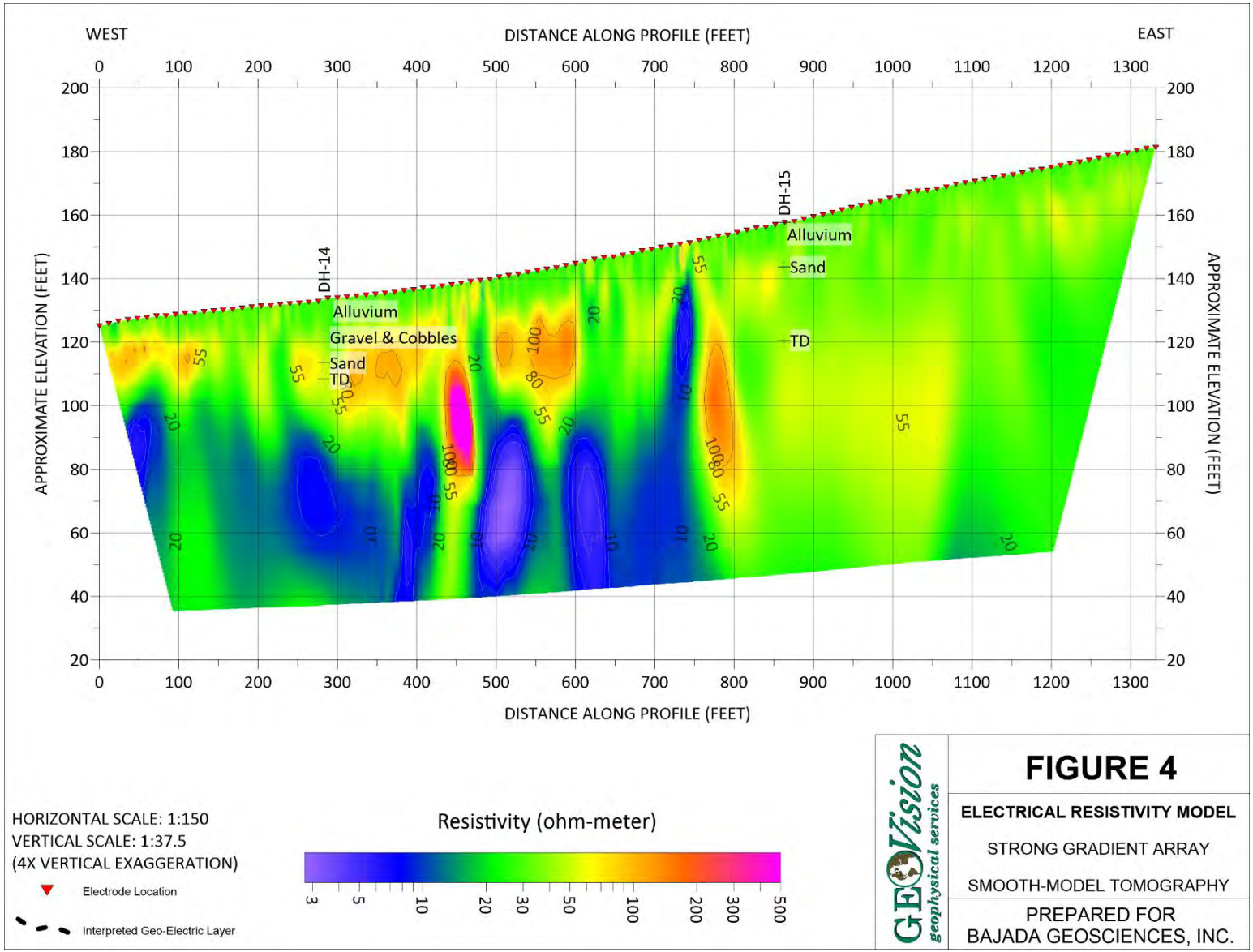


Figure 4: Electrical Resistivity Tomography Model – Strong Gradient Array

APPENDIX D

Preliminary (Desktop) Geotechnical Study

DRAFT PRELIMINARY (DESKTOP) GEOTECHNICAL REPORT

Santa Barbara-Ventura Tie-In Pipeline
Santa Barbara &
Ventura Counties, California

DRAFT

Submitted To:

Mr. Andrew J. Borgic, P.E.
WATER WORKS ENGINEERS
11515 West 190th Street
Suite 428
Gardena, CA 90248

Prepared by:
Bajada Geosciences, Inc.

March __, 2018
Project No. 1901.0101

BAJADA Geosciences, Inc.

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DRAFT

1 GENERAL

This report presents a preliminary (desktop) geotechnical study for Casitas Municipal Water District's (CMWD) proposed Santa Barbara-Ventura Tie-In Pipeline Project located in Santa Barbara and Ventura Counties, California, as shown on Plate 1 – Site Location Map. Our services have been performed under contract with Water Works Engineers (WWE) who is the civil engineering consultant for CMWD for the project.

The following sections present our understanding of the project, the purpose of our study, and the geotechnical findings, conclusions, and recommendations for the project. Our services were performed in general accordance with our proposal dated February 12, 2019.

1.1 PROJECT ALIGNMENT & UNDERSTANDING

We understand that CMWD intends to design and construct a new water pipeline connecting Santa Barbara County water transmission systems with Ventura County water transmission systems. Currently, we understand that such an intertie pipeline does not exist between the two counties. Thus, the proposed project consists of tying in Carpinteria Water District's system and the South Coast Conduit with a CMWD water transmission pipeline that feeds La Conchita.

Alignment maps showing the pipeline alignments studied are presented as Plate 2 – Proposed Pipeline Alignment. The proposed pipeline will extend south and east along Highway 192 from Shepard Mesa Road to a point south of the intersection of Highways 192 and 150. At that point, the alignment is proposed to extend easterly across Rincon Creek, cross Highway 150 and extend through existing avocado orchards on Rincon del Mar Ranch to tie in the with existing 20-inch diameter CMWD pipeline. We understand that the proposed pipeline will have a diameter of 16 inches and will be about 7,500 feet long.

To simplify discussions within this report, we've segregated the proposed pipeline into the following three segments and assigned stationing:

- **Santa Barbara Segment** – that portion of the pipeline alignment located within Santa Barbara County from Shepard Mesa Road to Rincon Creek (Stations 10+00 through about 57+00);
- **Rincon Creek Crossing Segment** – that portion of the pipeline alignment extending across Rincon Creek (from about Stations 57+00 to 59+00); and
- **Ventura Segment** – that portion of the pipeline alignment extending south and east from Rincon Creek to the easterly pipeline terminus (from about Station 59+00 to 85+00).

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Pipeline stationing is shown on Plate 3.1.

In addition to the proposed pipeline, we understand that a pump station will be designed and constructed. The location of the pump station, its dimensions, and depths are unknown to us at this time.

The approximate center point of the pipeline has the following latitude and longitude:

- Latitude: 34° 23' 22.0" (34.389369°)
- Longitude: -119° 27' 57.7" (-119.466022°)

1.2 STUDY PURPOSE

The purpose of our preliminary geotechnical study was to gather selected, available geotechnical, geological, and hydrogeologic information pertinent to the study area to prepare a preliminary characterization of geological conditions in the study area and to provide preliminary geotechnical recommendations for the design of the project. No subsurface exploration or laboratory testing was performed as part of this "desktop" study. This study is preliminary in nature and not intended to provide design-level geotechnical data.

1.3 SCOPE OF SERVICES

Services performed for this study are in general conformance with the proposed scope of services presented in our February 12, 2019 proposal. Our scope of services included:

- Reconnaissance of the site surface conditions, topography, geomorphology, and existing drainage features;
- Attempted acquisition of selected, existing, available geotechnical data relevant to the project area. Those data collected and reviewed during this study are presented in the References Cited section of this report and relevant, available drill hole logs from previous studies are presented in Appendix A – Subsurface Information;
- Review of pertinent, selected regional geological data;
- Review of selected historical aerial photographs of the project region presented in Appendix B – Historical Aerial Photographs;
- Preparation of this report, which includes:
    - A description of the proposed project;
    - A description of site surface conditions observed during our site reconnaissance;
    - A preliminary characterization of subsurface conditions likely to be encountered along the project pipeline alignments discussed in

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Section 1.1;

- 2016 California Building Code (CBC) seismic design criteria;
- Alignment maps presented as Plate 2;
- A geologic map showing the projected surface distribution of geological materials along the project alignments. Those maps are presented as Plates 3.1 through 3.2 – Geotechnical Maps;
- Preliminary geotechnical recommendations for:
    - Suitability of on-site materials for use as engineered fill;
    - Allowable bearing capacities for manhole and other foundations;
    - Temporary excavations, shoring, and trench backfill; and
- Appendices that present information reviewed for this study.

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2 DATA REVIEWED

Data reviewed in preparation of this preliminary geotechnical study included historical aerial photographs, historical topographic maps, regional geological and hydrogeologic information, and subsurface information presented in Caltrans geotechnical reports for studies in the project region. Private sources, WWE, Geotracker, Envirostor, U.S. Geological Survey, California Geological Survey, Caltrans, and other sources were contacted to obtain geotechnical data. The following sections discuss those data sources.

2.1 HISTORICAL AERIAL PHOTOGRAPHS & TOPOGRAPHY

Historical aerial photographs for the project area were reviewed. Those aerials photographs consisted of the following:

HISTORICAL AERIAL PHOTOGRAPHS REVIEWED

Flight Line	Date	Scale	Frames
C-430	1929	1:24,000	A-22 to A-26
C-509	1929	1:18,000	B-7 to B-11
C-4950	1937	1:24,000	SF-144 to -146 & SF-154 to -156
C-9113	1944	1:7,200	3-1 to 3-5 & 1-44 to 1-46
C-9800	1945	1:14,400	10-1060, 10-1061, & 10-1152 to -1155
GS-EM	1947	1:24,000	6-148 to 6-151
C-12790	1948	1:7,200	9-64 to 9-68
BTM_1954	1954	1:20,000	10K-184 to 10K-186
HA-AN	1956	1:9,600	6-18 to 6-21
HA-GN	1959	1:15,600	101 to 105
HB-FV	1965	1:6,000	36 to 39
HB_IU	1966	1;12,000	101 to 103
HB-NN	1969	1:6,000	19 to 22
HB-RD	1970	1:6,000	1 to 3
HB-SY	1971	1:6,000	41 to 44
PW-17206-SBFlood	1984	1:24,000	5 & 6
PW-VEN-11	1994	1:24,000	207-209

Selected aerial photographs are presented in Appendix B.

Topographic maps from the years 1904, 1910, 1918, 1921, 1938, 1946, 1953, 1961, 1962, 1964, 1968, 1975, 1989, 2000, 2012, and 2015 were reviewed for this study.

2.2 REGIONAL MAPS

A number of regional geological maps were collected and reviewed for this study. Those maps include Moser & Frizzell (1982), Maltby (1984), Dibblee & Ehrenspeck (1987), Bezore & Wills (1999), Tan & Clahan (2004), Gutierrez et al. (2008), and Minor & Brandt (2015). Plates 3.1 through 3.2 shows the geologic conditions along the project alignment based on

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review of those sources with modifications based on our aerial photograph review and site observations.

2.3 GEOTECHNICAL & ENVIRONMENTAL STUDIES

The project area is located in a relatively rural environment where few site-specific sources of data are available. Searches for subsurface data in the project area were made through the California State Water Board's Geotracker database (Geotracker, 2019) and the California Department of Toxic Substance Control's Envirostor database (Envirostor, 2019). In both cases, no relevant subsurface geologic or environmental data were available in the project region.

Subsurface data was obtained from the California Department of Transportation (Caltrans, 1995 & 2002) for Bridge No. 51-0317 and 51-0316, respectively, on Highway 150 crossing Rincon Creek. Those bridges are located about 500 feet northeast and 1,400 feet southwest of the proposed pipeline crossing of Highway 150, respectively. Locations of the bridges are shown on Plate 3.2. The Log of Test Borings (LOTB) for those bridges are included in Appendix A.

2.4 SOILS SURVEY

Soil data for the project area was obtained from the Natural Resources Conservation Services Soil Survey website (NRCS, 2018). The following soils series are located beneath or proximal to the proposed pipeline alignment:

SOIL UNITS ALONG PIPELINE ALIGNMENT

Soil Unit No.	Soil Unit Name
Cb	Camarillo Variant, fine sandy loam
EaB	Elder Sandy Loam 2% to 9% slopes
GcA	Goleta Fine Sandy Loam, 0% to 2% slopes
MdF	Milpitas Stony Fine Sandy Loam, 30% to 50% slopes
MeC	Milpitas Stony Fine Sandy Loam, 2% to 9% slopes
MeD2	Milpitas-Positas Fine Sandy Loam, 9% to 15% slopes
MeE2	Milpitas-Positas Fine Sandy Loam, 15% to 30% slopes
MeF2	Milpitas-Positas Fine Sandy Loam, 30% to 50% slopes
OAG	Orthents, 50% to 75% slopes
AcC	Anacapa Sandy Loam, 2% to 9% slopes
GxG	Gullied Land
LkF	Lodo Rocky Loam, 30% to 50% slopes
LoD2	Los Osos Clay Loam, warm, 9% to 15% slopes
MoC	Mocho Loam, 2% to 9% slopes
ScG	San Benito Clay Loam, 50% to 75% slopes
SoE2	Sespe Clay Loam, 15% to 30% slopes
SoF	Sespe Clay Loam, 30% to 50% slopes
SwC	Sorrento Loam, 2% to 9% slopes

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The distribution of the proposed pipelines across those units is shown on Plate 4 – Soil Survey Map. Those soils have the following reported characteristics:

SOIL SURVEY DATA

Soil Unit	USCS Symbol	Grain-Size (%)			Plasticity Index	Liquid Limit	K (cm/sec)	Corrosivity	
		Clay	Silt	Sand				Concrete	Steel
Cb	ML	30.5	34.4	35.1	22.5	43.8	$1.2x10^{-3}$	Moderate	High
EaB	SC	13.0	20.0	67.0	8.0	28.3	$5.5x10^{-3}$	Low	Low
GcA	CL/ML	13.0	26.4	60.6	7.4	27.7	$9.0x10^{-4}$	Low	High
MdF	SM	29.8	21.7	48.5	20.6	41.5	$2.3x10^{-3}$	Low	Moderate
MeC	SM	31.7	28.3	48.5	22.4	44.5	$2.3x10^{-3}$	Low	Moderate
MeD2	CL/ML	35.0	23.5	41.5	24.7	46.1	$2.1x10^{-3}$	Low	High
MeE2	CL/ML	35.0	23.5	41.5	24.7	46.1	$2.1x10^{-3}$	Low	High
MeF2	CL/ML	35.0	28.3	41.5	24.7	46.1	$2.1x10^{-3}$	Moderate	High
OAG									
AcC	SC/SM	12.0	29.5	58.5	7.0	25.3	$2.8x10^{-3}$	Low	High
GxG									
LkF	CL	22.5	37.7	39.8	15.0	30.0	$5.6x10^{-3}$	Low	Low
LoD2	CL	38.3	37.1	24.6	26.9	50.5	$7.4x10^{-5}$	Low	High
MoC	CL	24.5	37.0	38.5	16.5	36.8	$9.1x10^{-4}$	Low	Moderate
ScG	CL	31.0	34.0	35.0	21.6	43.8	$1.6x10^{-4}$	Low	Moderate
SoE2	ML	36.4	31.7	31.9	14.5	36.5	$9.8x10^{-5}$	Low	High
SoF	ML	35.9	31.8	32.2	14.1	36.4	$1.2x10^{-4}$	Low	High
SwC	CL	26.7	44.7	28.6	18.0	39.5	$4.7x10^{-4}$	Low	Moderate

Obtained from NRCS (2018); If cell is empty, no information was available from NRCS (2018).

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3 FINDINGS

3.1 ALIGNMENT CONDITIONS

The proposed alignment is located along or crosses existing state highway systems (SR150 and SR192) and agricultural roadways. When not located beneath roadways, the proposed alignment crosses agricultural lands developed primarily with avocados. A relatively short segment of the alignment crosses fallow lands as the pipeline crosses Rincon Creek. Those fallow lands are covered with oak trees and seasonal and perennial shrubs and grasses.

The Santa Barbara segment is characterized by lands having relatively flat to steep slopes. Immediately south of Shepard Mesa Road (Station 10+00) to about Station 25+50, the alignment is located on relatively flat ground with gradients of less than about 10 percent. Between about Stations 25+50 to 41+00, the alignment is located on moderately inclined ground with slopes ranging from about 10 to 20 percent and having localized relatively steep slopes located adjacent to the proposed alignment. Between about Station 41+00 to the Rincon Creek crossing, the alignment traverses relatively steep slopes with gradients ranging from about 20 to over 100 percent. Thus, slope gradients along the Santa Barbara segment range from less than about 5 percent to over 100 percent slopes. The proposed slope gradients along the Rincon and Ventura segments are relatively flat with slope gradients ranging from less than about 5 percent to up to about 20 percent. Elevations, based on the 7.5-minute USGS White Ledge Peak Quadrangle topographic map, range from about 140 to 280 along the entire alignment.

Drainage along the proposed alignment occurs as sheetflow into Rincon Creek or into a closed depression located south of Shepard Mesa Road.

3.2 GEOLOGIC CONDITIONS

3.2.1 Regional Geology

The project site is located within the Transverse Ranges geologic/geomorphic province of California. That province is characterized by generally east-west-trending mountain ranges composed of sedimentary and volcanic rocks ranging in age from Cretaceous to Recent. Major east-west trending folds, reverse faults, and left-lateral strike-slip faults reflect regional north-south compression and are characteristic of the Transverse Ranges

3.2.2 Local Geologic Setting

As shown on Plates 3.1 through 3.2, the proposed pipeline alignment extends across a variety of Plio-Pleistocene-age and more recent sediments. The following table presents the anticipated geological materials that will be crossed by the proposed pipeline on a station by station basis:

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UNDERLYING GEOLOGIC MATERIALS			
Stationing		Mapped Geologic Unit[1]	Considerations
From	To		
10+00	25+00	Alluvial Deposits	Poorly consolidated. Likely predominately granular with local fine-grained deposits. Localized to regionally abundant gravels, cobbles, and boulders. Local shallow groundwater.
25+00	57+50	Older Alluvium	Moderately consolidated. Predominately granular with local gravels, cobbles, and possibly boulders.
57+50	85+00	Younger Alluvium	Poorly consolidated. Abundant gravels, cobbles, and boulders were encountered by Caltrans (1995, 2002). Relatively shallow groundwater.

[1] – See Plates 3.1 and 3.2

Aside from alluvial deposits discussed above, the Santa Barbara and Casitas Formations are present in the project area. The Santa Barbara Formation consists of Pleistocene-age shale, siltstone, clayey sandstone and sandstone, with local conglomerate beds. This is a marine deposit that locally contains fossils and may interfinger with terrestrial deposits of the overlying Casitas Formation. The Casitas Formation is a Pleistocene-age, terrestrial sedimentary deposit consisting of sand, silt, clay, siltstone, sandstone and conglomerate.

Landslide deposits are present on slopes below the pipeline alignment between about Station 40+00 and 50+00 and on slopes flanking the Ventura Segment of the pipeline alignment, as shown on Plate 3.1. Those landslide deposits are largely confined to the Casitas Formation and range from active to dormant.

3.2.3 Groundwater

The project is located within the Carpinteria Groundwater basin. Depths to groundwater along the proposed alignment are unknown except at drill holes advanced by Caltrans along Rincon Creek. At those locations, in December of 1995 and June of 2002, groundwater was measured at depths of about 11 feet below the road surface of Highway 150. This groundwater elevation likely corresponds to about the water surface elevation of Rincon Creek at the time the measurements were performed.

Maltby (1984) mapped 1982 regional groundwater elevations for the project region. The depth to the regional groundwater table at that time ranged from about 50 feet at about Station 65+00 to 68 feet at about Station 20+00.

Few other sources of subsurface data are available to estimate depths to groundwater and seasonal fluctuations of groundwater elevations. A database search was performed in the

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California Department of Water Resources Water Library database (DWR, 2019) to estimate regional groundwater levels and no local well data were identified.
Relatively shallow groundwater is likely to be seasonally encountered between about Stations 15+00 and 24+00 where a closed depression is located. That depression would historically routinely flood Highway 192 and surrounding lands. Around 1989, a basin was constructed in this area to capture and seasonally hold stormwater. When this basin is retaining water, then shallow groundwater will likely be encountered in this area.

The depths of groundwater should be further evaluated during design-level studies for the proposed project.

3.2.4 Geoenvironmental Conditions

A search for possible sites having geoenvironmental concerns was performed through a search of the Geotracker and Envirostore databases. No known geoenvironmental (hazardous materials, contaminants, fuel spills, etc.) were identified within 3,000 feet of the proposed pipeline alignment. Being a rural, agricultural area, there are likely few reported geoenvironmental conditions in the region of the alignment. On many of these farms, fuel storage tanks have historically been present but are not currently in state or federal databases and, thus, if present, their locations are unknown.

In addition, a variety of herbicides and pesticides have been placed on agricultural lands in the area and no records are available to anticipate the types of chemicals used and potential risks of exposure. If this is of concern then spot samples of soils along the alignment can be obtained and tested for organic and inorganic constituents prior to construction.

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4 GEOLOGICAL HAZARDS

4.1 FAULTING

4.1.1 General

The State of California designates faults as Holocene-age or Pre-Holocene-age depending on the recency of movement that can be substantiated for a fault. Fault activity is rated as follows:

FAULT ACTIVITY RATINGS		
Fault Activity Rating	**Geologic Period of Last Rupture**	**Time Interval (Years)**
Holocene-Active	Holocene	Within last 11,000 Years[1]
Pre-Holocene	Quaternary & Older	>11,000 Years[1]
Age Undetermined	Unknown	Unknown

[1] – Holocene is defined as 11,700 years before present by the International Commission on Stratigraphy. The California State Mining and Geology Board, which administers the review and application of the Alquist-Priolo Earthquake Fault Zoning Act, currently recognizes the Holocene as 11,000 years before present.

The California Geologic Survey (CGS) evaluates the activity rating of a fault in fault evaluation reports (FER). FERs compile available geologic and seismologic data and evaluate if a fault should be zoned as Holocene-active, pre-Holocene, or age undetermined. If a FER evaluates a fault as Holocene-active, then it is typically incorporated into a Special Studies Zone in accordance with the Alquist-Priolo Earthquake Fault Zoning Act (AP). AP Special Studies Zones require site-specific evaluation of fault location for structures for human occupancy and require a habitable structure setback if the fault is found traversing a project site.

The proposed pipeline alignment is located in an area having numerous local and regional faults, as shown on Plate 5 – Regional Fault Map. The site is not located within an Alquist-Priolo Earthquake Fault Zone established by the State. However, the project site is on the eastern margin of the Santa Barbara Fold Belt (Keller & Gurrola, 2000) and extends along the mapped trace of the Rincon Creek fault between about Stations 23+00 and 40+00, as shown on Plate 3.1. The Rincon Creek fault is a northwest-trending reverse-oblique fault that initiates about a mile southeast of the eastern pipeline alignment terminus and extends northwest for between about 12.5 to 20 miles (20 to 32 kilometers) possibly joining with the Mesa fault and More Ranch fault systems (Keller & Gurrola, 2000; Hough & Martin, 2018). The fault is south dipping at about 45 to 55 degrees and has a right-oblique sense of displacement (Minor & Brandt, 2015).

The fault is considered age undetermined by the State but is considered Holocene-active by

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Keller & Gurrola (2000) and Hough & Martin (2018). Hough & Martin (2018) speculate that the Rincon Creek-Mesa fault system was responsible for the M6.5 or M6.8 (depending on the researcher) 29 June 1925 Santa Barbara Earthquake. We know of no paleoseismic exploration that has been performed on the Rincon Creek fault to establish the age of the fault as Holocene-active; however, geomorphically, the fault exhibits features that appear relatively youthful.

4.1.2 Fault Location

The most recently mapped trace of the Rincon Creek fault in the project area is shown on Plate 3.1 (Minor & Brandt, 2015). That trace extends parallel and beneath Highway 192 and the proposed pipeline between about Stations 23+00 and 40+00. The fault trace mapped in black on that plate was likely based on review of aerial photographs, field mapping, and the geologist's discretion. The trace of the Rincon Creek fault (in black) shown on that map diverges from the trace show in the California Geological Survey (CGS) and U.S. Geological Survey (USGS) fault catalogue, which is shown in brown. The brown trace also crosses the proposed pipeline alignment at about Station No. 82+00. No known paleoseismic or fault location trenches or geophysical surveys have been performed to identify the actual surface trace of the fault plane in this area.

Our review of aerial photographs along the alignment tends to corroborate the mapping performed by Minor & Brandt (2015) but also identified a lineation located northeast of the mapped trace of the Rincon Creek fault. That lineation is shown in red on Plate 3.1. In aerial photographs from 1929 and 1937, there is a topographic and tonal lineation located downslope from Highway 192 that could be associated with the fault. This lineation is located coincident with the topographic low at the base of slope and the tonal variance could be a depositional material change within the swale. Smith (1977), also mapped a potential fault trace in the same general location. If the actual trace of the Rincon Creek fault is located along this lineation, then the proposed alignment will cross the fault at about Station 23+00, extend across the fault hanging wall, and re-cross the fault trace at about Station 42+00.

4.1.3 Estimates of Fault Displacement

Deformation of the Rincon Creek fault was modeled to evaluate the amount of potential displacement that could be experienced due to fault rupture. Modeling was performed using deterministic methods along with a Probabilistic Fault Displacement Hazard Analysis (PFDHA) using empirical fault data. It should be noted that little quantitative fault displacement and age information is available for the Rincon Creek fault and that the following sections are provided to give an illustration of displacement magnitudes that might be expected from an earthquake along the fault. These values should be refined based on

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future site-specific paleoseismic evaluations of the fault prior to use in design-level services for the proposed pipeline.

4.1.3.1 Fault Model Input Values

The following are characteristics of the Rincon Creek fault that were established for displacement modeling:

FAULT SYSTEM CHARACTERISTICS	
Fault Length (km/miles)[1]	32/20
Fault Depths (km/miles)[2]	3/2
Inclination of fault plane (degrees)[3]	55
Slip Rate (mm/yr)[4]	0.3
Aseismic factor[5]	0

[1] – Per Keller & Gurrola (2000) and Hough & Martin (2018).
[2] – Fault depth based on estimates of Jackson (1981).
[3] – Inclination of faults based on Minor & Brandt (2015) and Jackson (1981).
[4] – Slip rate estimated by SCEDC (2019) and Keller & Gurrola (2000).
[5] – No known creep is occurring on the Rincon Creek fault. Therefore a "0" value is applied.

4.1.3.2 Deterministic Displacement Modeling

The moment magnitude (Mw) of the fault was estimated using methods of the Hanks & Bakun (2008) magnitude-area relation. Using the equation:

$$M_W = \text{Log}A + 3.94$$

Where A is the fault rupture area (km^2) and where A is less than 537 km^2, a Mw of 5.9 was estimated for the fault system. That M_W was used in the following regression to estimate average deterministic displacement that could occur across the fault:

$$\text{Log (AD)} = (M_W * 0.3244) - 2.2192$$

The regression was developed by Wells & Coppersmith (1994) and improved on by Ross (2011). Results of that evaluation indicate that up to 0.5 m (about 1.6 feet or 20 inches) of displacement could occur along the fault system.

4.1.3.3 Probabilistic Fault Displacement Hazard Analysis

PFDHA methods described by Shantz (2013) were utilized to estimate displacement of the fault at varying exposure periods. The evaluations were performed using the Mw estimated in Section 4.1.3.2. Fault slip rate and aseismic factor used in the analyses are presented in Section 4.1.3.1. The crustal rigidity value used in the probabilistic evaluation was $3x10^{11}$

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dyne/cm^2 and the standard deviation of fault displacement used was 0.39. Five methods were used to estimate average displacement (AD) values for the fault:

1. Log (AD) = 0.9 M_W - 6.32 (Wells & Coppersmith, 1994)
2. AD = 0.2*$L^{0.5}$ where L= fault length (Wesnousky 1, 2008)
3. Log (D) = (LogM_0*0.2)-2.01, where D=displacement (Yen & Ma, 2011)
4. AD = L*0.2 (Wesnousky 2, 2008)
5. Log (AD) = (0.3244* M_W)-2.2192 (Ross, 2011)

Using those values, a probabilistic evaluation of fault displacement was estimated for the Rincon Creek fault. The evaluation using the regression from Wells & Coppersmith (1994) and Ross (2011) yielded the lowest and highest estimated displacement at any given exposure period, respectively. We recommend that displacement values be estimated for a Maximum Considered Earthquake (MCE) event corresponding to a 2% chance of exceedance in a 50-year exposure period (2,500-year exposure period), as adopted by the California Building Code (CBC). Those results, based on a maximum considered earthquake (MCE) event, estimate the following displacements along the fault system based on our aforementioned input values:

RESULTS OF PFDHA

Method	Displacement[1]	
	Feet	Inches
Wesnousky 1 (2008)	1.3	16
Wells & Coppersmith (1994)	0.4	5
Yen & Ma (2011)	0.6	7
Wesnousky 2 (2008)	0.5	6
Ross (2011)	2.1	25
Average	**0.9**	**12**

[1] – based on a 2% chance of exceedance in any 50-year time-period.

Based on these evaluations, an average displacement value of 12 inches can be anticipated during any 2,500-year time period.

4.2 CBC SEISMIC DESIGN RECOMMENDATIONS

We understand that the proposed project will be designed and constructed under the 2016 California Building Code (CBC) criteria. At a minimum, improvements should be designed in accordance with the following seismic design criteria:

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CBC SEISMIC DESIGN PARAMETERS		
California Building Code	**Parameter**	**CBC Designation**
Site Coordinates	Latitude	34.389369°
	Longitude	-119.466022°
Section 1613.3.3 Table 1613.3.3(1)	Site Coefficient, F_a	1.00
Section 1613.3.3 Table 1613.3.3(2)	Site Coefficient, F_v	1.50
Section 1613.3.1 Figure 1613.3	Site Class Designation	D
	Seismic Factor, Site Class B at 0.2 Seconds, S_s	2.679g
	Seismic Factor, Site Class B at 1.0 Seconds, S_1	0.962g
Section 1613.3.3	Site Specific Response Parameter for Site Class D at 0.2 Seconds, S_{MS}	2.679g
	Site Specific Response Parameter for Site Class D at 1.0 Seconds, S_{M1}	1.443g
Section 1613.3.4	$S_{DS}=2/3S_{MS}$	1.786g
	$S_{D1}=2/3S_{M1}$	0.962g

4.3 LANDSLIDES

Active and dormant landslides are present throughout the project area, as shown on Plate 3.1. The closest landslide to the proposed alignment is located between about Stations 40+00 and 50+00. At that location, cut-bank erosion along Rincon Creek has undermined the slope located below the proposed pipeline alignment in this area resulting in a rotational/translational landslide located below agricultural lands south of the alignment and earthflows located immediately below Highway 192. All aerial photographs reviewed from 1922 to present show the presence of this landslide. In general, the landslide appears to expand during years having relatively high precipitation levels and remain relative dormant during years of average or low precipitation. Specifically, aerial photographs from 1945, 1956, 1969/1970, 1983, and 1998 show landslide growth at this location, which follow years having relative high rainfall volumes. Thus, the landslide growth appears to occur episodically.

Following the relatively high precipitation 1969 season, the 1970 aerial photographs show that grading had occurred on the landslide, presumably to increase the feature's stability and reduce the risk to Highway 192. Currently, the head scarp of the landslide is located

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immediately adjacent to the shoulder of Highway 192 and concrete K-rails have been placed along the margin of the road for public safety.

Additional landslides are located along the Ventura segment between about Station 70+00 and 85+00. These landslides are located on the slopes above the alluvial valley and consist of dormant and older landslide deposits. Recent movement of these landslides was not observed during our field visit nor on historical aerial photographs reviewed.

4.4 LIQUEFACTION

Liquefaction is described as the sudden loss of soil shear strength due to a rapid increase of soil pore water pressures caused by cyclic loading from a seismic event. In simple terms, it means that a liquefied soil acts more like a fluid than a solid when shaken during an earthquake. In order for liquefaction to occur, the following are needed:

- Granular soils (sand, silty sand, sandy silt, and some gravels);
- A high groundwater table; and
- A low density in the granular soils underlying the site.

If those criteria are present, then there is a potential that the soils could liquefy during a seismic event.

The adverse effects of liquefaction include local and regional ground settlement, ground cracking and expulsion of water and sand, the partial or complete loss of bearing and confining forces used to support loads, amplification of seismic shaking, and lateral spreading. In general, the effects of liquefaction on the proposed project could include:

- Lateral spreading;
- Vertical settlement; and/or
- The soils surrounding lifelines can lose their strength and those lifelines can become damaged or severed.

Lateral spreading is defined as lateral earth movement of liquefied soils, or soil riding on a liquefied soil layer, down slope toward an unsupported slope face, such as a creek bank, or an inclined slope face. In general, lateral spreading has been observed on low to moderate gradient slopes but has been noted on slopes inclined as flat as one degree.

Granular soils were reported in the upper 15 feet of the soil column in drill hole B1-02 advanced by Caltrans for Bridge 05-SB-0316. Those granular soils ranged in consistency from loose to medium dense. Groundwater was reported at a depth of about 11 feet in that drill hole, indicating about 4 feet of the granular soils were located beneath the groundwater

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table. That groundwater table will vary based on the water surface within Rincon Creek. The granular soils encountered within the Younger Alluvium, being loose to medium dense and in the presence of shallow groundwater. could have a potential to liquefy or spread laterally. This should be evaluated further during design-level studies.

4.5 EXPANSION POTENTIAL

There is a direct relationship between plasticity of a soil and the potential for expansive behavior, with expansive soil generally having a high plasticity. Thus, granular soils typically have a low potential to be expansive, whereas, clay-rich soils can have a low to high potential to be expansive.

Plasticity Index (PI) tests were not performed for the studies compiled and reviewed for this report. PI values, however, were reported by NRCS (2019) for the project area and ranged from about 7 to 27, with an average PI of about 16. PI Values for soils underlying the alignment shown on Plate 2 range from 7 to 24.7. Those PI values indicate the soils along the proposed pipeline segment have an expansion potential ranging from very low to medium/high, with an average of low to medium, as noted in the following table (Day, 1999):

EXPANSION POTENTIAL – PLASTICITY INDEX CORRELATION

Plasticity Index	Correlated Expansion Potential
0 – 10	Very Low
10 – 15	Low
15 – 25	Medium
25 – 35	High
35+	Very High

Taken from Day (1999)

4.6 CORROSION

Soil chemistry tests for evaluation of corrosion potential were performed by Caltrans (2002) for bridge 05-SB-0316 located along Highway 150 about 1,400 feet southwest of the proposed pipeline crossing of that roadway. Five soil tests were performed for that bridge to evaluate pH, sulfates, chlorides, and resistivity of those soils. The following table presents the results of those tests:

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SOIL CHEMISTRY RESULTS					
Boring	**Sample Depth**	**Sulfates (ppm)**	**Chlorides (ppm)**	**pH**	**Resistivity (ohms-cm)**
B1-02	1.5' to 2'			7.5	2,240
B1-02	12' to 16'	1,000	110	7.5	620
B2-02	46' to 50'			8.2	1,570
B2-02	16' to 19.5'			8.5	1,670
B2-02	65' to 69.5'			8.4	1,440
Data derived from Caltrans (2002). If cell is blank, no test results were reported.					

According to the ACI-318, a sulfate concentration below 0.10 percent by weight (1,000 ppm) is negligible. A chloride content of less than 500 ppm is generally considered non-corrosive to reinforced concrete. Based on the results of the soil chemistry tests, the site soils have a low potential for corrosion of concrete due to sulfates and chlorides.

Caltrans (2002) also performed minimum resistivity testing the soil samples. A commonly accepted correlation between soil resistivity and corrosivity towards ferrous metals (NACE Corrosion Basics, 1984) is provided below:

RESISTIVITY & CORROSION CORRELATION	
Minimum Resistivity (ohm-cm)	**Corrosion Potential**
0 to 1000	Severely Corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately Corrosive
Over 10,000	Mildly Corrosive

Thus, according to the table above, the soils are estimated to be corrosive to severely corrosive to metal.

Confirmatory sampling and testing should be performed during design-level studies.

4.7 NATURALLY OCCURRING ASBESTOS

Ultramafic rock, such as serpentinite, amphibolite, peridotite, dunite, pyroxenite, hornblendite, etc., can contain asbestiform minerals, which are fibrous, silica-rich crystals that can cause lung cancer, mesothelioma, asbestosis, and other health-related issues, if present. Typically, six minerals within ultramafic rocks are responsible for the primary, naturally occurring asbestiform concerns for health-related issues: chrysotile, tremolite, actinolite, anthophyllite, crocidolite, and amosite. These minerals may or may not be present in ultramafic rocks; thus, the presence of ultramafic rock does not automatically indicate that there is a health hazard. The presence of asbestiform minerals can sometimes be discerned in the field based on visual examination of rock exposures but, most often, must be confirmed using laboratory testing.

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Naturally occurring asbestos can be hazardous to human health if it is disturbed, becomes airborne and is inhaled. If NOA is not disturbed and fibers are not released into the air, then it is typically not considered a health hazard. Inhalation is the primary exposure route of concern, because breathing asbestos fibers may cause them to become trapped in the lungs. Ingestion is another, albeit less common, pathway of concern, because swallowing asbestos fibers may also cause the fibers to be trapped in body tissues. Asbestos is not absorbed through the skin, so merely touching it does not pose a significant risk to human health. Asbestos fibers are not water soluble and do not move through groundwater to any appreciable extent. Based on studies of other insoluble particles of similar size, the expected migration rate of an asbestos fiber through soils by the forces of groundwater is approximately 1 to 10 centimeters (0.4 to 4 inches) per 3,000 to 40,000 years (New Hampshire DES, 2010). Thus, asbestos is not considered a groundwater contaminant.

Ultramafic rocks have been not been mapped in the project area and were not encountered within explorations reviewed for this study. It is our opinion that NOA has a low potential to adversely impact the project.

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5 CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

Based on the results of our preliminary study, it is our opinion that there are geologic hazards along the alignment that might require mitigation or avoidance to reduce risks associated with construction of the project, as described in Section 1.1. Discussions regarding these geologic hazards are presented below.

Specific comments and preliminary recommendations regarding the geotechnical aspects of project design and construction are presented in the following sections of this report and are intended to assist in project refinement and are preliminary in nature. The recommendations presented, herein, should not be considered design-level and used for project design without further geotechnical exploration, laboratory testing, and analyses.

In addition, recommendations presented, herein, are based upon the preliminary site alignment illustrations provided by WWE along with stated assumptions. Changes in the configuration from those studied during this investigation may require supplemental recommendations.

5.2 GEOLOGIC HAZARDS

Five potential geologic hazards could impact the proposed pipeline performance:

- Faulting;
- Slope Instability;
- Liquefaction;
- Expansive Soils; and
- Corrosive Soils

In our opinion, based on the data reviewed, all other geologic hazards discussed herein pose a low risk for the performance of the pipeline along the proposed alignment.

5.2.1 Faulting

The proposed pipeline alignment is situated parallel to and almost directly on top of the mapped trace of the Holocene-Active Rincon Creek fault. Our mapping has identified that the trace of the fault could extend northeast of the mapped trace, as shown on Plate 3.1; however, no site-specific exploration has been performed to confirm where the actual fault trace is located.

Deterministic and probabilistic (2-percent chance of exceedance in any 50-year period) rupture offsets of 20 and 12 inches, respectively, might occur across the fault due to an

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earthquake on the Rincon Creek fault. These offsets could deform and damage the proposed pipeline between about Stations 23+00 and 40+00 and possibly at about Station 82+00.

There are no mitigations to prevent the fault from rupturing. However, rupture events can be separated by very long time intervals and there is a potential for the pipeline to be constructed and outlive its operational life without a rupture event occurring along the Rincon Creek fault. Without paleoseismic data specific to the fault, it is not possible to estimate the recurrence interval between rupture events and when the last rupture event occurred. Therefore, an opinion cannot be made about the likelihood of fault rupture during the operation life of the proposed pipeline.

If mitigations of fault hazard risks are desired, then reduction of those risks typically involves one of the following:

- Relocating the pipeline alignment away from the fault;
- Designing the pipeline to accommodate fault deformation; or
- Do nothing.

5.2.1.1 Pipeline Alignment Relocation Alternative

This alternative consists of avoidance of the fault to eliminate the potential risk of damage. For this project, the alignment would be moved northeast between about Stations 20+00 and 45+00. The realignment should stay southwest of the mapped unnamed antithetic fault noted on Plate 3.1. This realignment would involve obtaining easements across private properties and disrupting agricultural lands. Design-level studies would involve fault location exploration so that the alignment will not be sited on either fault.

5.2.1.2 Pipeline Accommodates Deformation Alternative

If the trace of the Rincon Creek fault directly underlies the pipeline between Stations 23+00 and 40+00, then this alternative may not be feasible because the entire pipeline along this segment will experience deformation during fault rupture. Thus, if this alternative is to be considered, then fault location studies should be performed to identify where the trace of the fault projects to the surface.

If the trace of the fault is not directly beneath the proposed pipeline alignment, then this alternative might be viable. Under this scenario, the proposed pipeline alignment crosses the fault and the majority of the pipeline in this segment is on the fault hanging wall. Thus, fault movement would need to be accommodated where the pipeline crosses the fault along with some bending stresses that might occur due to deformation of the hanging wall during rupture.

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Where the pipeline crosses the fault, deformation might be accommodated using extendable/compressible and flexible pipeline joints that allow absorption of deformation without interference with pipeline performance. Additional studies need to be performed to quantify the maximum deformation for use in design-level studies but based on our illustrative preliminary evaluations, up to 20 inches of reverse-oblique deformation might be experienced at each crossing location. This means that the pipeline would be put under compression (length shortened) and would move right-laterally (when looking directly across the fault). The total displacement of horizontal, lateral, and vertical movement vectors that might occur is unknown and requires further evaluation to quantify for design-level studies.

In addition, warping of the hanging wall might be experienced during fault rupture. This warping will likely occur as an arching of hanging wall sediments with the axis of the arch paralleling the fault system. Most flexible pipelines can accommodate some bending stresses and the amount of bending that might occur will need to be quantified during design-level studies. If the pipe is found able to accommodate the bending, then mortar coating and lining (if proposed) may not be feasible for corrosion resistance along this segment of pipeline due to cracking.

5.2.1.3 Do Nothing Alternative

This alternative consists of constructing the alignment as proposed with the anticipation that it will be damaged during a rupture along the Rincon Creek fault. Under such a scenario, temporary repair materials can be stockpiled that can be used to rapidly bring the pipeline back into service. Those repair materials are likely to consist of appropriately sized HDPE or interlocking PVC pipe that can be installed relatively quickly on the ground surface to bypass the damaged pipeline segmentd. This could consist of installing flanges along the pipeline at about Stations 20+00 and 45+00 on which those pipeline materials could be attached for the bypass.

5.2.2 Slope Instability

The head scarp of landslides caused by cut-bank erosion along Rincon Creek between about Stations 41+00 and 50+00, is impinging upon Highway 192 and could destabilize this section of the proposed pipeline alignment. The likelihood of this segment of the alignment being adversely affected by slope instability is unknown and should be quantified during design-level studies. If those studies find that the slope stability poses a risk too great for CMWD to accept then three mitigation alternatives are available:

- Reroute the pipeline alignment;
- Stabilize the underlying slope; or
- Do nothing.

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5.2.2.1 Pipeline Alignment Relocation Alternative

This alternative consists of rerouting the alignment north to avoid the risk. Stability analyses should provide the minimum distance to the north that the alignment will require relocation to reduce those risks. This realignment would involve obtaining easements across private properties and disrupting agricultural lands.

5.2.2.2 Slope Stabilization Alternative

This alternative would involve installing measures to stabilize the slope beneath that pipeline segment to reduce the risk of slope failure. For this local, typical slope stabilization measures could consist of installation of soil nails or construction of a soldier-pile or tie-back wall. Because the stabilization measures will also benefit Caltrans, there could be a potential for cost-sharing of these mitigation measures.

5.2.2.3 Do Nothing Alternative

This alternative consists of constructing the alignment as proposed with the anticipation that it will be damaged due to slope failure beneath this segment. Under such a scenario, temporary repair materials can be stockpiled that can be used to rapidly bring the pipeline back into service. Those repair materials are likely to consist of appropriately sized HDPE or interlocking PVC pipe that can be installed relatively quickly on the ground surface to bypass the damage pipeline segment. This could consist of installing flanges along the pipeline at about Stations 41+00 and 50+00 on which those pipeline materials could be attached for the bypass.

5.2.3 Liquefaction

As noted in Section 4.4, loose granular soils located below the groundwater table were encountered by Caltrans (2002). Those sediments are likely to have a potential to liquefy under seismic forces. Although the saturated section of the granular sediments is relatively thin, further assessments for liquefaction and/or lateral spreading should be performed during design-level studies. If liquefaction is estimated to pose a risk to the pipeline, then mitigations should be evaluated to reduce those risks.

5.2.4 Expansive Soils

Soils with low to high expansion potentials were reported in the project area (NRCS, 2019), as discussed in Section 4.5. It is unknown whether soils with a high expansion potential will be present along the proposed pipeline alignment; however, due to the depths of the proposed pipeline, it is our opinion that those soils will have a low potential to adversely impact the pipeline. However, design-level geotechnical studies should evaluate whether highly expansive soils are present and provide recommendations for project design and construction if those soils are encountered.

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5.2.5 Corrosive Soils

NRCS (2019) and Caltrans (2002) identify soils in the project area as being corrosive to severely corrosive to ferrous metals. We recommend that soil chemistry tests be performed during design-level geotechnical studies and tested for sulfate and chloride contents, pH, and resistivity to evaluate the degree of corrosion potential that alignment soils pose to concrete and ferrous metals. Results of those tests might warrant a corrosion engineer's involvement to mitigate corrosion on the proposed system.

5.3 GROUNDWATER

Relatively shallow groundwater with depths of eleven feet was encountered in explorations at Rincon Creek. Shallow groundwater should be anticipated along portions of the alignment underlain by Young Alluvium (Qya) and Intermediate Alluvium (Qia) and could be locally encountered along other portions of the proposed pipeline alignment. Explorations performed during design-level studies should refine the anticipated depths to groundwater along the alignment.

Groundwater elevations will fluctuate over time. The depth to groundwater can vary throughout the year and from year to year. Intense and long duration precipitation, modification of topography, and cultural land use changes along surrounding properties, such as irrigation, water well usage, on site waste disposal systems, utility leakage, and water diversions can contribute to fluctuations in groundwater levels. Localized saturated conditions or perched groundwater conditions near the ground surface could be present during and following periods of heavy precipitation or if on-site sources contribute water.

5.4 EXCAVATABILITY

Drill holes reviewed were advanced for geotechnical studies at Rincon Creek using hollow-stem auger drilling methods. In explorations at Bridge 05-SB-0316, loose to dense/soft to hard sediments were encountered and some soils contained gravel, cobbles, and possibly boulders. Practical refusal was not reported for explorations at that bridge. Practical refusal was encountered within cobble and boulder laden sediments at Bridge No. 05-SB-0317. It is our opinion, based upon preliminary data reviews, that the soils along the proposed pipeline alignment are generally excavatable using conventional heavy grading equipment except in areas where high concentrations of boulder might be encountered, such as along Rincon Creek. In those areas, heavy grading equipment can anticipate having moderate to difficult excavation conditions due to the large rock materials in the presence of relatively shallow groundwater. The presence of cobbles and boulders could pose challenging excavation conditions and should be further assessed during design-level services.

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5.5 TEMPORARY SLOPES

Based on information presented by studies referenced within this report, the soils likely to be encountered during construction of the proposed pipelines should conform to Cal/OHSA Type B soils. OSHA soil classification typing includes the following:

OSHA SOIL TYPE DETERMINATIONS	
Stable Rock	Natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed. It is usually identified by a rock name such as granite or sandstone. Determining whether a deposit is of this type may be difficult unless it is known whether cracks exist and whether or not the cracks run into or away from the excavation.
Type A Soils	Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) (144 kPa) or greater. Examples of Type A cohesive soils are often: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. (No soil is Type A if it is fissured, is subject to vibration of any type, has previously been disturbed, is part of a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H:1V) or greater, or has seeping water.
Type B Soils	Cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa). Examples of other Type B soils are: angular gravel; silt; silt loam; previously disturbed soils unless otherwise classified as Type C; soils that meet the unconfined compressive strength or cementation requirements of Type A soils but are fissured or subject to vibration; dry unstable rock; and layered systems sloping into the trench at a slope less than 4H:1V (only if the material would be classified as a Type B soil).
Type C Soils	Cohesive soils with an unconfined compressive strength of 0.5 tsf (48 kPa) or less. Other Type C soils include granular soils such as gravel, sand and loamy sand, submerged soil, soil from which water is freely seeping, and submerged rock that is not stable. Also included in this classification is material in a sloped, layered system where the layers dip into the excavation or have a slope of four horizontal to one vertical (4H:1V) or greater.
Layered Geological Strata	Where soils are configured in layers, i.e., where a layered geologic structure exists, the soil must be classified on the basis of the soil classification of the weakest soil layer. Each layer may be classified individually if a more stable layer lies below a less stable layer, i.e., where a Type C soil rests on top of stable rock.

The following maximum slope inclinations are allowed based upon OSHA soil types:

OSHA MAXIMUM ALLOWABLE SLOPES	
Soil Type	**Slope Ratio[1]**
Stable Rock	Vertical
Type A	¾:1
Type B	1:1
Type C	1½:1
[1] – horizontal : vertical	

Because of the presence of granular soils, unshored trenches should be anticipated to be sloped at inclinations no greater than 1:1 (horizontal to vertical) unless shoring is provided.

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Future geotechnical exploration for this project could identify if other soil types are present and, hence, potentially steeper allowable trench slopes.

Based on the drill hole logs reviewed site during this preliminary study, it is anticipated that loose, running, raveling, and/or flowing conditions could be encountered in excavations or trenches. If such conditions are encountered during construction, inclinations of unshored slope excavations may not stand exposed at the slope ratios noted above for OSHA Soil Types. In such situations, proposed excavations in those areas could fail and expand in an area much larger than the proposed width unless the excavation and/or trench is shored and adequately supported. Future geotechnical studies should evaluate these conditions and provide recommendations for methods to reduce risks associated with such soils.

5.6 RE-USE OF ON-SITE SOIL MATERIALS

Based on the reviewed drill hole logs and laboratory data collected for this study, it is our preliminary opinion that most of the near-surface soils encountered at the site should be useable for backfill materials within the trench zone (that portion of the pipeline trench above the pipe zone) but are unsuitable for use within the pipe zone (that portion of the pipeline trench from six inches below to six inches above the pipeline). Some over-size rock (greater than 3 inches in maximum dimension) may require screening from native soils for use in trench zone backfill.

5.7 ALLOWABLE FOUNDATION BEARING PRESSURES

It is assumed that all foundations for the proposed vaults or other structures will rest entirely on undisturbed natural soils or rock materials as discussed above. A preliminary allowable bearing pressure of 1,500 psf for isolated and continuous footing elements can be used for preliminary design and cost-estimating purposes for this project. Those preliminary allowable bearing pressures can be proportioned for dead loads plus probable maximum live load.

5.8 PRELIMINARY PIPELINE DESIGN FACTORS

5.8.6 External Loads on Buried Pipelines

External loads on buried pipes will consist of loads due to the overlying earth materials, loads due to construction activities, loads due to traffic, and other post construction land uses. It is recommended that the pipe be designed to resist the imposed loads with a factor of safety and an amount of deflection, as recommended by the pipeline manufacturer. The earth loads on the pipe can be estimated using formulas developed by Marston (1930) and Spangler (1982). When using Marston's formulas, a preliminary unit weight of the backfill materials can be assumed to be 125 pcf.

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The pipe may be subject to surcharge pressures due to construction activities and traffic. Those surcharge pressures should be considered in the design of the pipe.

5.8.7 Modulus of Soil Reaction (E')

Flexible and semi-rigid pipes are typically designed to withstand a certain amount of deflection from applied earth loads. Those deflections can be estimated with the equations developed by Spangler (1982). The modulus of soil reaction (E') values for the project were estimated using relations of Howard (1996). The table below presents E'_b values, which are recommended E' values for pipe zone backfill materials (pipe zone backfill). The recommended E'_b values presented in the table below apply to the initial backfill materials along the sides of the pipe at the recommended level of compaction.

MODULUS OF SOIL REACTION FOR PIPE ZONE BACKFILL MATERIALS (E'_B)

Soil Type	Depth of Burial	Recommended E'_b (psi)
Pipe Bedding and Pipe Embedment (clean crushed rock or sand)	5'	1,000
	10'	1,500
	15'	1,600
	15'+	1,700
Soil-Cement Slurry (backfilled within 2 days of placement)	Not Applicable	2,500

Where the zone of backfill beside the pipe is less than five times the pipeline diameter, the E'_b values above may not be applicable and the constrained soil modulus E'_n will affect flexible pipe design. E'_n corresponds to the E' value for the natural trench wall soils. The actual lateral soil modulus at the pipe depth will lie somewhere in between E'_b and E'_n depending on the trench width. Based on the data presented in drill hole logs reviewed for this study, the following preliminary E'_n values are recommended for use for planning-level design and cost estimating purposes:

PRELIMINARY E'_n VALUES FOR ON-SITE MATERIALS

Stationing		Earth Material[1]	E'_n Value (psi)
From	To		
10+00	23+00	Qia	600
23+00	57+50	Qoa	1,200
57+50	85+00	Qya	400

[1] – See Plate 3.1 and 3.2

For trench widths less than five times the diameter of the pipe, the composite design E' (E'_b and E'_n) may be calculated using the Soil Support Combining Factors (S_c) presented in the

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table below, where B_d is the trench width at pipe springline and D is the diameter of the pipe.

SOIL SUPPORT COMBINING FACTORS (S_C)						
E'_n/E'_b	$B_d/D=1.5$	$B_d/D=2.0$	$B_d/D=2.5$	$B_d/D=3.0$	$B_d/D=4.0$	$B_d/D=5.0$
0.1	0.15	0.30	0.60	0.80	0.90	1.00
0.2	0.30	0.45	0.70	0.85	0.92	1.00
0.4	0.50	0.60	0.80	0.90	0.95	1.00
0.6	0.70	0.80	0.90	0.95	1.00	1.00
0.8	0.85	0.90	0.95	0.98	1.00	1.00
1.0	1.00	1.00	1.00	1.00	1.00	1.00
1.5	1.30	1.15	1.10	1.05	1.00	1.00
2.0	1.50	1.30	1.15	1.10	1.05	1.00
3.0	1.75	1.45	1.30	1.20	1.08	1.00
>5.0	2.00	1.60	1.40	1.25	1.10	1.00

Source: "Pipeline Installation," A. Howard, 1996

The corresponding composite design E' can be calculated by selecting the appropriate S_c value from the table above and multiplying the appropriate E'_b value by S_c, as noted below:

$$E'=E'_b(S_c)$$

5.8.8 Thrust Resistance

Where the proposed pipeline changes direction abruptly, resistance to thrust, if needed, can be provided by mobilizing frictional resistance between pipe and the surrounding soil, by use of a thrust block, by use of restrained pipe joints, or by a combination of the above.

To design thrust resistance by mobilizing frictional resistance, a preliminary coefficient of lateral earth pressure at-rest value, K_o, of 0.5 can be used in conjunction with a coefficient of friction of 0.20 for PVC or HDPE pipelines. Those frictional values include a factor of safety of 1.5 and are based on the assumption that a sand with a sand equivalent (SE) of 28 or greater will be placed within the pipe zone.

5.8.9 Dewatering

As noted in Sections 3.2.3 and 5.3, groundwater can be expected at trench excavation depths along portions of the proposed pipeline alignment. Local dewatering, if needed, can probably be accommodated through the use of in-trench trash, sump, or other pumps. This should be further evaluated during design-level geotechnical studies for the project.

6 ADDITIONAL SERVICES

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This report and its associated recommendations were intended to assist WWE during preliminary design and cost estimating phases of the project. This report is not sufficient for design-level geotechnical engineering on the proposed project and we recommend that additional exploration, laboratory testing, and geotechnical engineering be performed to provide those design-level geotechnical services to WWE for the project.

7 LIMITATIONS

This report has been prepared in substantial accordance with the generally accepted geotechnical engineering practice, as it existed in the site area at the time our services were rendered. No other warranty, either express or implied, is made.

Conclusions and recommendations contained in this report were based on the reported conditions encountered during our review of selected, available, published information collected during this study and from our site observations. No subsurface exploration or laboratory testing was performed by BAJADA to prepare this report. This study is applicable only to those project features described herein (see Section 1.1 – Project Understanding). Soil and rock deposits can vary in type, strength, and other geotechnical properties between reported points of observation and exploration. Additionally, groundwater and soil moisture conditions can also vary seasonally and for other reasons. Therefore, we do not and cannot have a complete knowledge of the subsurface conditions underlying the project area. The conclusions and recommendations presented in this report are based upon the findings at the points of exploration from other's studies, and interpolation and extrapolation of information between and beyond the points of observation, and are subject to confirmation based on the conditions revealed by future geotechnical exploration and by construction.

The scope of services provided by BAJADA for this project did not include subsurface investigation and/or evaluation of toxic substances, or soil or groundwater contamination of any type. If such conditions are encountered during site development, additional studies may be required. Further, services provided by BAJADA for this project did not include the evaluation of the presence of critical environmental habitats or culturally sensitive areas.

This report may be used only by our client and their agents and only for the purposes stated herein, within a reasonable time from its issuance. Land use, site conditions, and other factors may change over time that may require additional studies. In the event significant time elapses between the issuance date of this report and construction, BAJADA shall be notified of such occurrence in order to review current conditions. Depending on that review, BAJADA may require that additional studies be conducted and that an updated or revised report is issued.

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Any party other than our client who wishes to use all or any portion of this report shall notify BAJADA of such intended use. Based on the intended use as well as other site-related factors, BAJADA may require that additional studies be conducted and that an updated or revised report be issued. Failure to comply with any of the requirements outlined above by the client or any other party shall release BAJADA from any liability arising from the unauthorized use of this report.



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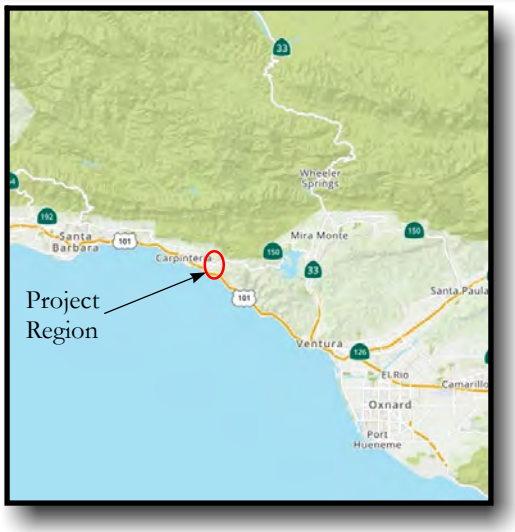
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Base maps from Bing Maps. Scale undetermined.

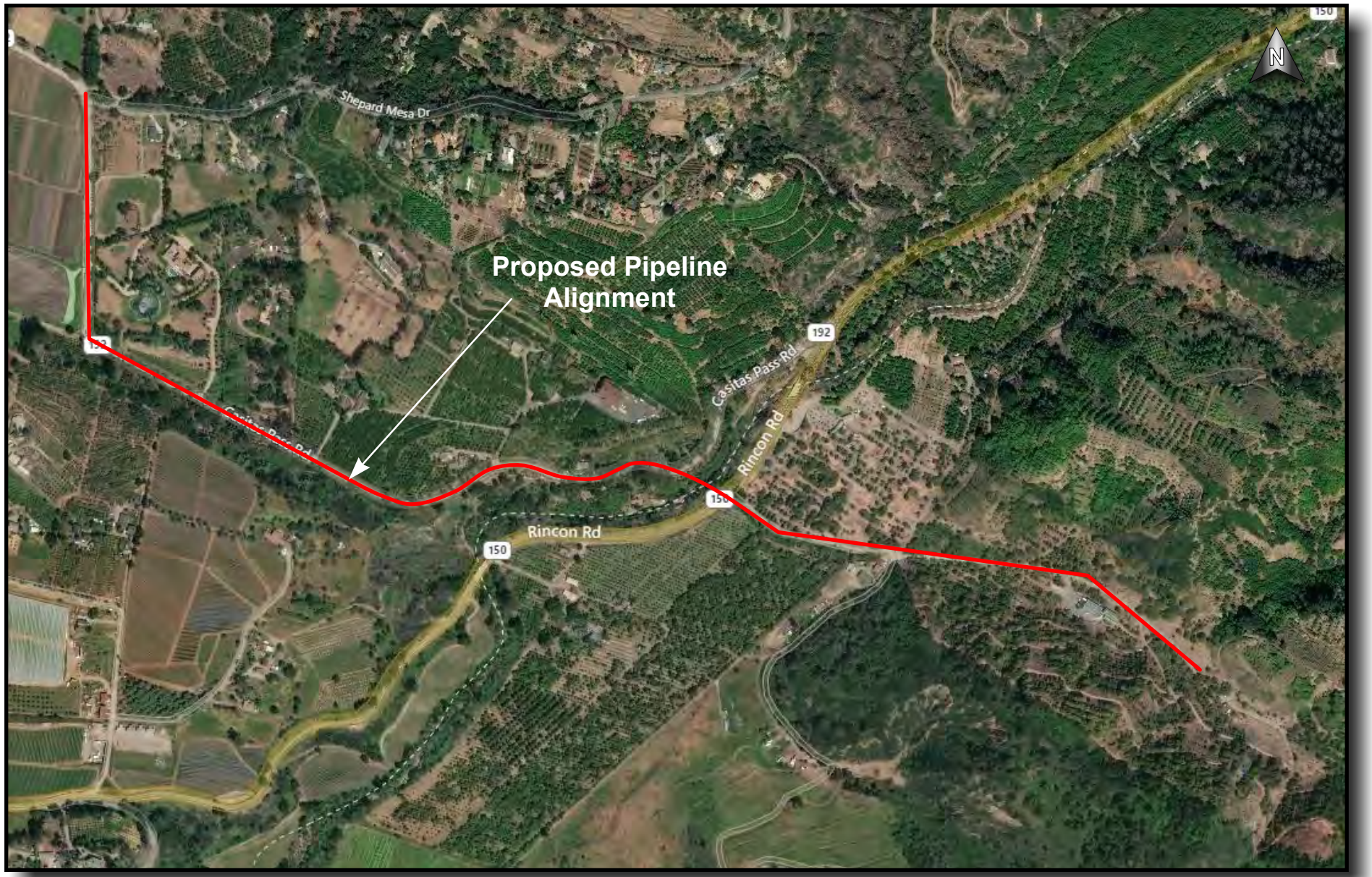
SITE LOCATION MAP

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 1

BAJADA Geosciences, Inc.

Project no. 1901.0101



PROPOSED PIPELINE ALIGNMENT

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 2

BAJADA Geosciences, Inc.

Project no. 1901.0101

Base imagery fron Bing Maps

Scale undetermined

SHEPARD MESA FAULT

UNNAMED ANTITHETIC FAULT

RINCON CREEK FAULT

CARPINTERIA FAULT

Qia

Qoa

Qia5?

Qia4?

Qia3?

Qya

Qia2?

Qca?

Qca

Qols

Qls

Qsb

10+00

20+00

30+00

50+00

60+00

70+00

80+00

Proposed Pipeline Alignment

Possible Fault Trace

Bridge 51-0317

Bridge 51-0316

0 250 500

Scale: 1”=500’
1:6,000

See Plate 3.2 for Key to Terms and Symbols

Base map modified from Minor & Brandt (2015)

GEOTECHNICAL MAP

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 3.1

BAJADA Geosciences, Inc.

Project no. 1901.0101

KEY TO TERMS AND SYMBOLS

Qya **Younger alluvium (Holocene)**—Poorly consolidated silt, sand, and gravel deposits occupying valley floors and floodplains of modern drainages

Qaf **Alluvial fan deposits (Holocene and late Pleistocene?)**—Weakly to moderately consolidated silt, sand, and gravel forming variably dissected fans

Qia **Intermediate alluvial deposits, undifferentiated (late Pleistocene)**—Weakly consolidated gravel and lesser sand and silt that form weakly to moderately dissected stream and river strath terraces positioned above adjacent modern floodplains, and broad, low-relief, piedmont alluvial aprons. Along larger drainages terrace-forming intermediate alluvial deposits are subdivided into six age groupings based chiefly on relative levels (elevations) of terraces, with the oldest terraces being the most elevated:

Qia1 **Intermediate alluvial deposits, terrace level 1**

Qia2 **Intermediate alluvial deposits, terrace level 2**

Qia3 **Intermediate alluvial deposits, terrace level 3**

Qia4 **Intermediate alluvial deposits, terrace level 4**

Qia5 **Intermediate alluvial deposits, terrace level 5**

Qia6 **Intermediate alluvial deposits, terrace level 6**

Qoa **Older alluvial deposits (late? and middle? Pleistocene)**—Moderately consolidated, stratified sand and sandstone, gravel, conglomerate, and breccia, and rare interbeds of clay, silt, and mudstone composing erosional remnants of older alluvial fans shed from the Santa Ynez Mountains

Qmt **Marine-terrace deposits (late Pleistocene)**—Sequence of basal marine, weakly to moderately consolidated, variably stratified, fossiliferous gravel, sand, and silt deposited in neritic, intertidal, beach, and estuarine environments and overlying nonmarine eolian sand and silt, alluvial gravel, and colluvial deposits. Marine-terrace deposits rest on elevated wave-cut platforms and form single terraces or flights of terraces

Qdf **Debris-flow deposits (Holocene and late Pleistocene?)**—Massive, weakly consolidated rock-debris breccia derived from rock units exposed upslope

Qls **Landslide deposits (Holocene and late? Pleistocene)**—Deposits of diverse slope-movement processes ranging from poorly sorted, disrupted mixtures of rock fragments and soil to relatively intact bedrock slide blocks

Qca **Casitas Formation (middle? Pleistocene)**—Nonmarine, moderately to well-consolidated siltstone and silt, multi-colored sandstone and sand, and conglomerate and gravel deposited mainly as alluvium likely shed off of the Santa Ynez Mountains and other nearby uplands. Unit resembles, and may be at least partly correlative with, the older alluvial deposits (Qoa) and the conglomerate of Ojai (Qco)

Qco **Conglomerate of Ojai (middle? Pleistocene)**—Nonmarine, moderately to well-consolidated conglomerate and gravel, sandstone and sand, and subordinate siltstone and silt deposited mainly as alluvium likely shed off of the Santa Ynez Mountains and other nearby uplands. Unit resembles, and may be at least partly correlative with, the older alluvial deposits (Qoa) and the Casitas Formation (Qca)

Qsb **Santa Barbara Formation (middle and early Pleistocene)**—Marine, pale-gray, -yellow, and -tan, friable, bioturbated and massive sandstone; includes subordinate interbeds and intervals of shale, siltstone, and silty to clayey sandstone. Contains diverse assemblage of marine invertebrate fossils. Contains rare conglomeratic beds and lenses, and uppermost part of unit locally interfingers with nonmarine conglomerates of the Casitas Formation (Qca)

Contact—Long-dashed where approximately located; short-dashed where inferred, dotted where concealed, queried where identity or existence is questionable; contact attitude (green tic) shows direction and angle of dip

Fault—Long-dashed where approximately located, short dashed where inferred, dotted where concealed, queried where uncertain; small red arrow shows direction and angle of dip, red diamond-headed arrow shows bearing and rake of slickenlines and inferred slip direction of hanging-wall block

Normal fault reactivated as strike-slip fault—Long-dashed where approximately located, short dashed where inferred, dotted where concealed; ball and bar on apparent downthrown side (note that this only applies to the Arroyo Parida Fault in and west of Santa Ana Valley); opposing arrows indicate sense of younger strike-slip movement

Strike-slip fault—Long-dashed where approximately located, short dashed where inferred, dotted where concealed; opposing arrows indicate sense of strike-slip component of movement

Thrust fault—Sawteeth on upthrown side, short dashed where inferred, dotted where concealed

Reverse fault—Long-dashed where approximately located, short dashed where inferred, dotted where concealed, queried where identity or existence is questionable; rectangles on upthrown side

Anticline—Long-dashed where location approximate, short dash where inferred, dotted where concealed, queried where identity or existence is questionable; large arrowhead shows direction of plunge

Syncline—Long-dashed where location approximate, short dash where inferred, dotted where concealed, queried where identity or existence is questionable; large arrowhead shows direction of plunge

Landslide scarp—Hachures point down scarp

Landslide movement—Arrows show direction of downslope movement

Landslide internal contact

Marine-terrace shoreline angle—Approximately located based on subtle to strong topographic steps of terrace surface; locally coincides with contact between Qmt and older units

Horizontal bedding

Overturned bedding—Showing strike and dip

Inclined bedding—Showing strike and dip

Inclined bedding—Showing approximate strike and dip

Inclined bedding, questionable—Showing strike and dip of bedding

Oil seep

MODIFICATIONS TO MINOR & BRANDT (2015) MADE DURING THIS STUDY

Qols **Older Landslide Deposits** - Landslide deposits observed in aerial photographs that exhibit weathered and poorly expressed geomorphology implying older age.

Water Well - as noted on topographic maps or Geotracker/GAMA

Lineation - observed on aerial photographs, possibly indicative of faulting, bedding, or other discontinuity

80+00 **Stationing** in feet.

Possible trace of Rincon Creek fault

USGS/CGS fault catalogue trace of Rincon Creek fault

Modified from Minor & Brandt (2015)

GEOTECHNICAL MAP

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 3.2

BAJADA Geosciences, Inc.

Project no. 1901.0101

SOIL UNITS ALONG PIPELINE ALIGNMENT

Soil Unit No.	Soil Unit Name
Cb	Camarillo Variant, fine sandy loam
EaB	Elder Sandy Loam 2% to 9% slopes
GcA	Goleta Fine Sandy Loam, 0% to 2% slopes
MdF	Milpitas Stony Fine Sandy Loam, 30% to 50% slopes
MeC	Milpitas Stony Fine Sandy Loam, 2% to 9% slopes
MeD2	Milpitas-Positas Fine Sandy Loam, 9% to 15% slopes
MeE2	Milpitas-Positas Fine Sandy Loam, 15% to 30% slopes
MeF2	Milpitas-Positas Fine Sandy Loam, 30% to 50% slopes
OAG	Orthents, 50% to 75% slopes
AcC	Anacapa Sandy Loam, 2% to 9% slopes
GxG	Gullied Land
LkF	Lodo Rocky Loam, 30% to 50% slopes
LoD2	Los Osos Clay Loam, warm, 9% to 15% slopes
MoC	Mocho Loam, 2% to 9% slopes
ScG	San Benito Clay Loam, 50% to 75% slopes
SoE2	Sespe Clay Loam, 15% to 30% slopes
SoF	Sespe Clay Loam, 30% to 50% slopes
SwC	Sorrento Loam, 2% to 9% slopes

0 300 600

Scale: 1”=600’
1:7,200

SOILS MAP

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 4

BAJADA Geosciences, Inc.

Project no. 1901.0101

Base map: 7.5’ USGS White Ledge Peak Quadrangle Topographic map. Soils data from NRCS (2019)



Active	
Historic Displacement (last 200 years)	Holocene Displacement (last 11,700 years)
Potentially Active	**Inactive**
Late Quaternary Displacement (last 700,000 years)	Quaternary Fault (last 1.6 million years)

Base map from USGS Interactive Fault Map (2019)

Scale undetermined

REGIONAL FAULT MAP

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. 5

BAJADA Geosciences, Inc.

Project no. 1901.0101

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APPENDIX A

Subsurface Exploration

State of California Business, Transportation and Housing Agency

Memorandum

To: SHANNON POST, Chief
Bridge Design Central

Date: October 15, 2002

File: 05-SB-150-1.6/R2.6
(1.0/R1.6 PM)
05-282801
Roadway Realignment
Bridge No. 51-0316

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES

Ref:
1) *Preliminary Geologic Recommendations and Resource Estimate for Advance Planning Study* for 05-SB-150-1.6/2.6, EA 05-282801, Rincon Creek Bridge, Bridge No. 51-0316, by Office of Structure Foundations dated June 29, 2000,
2) *Seismic Design Recommendations* for 05-SB, VEN-150-1.6/2.6, EA 05-282801, Rincon Creek Br. (Replace), Bridge No. 51-0316, by Office of Geotechnical Earthquake Engineering dated June 9, 2000,
3) *Foundation Investigation* for 05-SB-150-1.1, EA 05-282801, Rincon Creek Bridge, Bridge No. 51-0316, by Office of Structural Foundations dated November 28, 1995.

Subject: Preliminary Foundation Report

This memo is in response to a Request for Foundation Reports memo from the Office of Structure Contract Management dated March 27, 2002. Since the time of this request it is our understanding that the structures aspect of this project has been brought back in-house and the time line for PS&E has been extended from its original proposed date of May 15, 2003 to April 1, 2004. This memorandum presents our preliminary foundation recommendations (PFR) for the above mentioned project.

In 1996 a completed set of plans was produced for the realignment of Route 150 between PM 1.0 and R1.6. It is our understanding that due to permitting issues this project did not proceed to construction and a slightly different alignment was proposed at the west end of the project to accommodate permitting issues. It was proposed in the 1996 set of plans to replace the two one-lane bridges within the project limits, Bridge Numbers 51-140 and 51-141. The revised alignment proposes both bridges be replaced but only the bridge at the west end of the project, Bridge No. 51-140 is proposed for a different location than what is shown in the 1996 plans. The 1996 plans show the proposed bridge, Bridge No. 51-0316, 20 to 26 meters downstream of the existing bridge structure. The new bridge, Bridge No. 51-0316, is currently proposed to be constructed in the same location as the existing bridge. The new bridge will be wider to accommodate two-way traffic and a few meters longer. Additional borings and field work have been conducted along with a review of all the preexisting work referenced above to develop the recommendations provided herein. It should

be noted that no supplemental work has been conducted for the proposed bridge, Bridge No. 51-0317 at the east end of the project since the proposed bridge location has not changed from the 1996 plans.

Site Investigation

A foundation investigation was conducted in June of 2002 by Geotechnical personnel to supplement the 1996 bridge foundation investigation. It was conducted for the purpose of determining the existing site conditions, subsurface stratigraphy, subsurface water levels, corrosion potential, and the foundation conditions. Two 94 millimeter diameter mud rotary borings (Borings B1-02 and B2-02) were drilled at the project site. B1-02 was drilled at the northeast end of the existing bridge structure to a depth of 27.4 meters and B2-02 was drilled at the southwest end of the existing bridge structure to a depth 25.5 meters. Standard Penetration Tests (SPT), ASTM Test Method 1586, and continuous coring with a wireline 94 millimeter system was conducted during the drilling operations. The SPT tests were conducted at selected intervals for soil classification and density determination. Open Standpipe piezometers were constructed in both borings for determination of subsurface piezometric water levels. Boring B1-02 was cased with slotted PVC pipe and backfilled with #8 sand to within 3 meters of the ground surface. The top 3 meters was cased with solid PVC pipe and backfilled with bentonite chips. Boring B2-02 was cased with slotted PVC pipe and backfilled with #8 sand to within 6 meters of the ground surface. The top 6 meters was cased with solid PVC pipe and backfilled with bentonite chips. A copy of the boring logs along with a legend is included as Attachment 4 and 5. A copy of the Log of Test Borings from the 1996 plans for Bridge No. 51-0316, Attachment 6, is also attached for reference. It should be noted that the proposed bridge structure that is shown on the 1996 Log of Test Borings is 20 to 26 meters downstream of the current revised proposed bridge location.

Geology

The dominant physical feature of the region is the Santa Ynez Mountain Range, which lies to the north of the project site. Most of the structural trends in the area are oriented east-west with the Rincon Creek thrust fault zone located with the project limits. The lowlands are structural lows and the hills are anticlines or upfaulted blocks.

The project site can be characterized as varying depths of overburden overlying the Plio-Pleistocene continental deposits of Casitas Formation. The Casitas formation consists of two members. The lower member, which was found below the roadbed elevation, is predominantly gray to reddish clay, silt, and sand in fairly regular beds. The upper member, which is exposed in the cuts just westbound of the proposed structure, is crudely bedded flanglomerate, cobble, gravel, and pebble silty sand.

The borings that were drilled at either end of the existing bridge structure revealed the depth of the Casitas formation from the existing roadbed elevation. The overburden soils encountered in the borings varied in depth from 4.6 to 5.5 meters in Borings B1-02 and B2-02. The overburden soils encountered in the borings were generally loose to medium dense silty and clayey sands with gravels and cobbles encountered from a depth of 2.5 meters to the top of the Casitas formation.

Groundwater

Groundwater was encountered during the field investigation at a depth 3.5 meters in boring B1-02 and 3.8 meters in boring B2-02 below the existing ground surface. At the north end this would equate to a groundwater elevation of 33.8 meters and at the south end of the existing structure this would equate to a groundwater elevation of 33.1 meters. As is shown on the attached borings logs, Attachment 5, these water levels were encountered during July of 2002. It is very likely that these groundwater elevations will rise during the winter and spring. Rincon Creek runs year round and the creek flow line is approximately at an elevation 33 meters at the existing bridge. There is no information about the surface water in the creek channel but due to the porous nature of the overburden soils adjacent to the creek it is reasonable to assume the groundwater may reach the height of the highest anticipated level in the creek. Groundwater levels will continue to be monitored through the winter months and into next summer.

As-Built Data

This bridge was constructed in 1927 and no As-Built data was available. Contract Plans dated October, 1924, Document No. 50001024, were located but there were no construction notes or as-built notes on the contract documents.

Seismic Study and Liquefaction Evaluation

Seismic design recommendations have been developed for the proposed bridge by the Office of Earthquake Engineering and their findings are presented in the above referenced report.

Scour Evaluation

An in-depth search for existing scour potential information was conducted. Several references to scour have been stated in the previous reports referenced above. In the 1995 *Foundation Investigation* report the local scour was estimated to extend to an elevation of 29.9 meters (98 feet) which is approximately 7.5 meters below the existing roadbed grade and 2.8 meters into the Casitas formation. Based on a discussion with Mark Palmer in Geotechnical Services it is possible for local scour to extend into the Casitas formation. Although this information is provided in the Foundation report it was not generated from Geotechnical Services. Most likely this information came from the Office of Hydraulics in the Division of Engineering Services. Hydraulics did not have any record of making this recommendation so it was not possible to verify this information for the proposed bridge location.

In the 2000 *Preliminary Geologic Recommendations* report no estimate of scour is provided. Instead, it is requested that scour information be provided to this office at the time of the request for foundation recommendations.

Several reports were also found in the preliminary files held by the District 5 design engineer David Beard. A report PR No. 17 dated June 24, 1987 stated that the bottom of the existing footing was at 32.4 meters (106.4 feet) and that 0.6 meters of scour was noted in the channelbed during April of 1987. A second report, Preliminary Report by SS Wang dated November 15, 1995, stated that the abutment scour may be negligible and that contraction scour is calculated to be 0.5 meters based on FHWA HEC 18 equation.

The pile cap elevation will be dependent upon the depth of scour at the bridge location. The pile cap should be constructed at a depth below the anticipated depth of scour and the pile cap construction will require an excavation to the bottom of the pile cap. If the scour depth is confirmed to extend to an elevation of 29.9 meters, then construction of the pile cap below the groundwater surface should be expected since groundwater was found at an elevation of 33.8 meters even in July of normal rain year. The hydraulic conductivity of the material is unknown at this time but it is anticipated that the material between the elevations of 29.9 meters and 33.8 meters may be very porous due to the quantity of gravel and cobbles that were encountered during drilling of this zone. If an estimate of the hydraulic conductivity of the material surrounding the proposed excavation is desired for constructability purposes please state this specifically in the Foundation Report request along with the scour potential information. Supplemental drilling, testing, and analysis will be required to estimate the hydraulic conductivity.

Corrosion Evaluation

Samples of several of the encountered soil strata were collected for corrosion testing during the drilling operations of borings B1-02 and B2-02. The sample locations and the test results are shown below with the depth column referring to the depth that the sample was obtained below the existing ground elevation. The water sample was collected from a piezometer that was placed in boring B2-02.

SIC Number	Boring	Material Type	Depth m	Elevation m	pH	Resistivity Ω-cm	Sulfate ppm	Chloride ppm
C421534	B2-02	Water	4	32.9	7.6	640	340	94
C421535	B1-02	Soil	0.3 to 0.6	37 to 36.7	7.5	2240	-	-
C421536	B1-02	Soil	3.5 to5.0	33.8 to 32.3	7.5	620	1000	110
C421537	B2-02	Soil	14 to 15.2	22.9 to 21.7	8.2	1570	-	-
C421538	B2-02	Soil	5 to 6	31.9 to 30.9	8.5	1670	-	-
C421539	B2-02	Soil	20 to 21.3	16.9 to 15.6	8.4	1440	-	-

Table 1: Corrosion Results

CalTrans defines a corrosive material as an area where the soil and water has a minimum resistivity of less than 1000 ohm-cm and either contains more than 500 ppm of chlorides, more than 2000 ppm of sulfates, or has a pH of 5.5 or less. According to this criteria none of the tested soil shown above is considered corrosive. The corrosion results were forwarded to Corrosion Technology Branch for a review. The result of their review is attached as Attachment 7.

Preliminary Foundation Recommendations

It is proposed to construct a single span bridge structure (Bridge No. 51-0316) over Rincon Creek. Design loads are unknown at this time since the structure has changed design teams and it remains unassigned at the time of writing this report. It was assumed that the structure loads would not vary much from the proposed 1996 structure since the structure is approximately the same dimensions. For the 1996 bridge structure the design load is shown as 35 tons; therefore it was proposed to use 70 ton piles. The following foundation types were considered for the support of the bridge structure.

1. H-Piles: Steel H-piles were the proposed foundation type in the 1996 plans and is still considered a viable option. Hard driving should be anticipated since the stratigraphy consists of hard clay layers and very dense sand layers to depth. Depending upon the elevation at which the pile cap is placed, the H piles may encounter a dense layer of cobbles and gravels that was observed within 5.5 meters of the existing ground surface. Driving shoes may be required to protect the pile tips. H-piles are vulnerable to corrosion especially in areas where the H pile has been damaged or deflected by large obstructions. As per the Corrosion Technology Branch, no corrosion mitigation was found necessary for driven steel H-piles. Compared to other pile types, H-piles provide limited lateral or uplift capacity. Additional piles, thicker structural section area, and larger pile caps may be required to resist the design lateral loading. H-piles tend to run when installed in environments where water is present. If the piles run, lugs may be added to the piles in order to achieve bearing at a specified tip elevation.

2. CIDH Piles: CIDH piles can be considered a viable option at this site CIDH piles have high bearing and lateral capacity but constructability issues should be considered very strongly. As with the H-piles the lens of dense cobbles and gravels may be encountered within 5.5 meters of the existing ground surface and whether this lens of cobbles and gravel will be a construction issue will depend upon the elevation of the pile cap. It is recommended to use CIDH piles with a diameter of 406 mm (24 inch) or larger.

   Due to the presence of groundwater at 3.5 meters below the existing ground surface, and the presence of cohesionless material in the Casitas Formation casing or slurry displacement construction methods may be required. Casing or slurry displacement will help prevent water from flowing into the drilled shaft and sand and gravel from caving or heaving. Wet method CIDH construction should be anticipated for this project site.

3. Open-ended Steel Pipe Piles/ CISS Piles: The following recommendation was provided in the above referenced 2000 *Preliminary Geologic Recommendations* report and is still considered valid:

   > Driven steel pipe piles may be used for supports at all support locations. CISS piles are suitable as a pile alternative for this site. Center relief drilling may be used if the pile reaches refusal before the specified tip elevation. CISS piles are suitable for sites that might require high lateral

capacity. In locations where groundwater may be encountered during construction slurry displacement may be required for installation of the piles.

Construction difficulties should be noted. If these piles are to be reinforced and because of the difficulty in cleaning and inspecting the installed shell, Alternative "W" pile is not recommended for this site. If CISS piles are selected for support, only large shells are recommended. If the shells are to be reinforced with steel cages and filled with concrete, drilling through the pipe may require maintaining a hydraulic head in the shell casing. If high groundwater level is encountered at the site, water/slurry pressure head may be required to be maintained in the steel shell above the anticipated potentiometric level of the groundwater to prevent soil blowout from occurring inside the steel shell. CISS piles with thick shells are suitable for sites that might require high lateral capacities.

Large CISS piles with diameter of 610 mm (24 in) or larger may be used for supports at this site. Large diameter CISS piles with pile extension may be used as a pile alternative for the pile cap. These piles may need to be designed for use in corrosive environment. It is recommended that CISS piles be used at the bents with multiple columns. Long single columns with large loads are not recommended. A single column bent with a large load tends to be very deep and is very hard to inspect for defects. Pile load testing will be required at this site. Loads greater than 8.9 MN (1000Tons) per pile are not recommended due to the difficulty in testing and verifying the loads in the field.

4. Driven Concrete Piles/Close ended Steel Pipe Piles: Due to the subsurface stratigraphy, driven concrete and steel pipe piles are not feasible for the bridge structure foundation. It is unlikely that the axial and lateral capacity would be achieved because it is likely that the piles would reach refusal on the layers of hard clay and very dense sand and gravel prior to reaching the specified pile tip elevation.

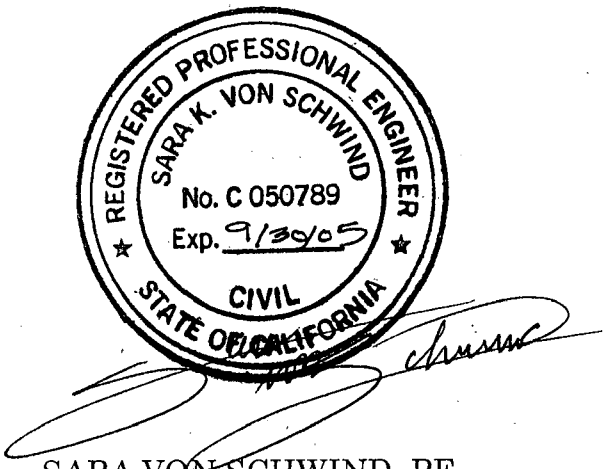
The above discussions are intended to provide preliminary interpretation of the site conditions for the purpose of cost estimates and preliminary planning. H-piles and CIDH piles are considered the most appropriate foundation types for the structure foundation. When the foundation demands are determined, final recommendations will be provided in the Foundation Recommendations Report.

Additional Field Work and Testing

The request for the Foundation Recommendations Report should include the bridge general plan, foundation design loads, the determined lowest elevation of potential scour, and the preferred bridge foundation type. Drilling of additional borings for the Foundation Recommendations Report is not

anticipated unless a more detailed understanding of the groundwater regime is desired. This may require two additional borings and time for testing and analysis to be conducted. Similar work may be necessary for bridge 51-0317.

If you have any questions or comments, please contact Sara von Schwind at (805) 549-3198 (CalNet: 629-3198) or Ron Richman at (805) 549-3385 (CalNet: 629-3385).



SARA VON SCHWIND, PE
Associate Materials & Research Engineer
Geotechnical Design – North
Branch D

Supervised by

RON RICHMAN, CHIEF, PE, CEG
Geotechnical Design – North
Branch D

Attachments (7)
c: RBibbens
DReeves
GSaunders
GDN.02

SKvS/skvs/1_1psfr1

List of Attachments

Attachment 1 ..... Location Map

Attachment 2 ..... Geology Map

Attachment 3 ..... Geology Map Legend

Attachment 4 .....Boring Log Legend

Attachment 5 .....Boring Logs

Attachment 6 .....1995 Log of Test Borings

Attachment 7 ..... Corrosion Review

Notes:

1. Unless Denoted Otherwise, All Dimensions For Measurement Of Length Shown On This Plan Are In Meters.

2. For Complete Right Of Way And Accurate Data, See Right Of Way Record Maps At District Office.

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
05	SB, Ven	150	1.5/2.7		

REGISTERED CIVIL ENGINEER

D. C. Beard
No. 52074
12-31-02
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Caltrans Metric

DATE	REVISED BY	DATE REVISED

CALCULATED/DESIGNED BY

CHECKED BY

PROJECT ENGINEER
D.C. Beard

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT DEVELOPMENT

Santa Barbara Co
Ventura Co

102+06.367
97.736

Rincon Creek

Remove Concreted Rock Slope Protection

Conservation Easement

DENSE TREES

"LOL"
R=125 m
Δ=24°28'32"
T=27.112 m
L=53.397 m

7.6 m MBGR Terminal System (Type SRT)

Irrigation Crossovers

B2-02

+54 EB

+32 BB

+35 EB

Rincon

102

Permit To Enter

19 m MBGR Terminal Anchor Assembly (Type SFT)

Rincon Ck. Bridge No. 51-0316

"LOL"
R=125 m
Δ=63°24'40"
T=77.218 m
L=138.342 m

Match Line - See Sheet L-2

Exist R/W

N 33° 19' 58" E

44.093 100

N 53° 46' 2" E

64.8 m MBGR Terminal System (Type ET)

"LOL"
R=166 m
Δ=20°26'03"
T=29.739 m
L=58.846 m

Driveway 1
See Sheet C-2

ORCHARD

Santa Barbara Co
Ventura Co

Rincon Creek

LEGEND

Approximate Boring Location
B2-02

Scale: 1:500

LOCATION MAP
ATTACHMENT 1

LAST REVISION 10-10--02 TIME PLOTTED => 10-OCT-2002 10:24

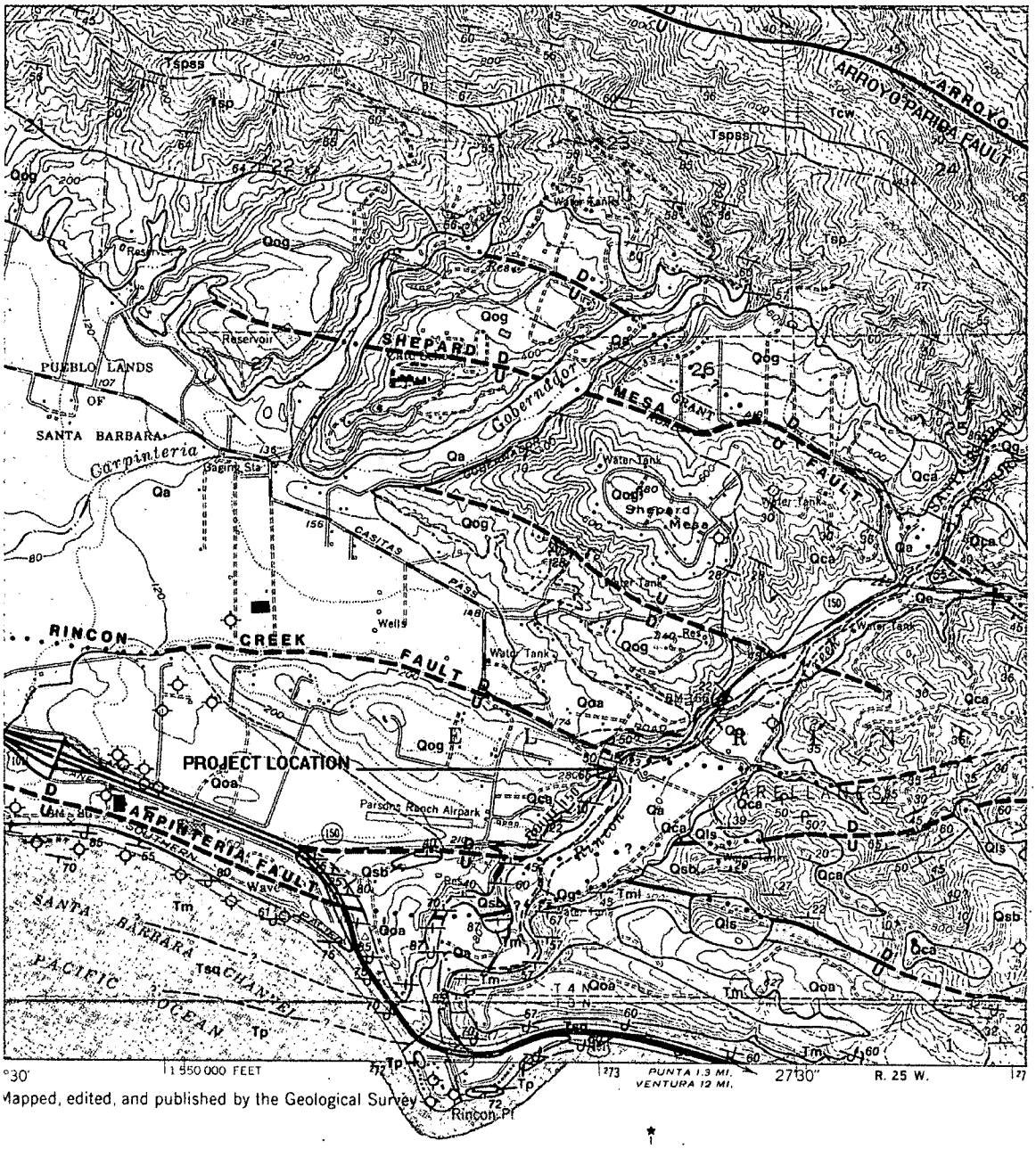
FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => sschwind
DGN FILE => rinconl_10_10.dgn

CU 05245

EA 282801

GEOLOGIC MAP
05-SB-150-1.0/R1.6 PM
05-282801



Mapped, edited, and published by the Geological Survey

SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETRE

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS



QUADRANGLE LOCATION

GEOLOGIC MAP OF THE (IN PART)
WHITE LEDGE PEAK QUADRANGLE

SANTA BARBARA and VENTURA COUNTIES, CALIFORNIA

ATTACHMENT 2

GEOLOGIC MAP LEGEND

WHITE LEDGE PEAK QUADRANGLE

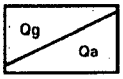
LEGEND

QUATERNARY

Holocene

?

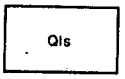
Pleistocene



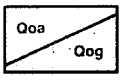
SURFICIAL SEDIMENTS

Qg *stream channel deposits, mostly gravel and sand*

Qa *alluvium; unconsolidated flood-plain deposits of silt, sand and gravel*



LANDSLIDE DEBRIS

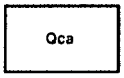


OLDER DISSECTED SURFICIAL SEDIMENTS

Qos *remnants of weakly consolidated older alluvial deposits of gravel, sand and silt*

Qog *cobble-boulder tan gravel and fanglomerate deposits composed largely of sandstone detritus*

UNCONFORMITY



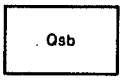
CASITAS FORMATION

nonmarine; early to middle(?) Pleistocene age

Qca *weakly consolidated alluvial deposits: gray to tan cobble-boulder gravel and gray to reddish sand and clay*

TERTIARY & QUATERNARY

Pliocene & Pleistocene



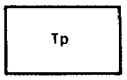
SANTA BARBARA FORMATION

shallow marine; early Pleistocene and latest Pliocene (?) age

Qsb *massive to bedded, poorly consolidated tan to yellow fossiliferous sand and silt*

UNCONFORMITY

Pliocene

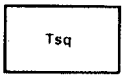


PICO FORMATION

marine; Pliocene age

Tp *massive to bedded gray siltstone, mudstone and minor tan sandstone; sandstone locally pebbly*

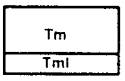
Miocene



SISQUOC SHALE

marine; late Miocene age

Tsq *light gray, silty shale or claystone, locally slightly siliceous and diatomaceous; Delmontian-Mohnian Stages*

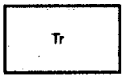


MONTEREY FORMATION
(MODELO FORMATION)

marine; early to late Miocene age

Tm *upper shale unit; white-weathering, thin bedded, hard, platy to brittle siliceous shale; Mohnian Stage*

Tml *lower shale unit: white-weathering, soft, fissile to punky clay shale with interbeds of hard siliceous shale and thin limestone strata; Luisian-Relizian Stages*



RINCON SHALE

marine; early Miocene age

Tr *poorly bedded gray clay shale and siltstone, locally concretionary; Saucesian and upper Zemorrian Stages*

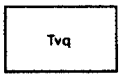
TERTIARY

Oligocene

?

?

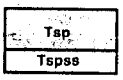
Eocene



VAQUEROS SANDSTONE

shallow marine; early Miocene age

Tvq *massive to thick bedded, light greenish-gray to tan, fine grained sandstone, locally calcareous; Zemorrian Stage*

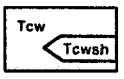


SESPE FORMATION

nonmarine; predominantly Oligocene age

Tsp *maroon, red and green silty shale or claystone with interbedded red sandstone; red arkosic sandstone and conglomerate at base*

Tspss *pink sandstone and minor red claystone*

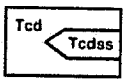


COLDWATER SANDSTONE

marine; late Eocene age

Tcw *hard, tan, bedded arkosic sandstone with minor interbeds of greenish-gray siltstone and shale, local oyster shell beds common in upper part; Narizian Stage*

Tcwsh *greenish-gray siltstone and shale with occasional interbeds of tan sandstone*

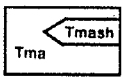


COZY DELL SHALE

marine; late Eocene age

Tcd *dark gray, argillaceous to silty micaceous shale with minor light gray to tan arkosic sandstone; Narizian Stage*

Tcdss *light gray to tan arkosic sandstone with minor interbeds of gray micaceous shale*

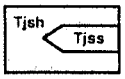


MATILIJA SANDSTONE

marine; middle to late Eocene age

Tma *hard, thick bedded, tan to mottled light greenish-gray arkosic sandstone with thin partings to thick interbeds of gray micaceous shale; lower Narizian (?) and upper Ulatisian (?) Stages*

Tmash *gray micaceous shale with minor tan sandstone interbeds*



JUNCAL FORMATION

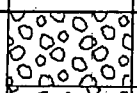
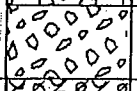
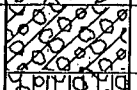
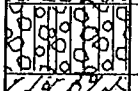
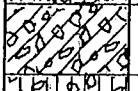
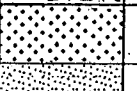
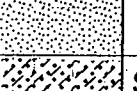
marine; early to middle Eocene age

Tjsh *dark gray micaceous shale with minor thin interbeds of hard, gray-white to tan arkosic sandstone; lower Ulatisian(?) to upper Penutian(?) Stages*

Tjss *hard, gray-white to tan arkosic sandstone with minor interbeds of dark gray micaceous shale*

ATTACHMENT 3

COARSE GRAINED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			Graphic Symbol	Group Symbol	TYPICAL GROUP NAMES
COARSE GRAINED SOILS More than half of materials is larger than 75 x 10^{-3} mm (No. 200) sieve size	GRAVELS More than half of coarse fraction is larger than 4.75 mm (No. 4) sieve size	CLEAN GRAVELS		GW	Well-graded gravel (with sand)
				GP	Poorly graded gravel (with sand)
		GRAVELS WITH SOME FINES		GW-GM	Well-graded gravel with silt (and sand)
				GW-GC	Well-graded gravel with clay (and sand)
				GP-GM	Poorly graded gravel with silt (and sand)
				GP-GC	Poorly graded gravel with clay (and sand)
		GRAVELS WITH FINES		GM	Silty gravel (with sand)
				GC	Clayey gravel (with sand)
	SANDS More than half of coarse fraction is smaller than 4.75 mm (No. 4) sieve size	CLEAN SANDS		SW	Well-graded sand (with gravel)
				SP	Poorly graded sand (with gravel)
		SANDS WITH SOME FINES		SW-SM	Well-graded sand with silt (and gravel)
				SW-SC	Well-graded sand with clay (and gravel)
				SP-SM	Poorly graded sand with silt (and gravel)
				SP-SC	Poorly graded sand with clay (and gravel)
		SANDS WITH FINES		SM	Silty sand (with gravel)
				SC	Clayey sand (with gravel)

Classification of earth material as shown above is based upon field inspection and/or mechanical analysis. Refer to ASTM Designation D-2488-90 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" and D2487 "Standard Test Method for Classification of Soils for Engineering Purposes"

Relative Density	SPT N-value blows/0.3 m	Field Approximation
Very Loose	0 - 4	Easily penetrated 30 cm with 13 mm rebar pushed by hand
Loose	5 - 10	Easily penetrated several cm with 13 mm rebar pushed by hand
Medium dense	11 - 30	Easily to moderately penetrated with 13 mm rebar driven by 2.3 kg hammer
Dense	31 - 50	Penetrated 0.3 m with difficulty using 13 mm rebar driven by 2.3 kg hammer
Very dense	>50	Penetrated only a few cm with 13 mm rebar driven by 2.3 kg hammer

ATTACHMENT 4

FINE GRAINED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS		Graphic Symbol	Group Symbol	TYPICAL GROUP NAMES		
FINE GRAINED SOILS More than half of material is smaller than 75×10^{-3} mm (No. 200) sieve size	INORGANIC FINE GRAINED SOIL		CL	<30% plus No. 200		Lean clay (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy lean clay (with gravel)
					%sand < %gravel	Gravelly lean clay (with sand)
			ML	<30% plus No. 200		Silt (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy silt (with gravel)
					%sand < %gravel	Gravelly silt (with sand)
			CH	<30% plus No. 200		Fat clay (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy fat clay (with gravel)
					%sand < %gravel	Gravelly fat clay (with sand)
			MH	<30% plus No. 200		Elastic silt (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy elastic silt (with gravel)
					%sand < %gravel	Gravelly elastic silt (with sand)
	ORGANIC FINE GRAINED SOIL		OL/OH	<30% plus No. 200		Organic soil (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy Organic soil (with gravel)
					%sand < %gravel	Gravelly organic soil (with sand)

Classification of earth material as shown above is based upon field inspection and/or mechanical analysis. Refer to ASTM Designation D-2488-90 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" and D2487 "Standard Test Method for Classification of Soils for Engineering Purposes"

Consistency	Approx. Undrained Shear Strength S_u KN/m^2	(ksf)	SPT N-value blows/0.3 m	Field Approximation
Very Soft	≤12	(<1/4)	<2	Squeezes between fingers when fist is closed; easily penetrated several inches by fist
Soft	13 - 25	(1/4 - 1/2)	2 - 4	Easily molded by fingers; easily penetrated several inches by thumb
Firm	26 - 50	(1/2 - 1)	5 - 8	Molded by strong pressure of fingers; can be penetrated several inches but thumb with moderate effort
Stiff	51 - 75	(1 - 1 1/2)	9 - 15	Dented by strong pressure of fingers; readily indented by thumb by can be penetrated only with great effort
Very stiff	76 - 100	(1 1/2 - 2)	16 - 30	Readily indented by thumbnail
Hard	>100	(>2)	>31	Indented with difficulty by thumbnail

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B1-02	Location: 2.55 m Right of CL Align "REV" : Station 101+42.3	E.A. 05-282801
Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6 -(KP) 1.6/R2.6	Project Description: Rincon Creek Bridges	Page 1 of 6
Date Started: 6-25-02 Completed: 6-26-02	Drill Rig: B-47 Trailer Mounted , #4787	Depth to Water : 3.53 m : 3.57 m Date : 7-9-02 : 7-28-02
Surface Elevation: 37.33	Drill Method/Hammer Type: Mud Rotary/63.5 KN Safety Hammer	
Total Depth (ft.) 90.0 (meters) 27.43	Drillers: Bob Gingell, Bob Eneix, Baird McKnight	
	Logged By: Sara von Schwind/ Dan Appelbaum	

Depth (ft / m)	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
0 / 0										Ground Surface					37.33
										Silty Sand loose, brown, dry, fine grained, with sandstone cobbles					
1															37
2	94mm														
3 / 1										***Silty Sand with gravel*** medium dense, brown, moist, angular, fine to medium sand, angular and rounded fine to coarse gravel					
4															
5															36
6	SPT	1	72%	8,7,7	14										
7 / 2															
8								SM							35
9	94	2								Cobble					
10 / 3															
11	SPT	3	78%	2,2,10	12					No gravels with layers of sandy silt, soft, brown, with black organics					34
12															
13 / 4	94	4	37%							With coarse gravel up to 65 mm diameter, rounded					
14															33
15															

ATTACHMENT 5

Caltrans	SOIL BOREHOLE LOG	Geotechnical Design - North, Branch D
Borehole No. B1-02	*Location:* 2.55 m Right of CL Align. "REV" : Station 101+42.3	E.A. 05-282801
Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6 *-(KP)* 1.6/R2.6	*Project Description:* Rincon Creek Bridges	*Page 2 of 6*

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
											Lean Clay hard, strong brown with gray streaks, moist, highly plastic, with structure (Casitas Formation)					
16		SPT	5	59%	9,14,23	37										
	5										strong brown					
17							431									32
18		94	6	68%							[Casing Depth]					
19																
	6															
20																
		SPT	7	46%	11,13,21	34			CL							31
21																
22																
23	7	94	8	21%			311									
24																30
25											very dark grayish brown, with thin lenses of silty SAND, very dark grayish brown					
		SPT	9		21,30,48	>70	>431									
26	8										Graded into					
		94	10	60%					SC		***Clayey SAND*** very dense, very dark grayish brown, fine, angular					
27																29
28											[Drilling mud surfacing in area of drilling. A total of 18 feet of casing was driven to stop circulation loses.]					
29		94	11	100%												
	9															
30																

Caltrans	SOIL BOREHOLE LOG	Geotechnical Design - North, Branch D
Borehole No. B1-02	Location: 2.55 m Right of CL Align. "REV" : Station 101+42.3	E.A. 05-282801
Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6 -(KP) 1.6/R2.6	Project Description: Rincon Creek Bridges	Page 3 of 6

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
		SPT	12	100%	67	>70					Alternating Lenses of					
31											**Sandy Lean CLAY and Clayey SAND** sandy lean clay, hard, dark gray, and clayey sand very dense, very dark grayish brown, fine grained, angular, cemented. Lenses may vary from 0.6m to 1.2 m in thickness					28
32																
33	10	94	13	87%												
34																27
35		SPT	14	74%	35,70	>70										
36	11								SC/CL							
37																26
38		94	15	38%												
39	12															
40											same alternating lenses as thin as 0.15 m lenses with black organics in the clay					
		SPT	16	100%	27,70/14cm	>70										25
41																
42											**Clayey SAND** very dense, very dark grayish brown, fine grained angular, cemented					
43	13	94	17	88%												
44									SC							24
45																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B1-02

Location: 2.55 m Right of CL Align. "REV" : Station 101+42.3

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6
-(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
											Clayey SAND very dense, very dark grayish brown, fine grained angular, cemented					
46	14	SPT	18	83%	52,50/8cm	>70			SC							
47																23
48		94	19	35%												
49	15															
50		SPT	20	88%	29,50/10cm	>70										22
51											0.3 m lense of dark bluish gray, fine to coarse angular and rounded					
52																
53	16	94	21	46%												
54																21
55		SPT	22	100%	50/14cm	>70										
56	17										**Poorly graded SAND with silt** very dense, gray, moist, fine grained, non-plastic					
57																20
58		94	23						SP							
59	18															
60																19

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B1-02

Location: 2.55 m Right of CL Align. "REV" : Station 101+42.3

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6 -(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sampler: Sample Number	Sampler: Recovery/Length %	Sampler: Blows per 150mm	Sampler: N (SPT)	Sampler: Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Test Results: Wet Unit Weight (KN/cubic meter)	Test Results: Water Content (%)	Test Results: Liquid Limit (%)	Test Results: Plastic Limit (%)	Elevation (m)
61		SPT	24	87%	8,10,>50	>70	>431				***Sandy Lean CLAY*** hard, brownish gray, slightly moist, low plasticity, sand fraction is very fine grained					
62	19															
63		94	25	19%					CL		***Lean CLAY with Sand*** hard, brown with gray lenses of fine sand, slightly moist, moderate plasticity					18
64																
65		SPT	26	100%	60/15cm	>70					Alternating Layers of					
66	20										***Sandy CLAY and Clayey SAND*** hard, grayish brown, slightly moist, low to moderate plasticity, sands are very fine grained					
67									SC/CL							17
68		94	27	11%												
69	21															
70		SPT	28	100%	35,75/6cm	>70					***Sandy Lean CLAY*** hard, brown, slightly moist, low plasticity very fine sands					16
71																
72	22															
73		94	29	100%					CL							15
74																
75																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B1-02

Location: 2.55 m Right of CL Align. "REV" : Station 101+42.3

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6
-(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
	23										**Sandy Lean CLAY** hard, brown, slightly moist, low plasticity very fine sands					
76																14
77		94	30	96%												
78																
	24										*End of Borehole = 90 feet Installed 80 ft of 1.5 inch slotted PVC capped with 10 ft of 1.5 inch solid PVC. Backfilled with #8 Sand and sealed with bentonite chips. (Top of Pipe Elevation 37.33 m)*					
79																
80									CL							13
81																
82	25	94	31	100%												
83																12
84																
85		SPT	32	100%	70/9cm	>70										
	26															
86																11
87																
88		94	33	70%												
	27															
89																10
90																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02	*Location:* 8.5 m Left of CL Align. "REV" : Station 101+18.5	*E.A.* 05-282801
Dist.-County-Rt.-PM 05-SB-150-1.1/1.6 *-(KP)* 1.6/R2.6	*Project Description:* Rincon Creek Bridges	*Page 1 of 6*
Date Started: 6/26/02 *Completed:* 6/27/02	*Drill Rig:* Trailer Mounted B-47, C# 4787	*Depth to Water* : 3.78 m : 3.79 m : *Date* : 7/9/02 : 7/23/02 :
Surface Elevation: 36.85 m	*Drill Method/Hammer Type:* Mud Rotary/ 63.5 kg Safety Hammer	
Total Depth (ft.) 83.5 *(meters)* 25.45	*Drillers:* Bob Gingell, Bob Enelx, Baird McKnight	
	Logged By: Dan Appelbaum, Sara von Schwind	

Depth (ft / m)	Sampler/Bit	Sampler: Sample Number	Sampler: Recovery/Length %	Sampler: Blows per 150mm	Sampler: N (SPT)	Sampler: Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Test Results: Wet Unit Weight (KN/cubic meter)	Test Results: Water Content (%)	Test Results: Liquid Limit (%)	Test Results: Plastic Limit (%)	Elevation (m)
0 ft / 0 m										Ground Surface					36.85
1	94mm		0												
2															
3 / 1															36
4															
5															
6	SPT	1	0	6,6,17	23			SC		***Clayey SAND*** medium dense, brown, moist, low plasticity, fine grained, angular, poorly graded					35
7 / 2															
8	94mm		23					CL		***Sandy Lean CLAY with gravel and cobbles*** brown, moist, low plasticity, poorly graded fine sand, gravels and cobbles appear to be sandstone, gray and brown, fine grained					
9										***Sandstone Cobbles and Boulders*** greenish-gray, black, brown, hard, subrounded					34
10 / 3															
11								GP							
12	94mm	2	13												
13 / 4															33
14															
15								SP-SC		***Poorly Graded SAND with gravel and Clay*** very dense, brown with lenses of gray, moist, slight plasticity, fine grained, gravel is subrounded					

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6 -(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sampler: Sample Number	Sampler: Recovery/Length %	Sampler: Blows per 150mm	Sampler: N (SPT)	Sampler: Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Test Results: Wet Unit Weight (KN/cubic meter)	Test Results: Water Content (%)	Test Results: Liquid Limit (%)	Test Results: Plastic Limit (%)	Elevation (m)
16	5	SPT	3	0	12,33,50	>70			SP-SC		**Poorly Graded SAND with gravel and Clay** very dense, brown with lenses of gray, moist, slight plasticity, fine grained, gravel is subrounded					32
17																
18		94mm		37					GP		**Poorly graded GRAVEL** gray, black, brown, red, coarse to medium, subrounded					
									CL		**Sandy Lean CLAY** hard, brown, slightly moist, low plasticity, with fine grained sand (Casitas Formation)					
19	6										**Poorly graded SAND with clay** very dense, brown, slightly moist, slightly plastic, fine grained					31
20		SPT	4	100	30,50/12cm	>70										
21																
22																30
23	7	94mm		37												
24																
25		SPT	5	100	70/12cm	>70			SP-SC		[Lost circulation at 7.6 m and never regained circulation]					29
26	8															
27																
28		94mm		81												28
29	9															
30																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6
-(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
31		SPT	6	0	38,50/21cm	>70			RX		***Sandstone Layer*** grayish-tan, very hard, fresh					
											Poorly graded SAND very dense, grayish brown, moist, non-plastic, fine grained					
32		94mm	7	100												27
	10															
33									SP							
34		94mm		100												
35											dark reddish brown, with lenses of sandy lean clay and sandy silt up to 0.15 m thickness					
		SPT	8	97	32,70	>70			SP/CL							26
36											***Silty SAND*** very dense, dark reddish brown, moist, angular, fine grained with layers of lean clay and silt up to 0.15 m thickness					
	11															
37																
38		94mm	9	100												
39																25
	12															
40		SPT	10	100	50/11cm	>70					Grayish brown and dark reddish brown with some lenses of silty sand with gravel, grayish brown fine subrounded gravel					
41																
42									SM							24
	13	94mm	11	36												
43																
44																
45																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6 *-(KP)* 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
											Up to 0.6 m lenses of lean clay, dark reddish brown, hard, moist, with black organics					
46	14	SPT	12	97	31,70	>70										23
47									SM/C							
48		94mm	13	55												
49	15															22
50		SPT	14	87	68	>70					***Poorly graded SAND*** very dense, dark gray, wet, fine grained, angular, cemented, with occassional black organics					
51																
52																21
53	16	94mm	15	9					SP							
54																
55		SPT	16	100	54	>70					Very fine grained with lenses of silt, hard, dark gray, moist					20
56	17															
57																
58		94mm	17	39					SP/ML							19
59	18															
60																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6 -(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
		SPT	18	100	34,70	>70					Very fine grained with lenses of silt, hard, dark gray, moist					
61																
62																18
	19															
63		94mm	19	36												
64																
									CL		***Lean CLAY*** hard, dark reddish brown, moist, highly plastic with structure					
65		SPT	20	100	51	>70	>431				***SILT interbedded with Lean CLAY*** silt, hard, dark reddish brown, moist interbedded with lean clay, hard dark reddish brown, moist with occassional black organics					17
	20															
66																
67																
		94mm	21	66			>431									
68																
																16
69	21								CL/ML							
70																
		SPT	22	100	42,50/10cm	>70	>431									
71																
																15
72																
	22															
73		94mm	23	100												
74																
75																14

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6
-(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sampler: Sample Number	Sampler: Recovery/Length %	Sampler: Blows per 150mm	Sampler: N (SPT)	Sampler: Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Test Results: Wet Unit Weight (KN/cubic meter)	Test Results: Water Content (%)	Test Results: Liquid Limit (%)	Test Results: Plastic Limit (%)	Elevation (m)
76	23	94mm	24	0												
77											***Clayey SAND*** very dense, dark reddish brown, fine grained, angular, with occassional coarse grained, rounded, very cemented					
78		94mm	25	71												13
79	24								SC							
80		SPT	26	100	70/11cm	>70										
81											Fine to coarse grained					
82	25	94mm	27	100												12
83																
84											End of Borehole					
85											***End of Borehole = 83.5 feet Installed 60 feet of 1.5 inch slotted PVC capped with 20 feet of 1.5 inch solid PVC. Backfilled with #8 sand and sealed with bentonite chips. (Top of pipe Elevation 36.89 m)***					11
86	26															
87																
88																10
89	27															
90																

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	150	1.1		

REGISTERED ENGINEER-CIVIL — R. MAHALLATI, No. 49374, Exp. 9-30-98, CIVIL, STATE OF CALIFORNIA

PLANS APPROVAL DATE

Caltrans Metric

Revisions made to this Log of Test Borings from original 1988 Log of Test Borings are:

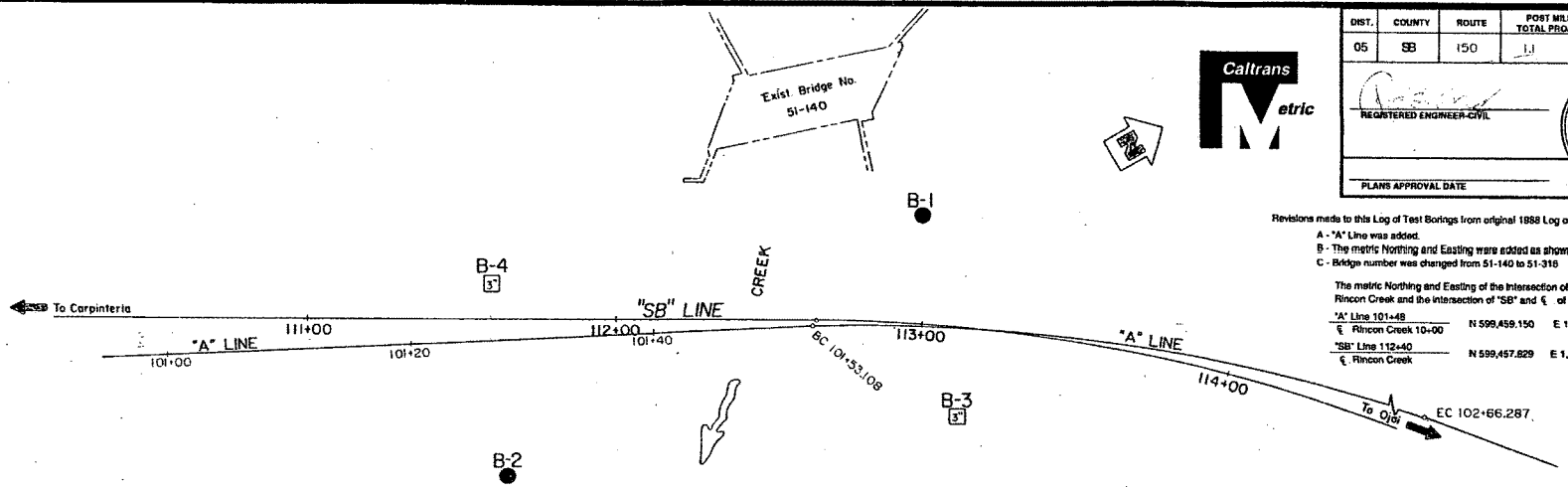
A - "A" Line was added.

B - The metric Northing and Easting were added as shown below.

C - Bridge number was changed from 51-140 to 51-316

The metric Northing and Easting of the intersection of "A" and ℄ of Rincon Creek and the intersection of "SB" and ℄ of Rincon Creek are:

"A" Line 101+48 ℄ Rincon Creek 10+00	N 599,459.150	E 1,864,953.599
"SB" Line 112+40 ℄ Rincon Creek	N 599,457.829	E 1,864,952.357



BENCH MARK

TBM "B" Elev. 121.75

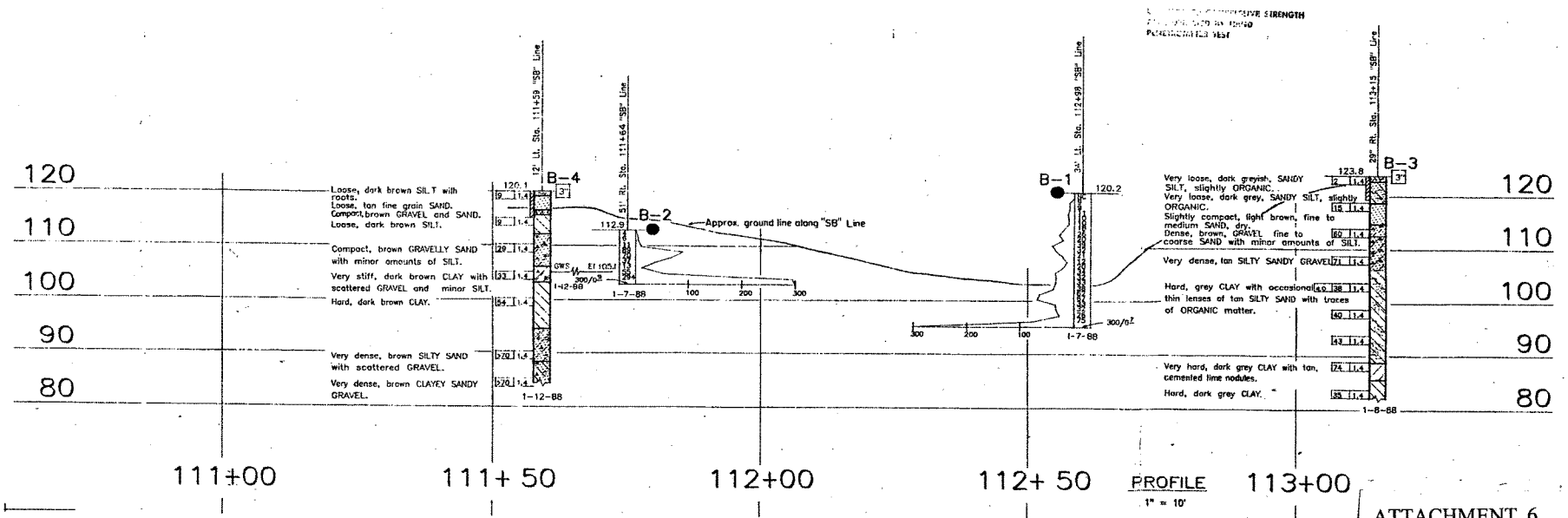
Set-On Found chiseled ⌀ top

N.E. Wingwall 64' Lt. "SB" 112+85

PLAN

"SB" LINE 1" = 20'

"A" LINE 1 " 200.

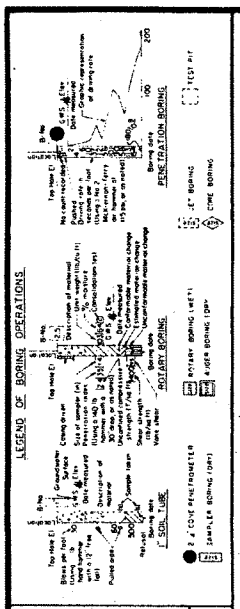


PROFILE

1" = 10'

ATTACHMENT 6

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL; SAND; SILT; CLAY; SILTY CLAY or CLAYEY SILT or ORGANIC MATTER; FILL MATERIAL; IGNEOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC ROCK; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND

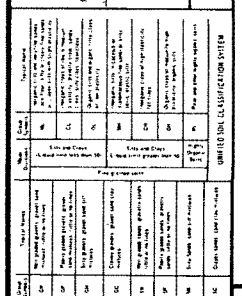
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration (Blows/Ft.)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Medium stiff
20-35	Compact	Very stiff
35-69	Dense	Hard
>70	Very dense	Very hard

UNIFIED CLASSIFICATION SYSTEM



DRAWN BY	bruce cohoton 1-88	FIELD INVESTIGATION BY	CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN
CHECKED BY		Quinn H. Miller 632			

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

State of CALIFORNIA DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN — Noel J. Sims 43024 PROJECT ENGINEER REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. 51-316

POST MILE 1.1

RINCON CREEK BRIDGE

LOG OF TEST BORINGS

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2

CU 05

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: SARA VON SCHWIND
Associate Materials & Research Engineer
Geotechnical Design / North / Branch D

Date: October 3, 2002

File: 05-SB-150-1.6/R2.6
Rincon Creek Bridge
Br. No. 51-0316
EA: 05-282801

From: DOUGLAS M. PARKS
Chief
Corrosion Technology Branch
Engineering Services

Subject: Corrosion Review for Rincon Creek Bridge

We have completed our corrosion mitigation review for the Rincon Creek Bridge project outlined in a September 16, 2002, memorandum sent to Doug Parks of the Corrosion Technology Branch. Our review is based on corrosion test results of soil and water samples, information from the Log of Test Borings, and the California Department of Transportation (Department) Bridge Design Specifications, Article 8.22 (July 2000) and Interim Memo to Designers 10-5 (December 2000).

Project Description

The project site is located on Route 150 in Santa Barbara County. It is proposed to replace the existing bridge, No. 51-140, with a wider bridge, No. 51-316, to accommodate the new traffic lanes. At this time, it is proposed that the bridge foundations will either consist of CIDH piles or driven steel H-piles. The pile cap for the foundations will be constructed 22 feet (6.7 meters) below the existing ground surface, which is below the existing ground water table of approximately 10 feet (3 meters).

Corrosion Review

The Department defines a corrosive area as an area where the soil and/or water has a minimum resistivity of less than 1000 ohm-cm, and either contains more than 500 ppm of chlorides, more than 2000 ppm of sulfates, or has a pH of 5.5 or less.

Subsurface soil samples were obtained and tested for pH, minimum resistivity, sulfate concentration, and chloride concentration in accordance with CTM 643, CTM 417, and CTM 422. The soil sample test results are as follows:

The pH level of the soil ranged from 7.5 to 8.4, and the minimum resistivity of the soil was 620 ohm-cm. The sulfate concentration of the soil ranged from 340 ppm to 1000 ppm, and the chloride concentration of the soil ranged from 94 ppm to 110ppm.

A water sample was also collected at the site and tested for pH, minimum resistivity, sulfate concentration, and chloride concentration. The water sample test results are as follows:

The pH level of the water was 7.6, and the minimum resistivity of the water was 640 ohm-cm. The sulfate concentration of the water was 340 ppm, and the chloride concentration of the water was 94 ppm.

The soil and water present at the site are non-corrosive to the proposed foundation elements.

Corrosion Recommendations

In order to maintain a 75-year design life for the structure, the proposed structure elements should be designed according to the following provisions:

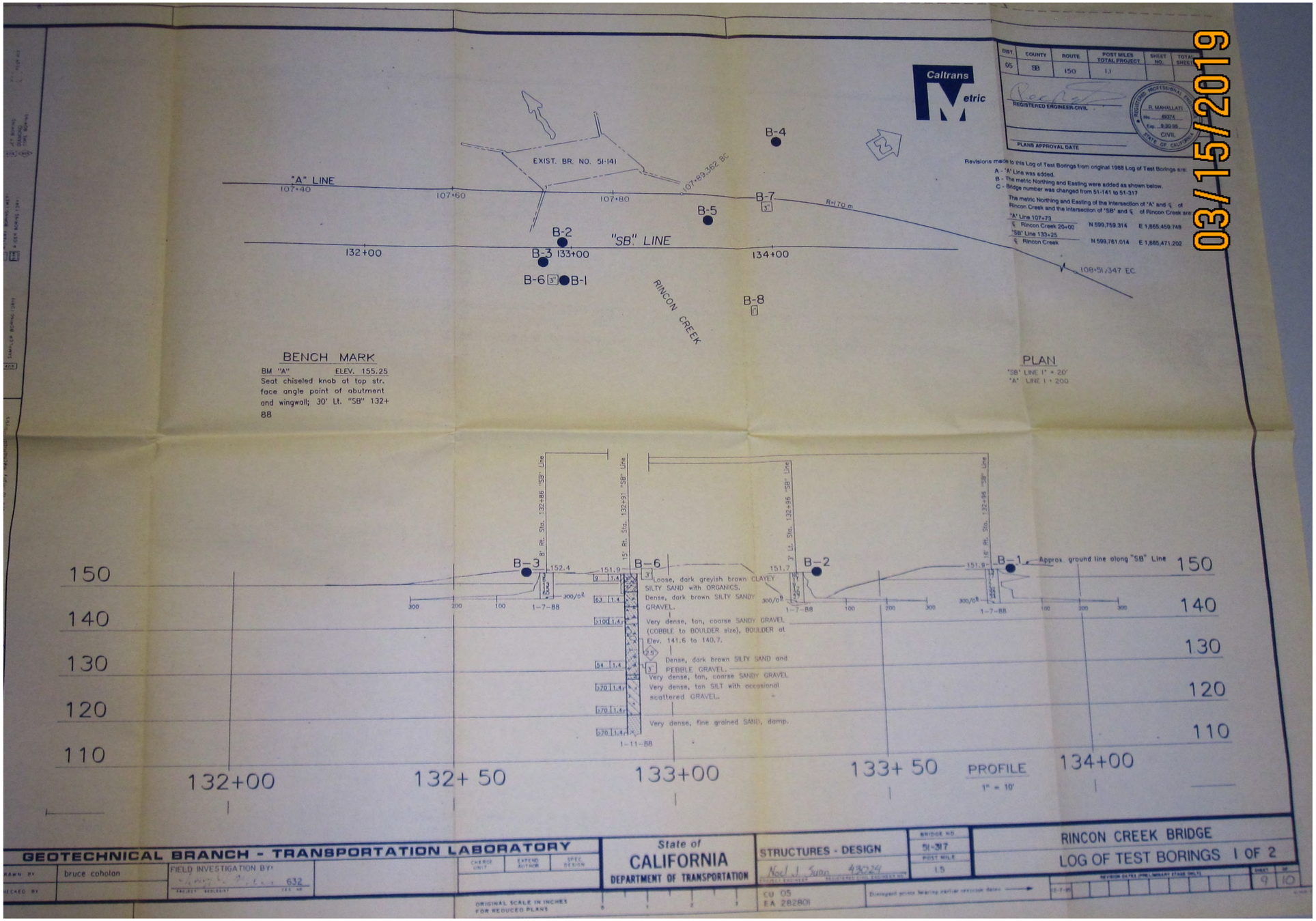
- Reinforced concrete at this site should be designed in accordance with BDS Table 8.22.2 (July 2000).

- If driven steel H-piles are used, no corrosion mitigation measures are required.

If you have any questions regarding our comments, please contact Mike Piepoli of my staff at (916) 227-7068.

Attachment

c: Mike Piepoli, Susan Hall, Arron Rambach, Corrosion Technology Branch



BRIDGE 5-SB-0137 LOTB, SHEET 1 of 2

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. A-1

BAJADA Geosciences, Inc.

Project no. 1901.0101

Caltrans Metric

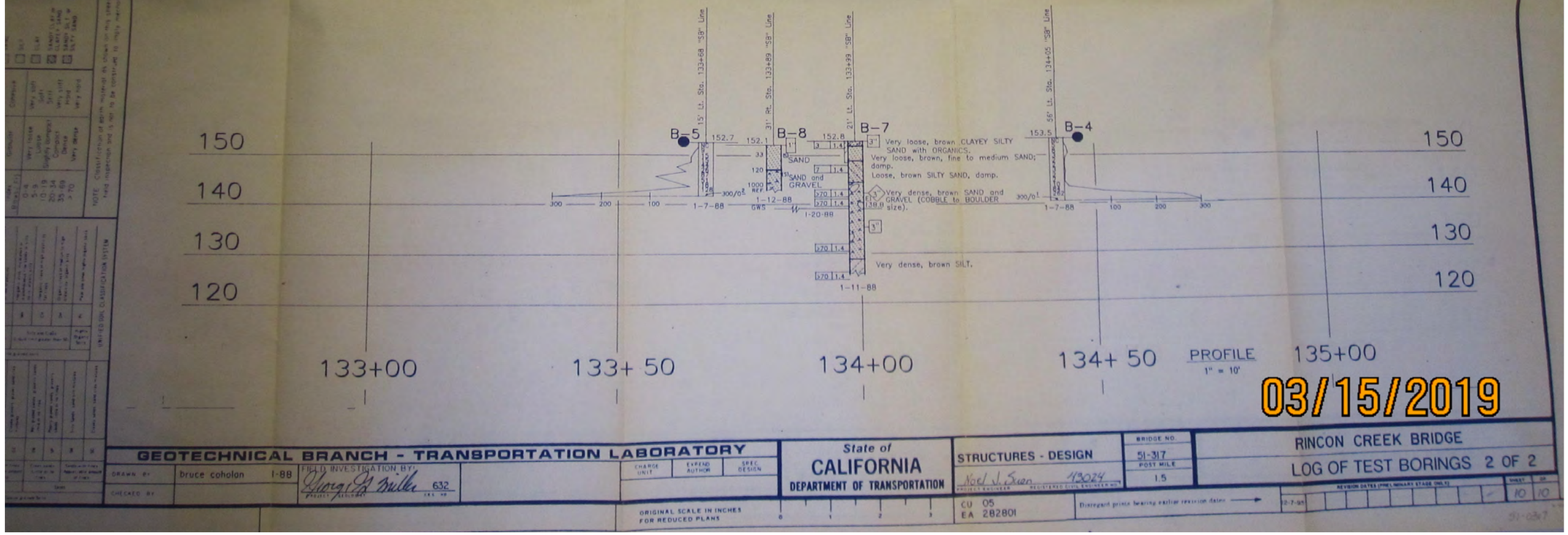
DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	150	1.1		

REGISTERED ENGINEER-CIVIL

R. MAHALLATI
No. 69374
Exp. 9-30-96
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

FOR PLAN VIEW, SEE LTB SHEET 1 OF 2



03/15/2019

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY: bruce coholon 1-88
CHECKED BY:
FIELD INVESTIGATION BY: Gregg A. Miller 632

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
Noel J. Swan 13024

BRIDGE NO. 51-317
POST MILE 1.5

CU 05
EA 282801

RINCON CREEK BRIDGE
LOG OF TEST BORINGS 2 OF 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

Disregard prints bearing earlier revision dates

12-7-95

SHEET 10 OF 10

51-0137

BRIDGE 5-SB-0137 LOTB, SHEET 2 of 2

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. A-2

BAJADA Geosciences, Inc.

Project no. 1901.0101

DRAFT

APPENDIX B

Historic Aerial Photographs



Scale undetermined

C-430, FRAME A-23, 1929

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.1

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

C-4950, FRAME SF-145, 1937

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.2

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

C-9800, FRAME 1059, 1945

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

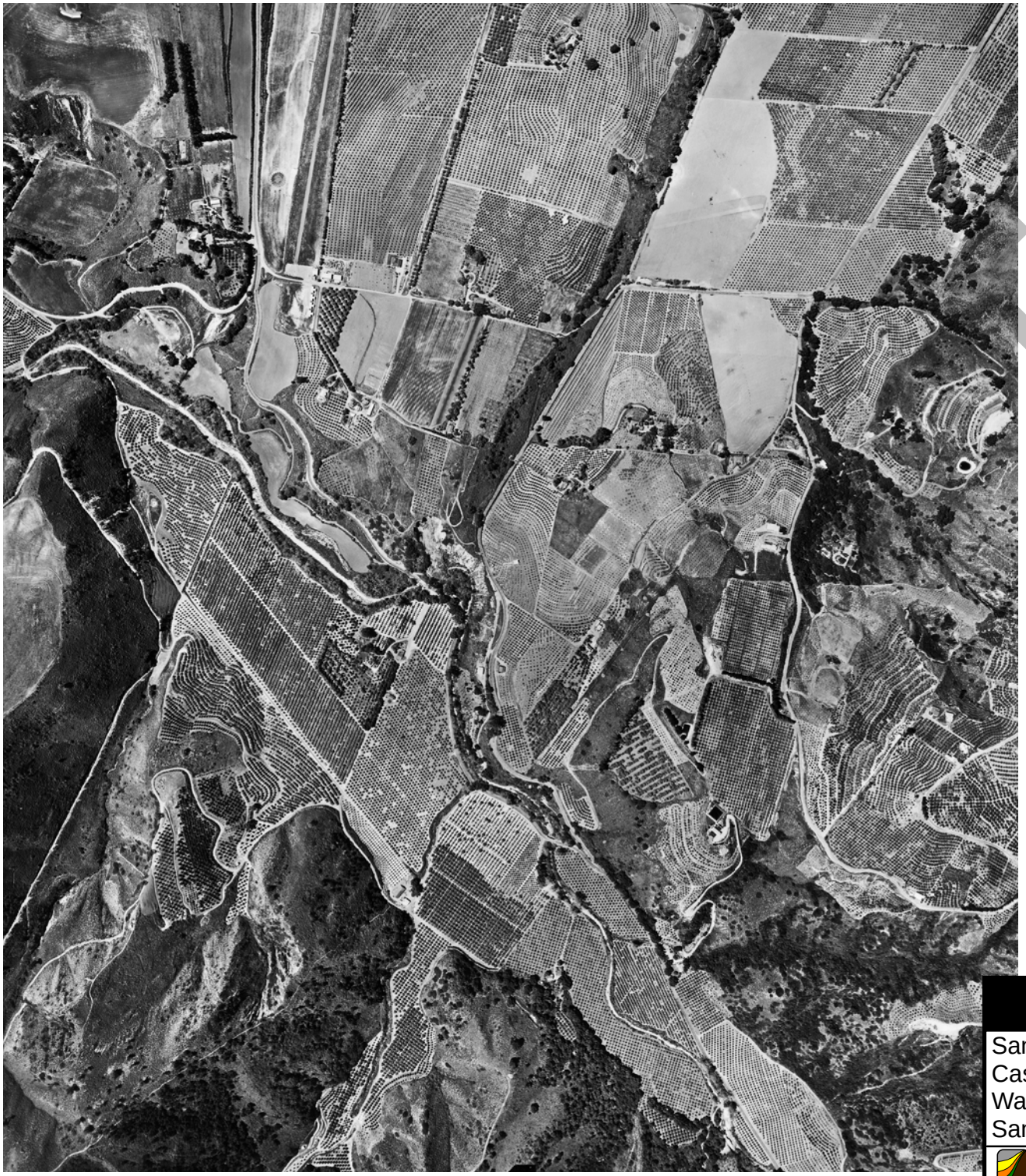
Plate No.

B-1.3

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

HA-AN, FRAME 6-20, 1956

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.4

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

HB-FV, FRAME 39, 1965

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.5

BAJADA Geosciences, Inc.

Project no.
1901.0101



Scale undetermined

HB-NN, FRAME 21, 1969

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.6

BAJADA Geosciences, Inc.

Project no.
1901.0101



Scale undetermined

HB-RD, FRAME 1, 1970

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.7

BAJADA Geosciences, Inc.

Project no.
1901.0101



Scale undetermined

HB-SY, FRAME 41, 1971

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.8

BAJADA Geosciences, Inc.

Project no.
1901.0101

APPENDIX A

Subsurface Exploration

State of California Business, Transportation and Housing Agency

Memorandum

To: SHANNON POST, Chief
Bridge Design Central

Date: October 15, 2002

File: 05-SB-150-1.6/R2.6
(1.0/R1.6 PM)
05-282801
Roadway Realignment
Bridge No. 51-0316

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES

Ref:
1) *Preliminary Geologic Recommendations and Resource Estimate for Advance Planning Study* for 05-SB-150-1.6/2.6, EA 05-282801, Rincon Creek Bridge, Bridge No. 51-0316, by Office of Structure Foundations dated June 29, 2000,
2) *Seismic Design Recommendations* for 05-SB, VEN-150-1.6/2.6, EA 05-282801, Rincon Creek Br. (Replace), Bridge No. 51-0316, by Office of Geotechnical Earthquake Engineering dated June 9, 2000,
3) *Foundation Investigation* for 05-SB-150-1.1, EA 05-282801, Rincon Creek Bridge, Bridge No. 51-0316, by Office of Structural Foundations dated November 28, 1995.

Subject: Preliminary Foundation Report

This memo is in response to a Request for Foundation Reports memo from the Office of Structure Contract Management dated March 27, 2002. Since the time of this request it is our understanding that the structures aspect of this project has been brought back in-house and the time line for PS&E has been extended from its original proposed date of May 15, 2003 to April 1, 2004. This memorandum presents our preliminary foundation recommendations (PFR) for the above mentioned project.

In 1996 a completed set of plans was produced for the realignment of Route 150 between PM 1.0 and R1.6. It is our understanding that due to permitting issues this project did not proceed to construction and a slightly different alignment was proposed at the west end of the project to accommodate permitting issues. It was proposed in the 1996 set of plans to replace the two one-lane bridges within the project limits, Bridge Numbers 51-140 and 51-141. The revised alignment proposes both bridges be replaced but only the bridge at the west end of the project, Bridge No. 51-140 is proposed for a different location than what is shown in the 1996 plans. The 1996 plans show the proposed bridge, Bridge No. 51-0316, 20 to 26 meters downstream of the existing bridge structure. The new bridge, Bridge No. 51-0316, is currently proposed to be constructed in the same location as the existing bridge. The new bridge will be wider to accommodate two-way traffic and a few meters longer. Additional borings and field work have been conducted along with a review of all the preexisting work referenced above to develop the recommendations provided herein. It should

be noted that no supplemental work has been conducted for the proposed bridge, Bridge No. 51-0317 at the east end of the project since the proposed bridge location has not changed from the 1996 plans.

Site Investigation

A foundation investigation was conducted in June of 2002 by Geotechnical personnel to supplement the 1996 bridge foundation investigation. It was conducted for the purpose of determining the existing site conditions, subsurface stratigraphy, subsurface water levels, corrosion potential, and the foundation conditions. Two 94 millimeter diameter mud rotary borings (Borings B1-02 and B2-02) were drilled at the project site. B1-02 was drilled at the northeast end of the existing bridge structure to a depth of 27.4 meters and B2-02 was drilled at the southwest end of the existing bridge structure to a depth 25.5 meters. Standard Penetration Tests (SPT), ASTM Test Method 1586, and continuous coring with a wireline 94 millimeter system was conducted during the drilling operations. The SPT tests were conducted at selected intervals for soil classification and density determination. Open Standpipe piezometers were constructed in both borings for determination of subsurface piezometric water levels. Boring B1-02 was cased with slotted PVC pipe and backfilled with #8 sand to within 3 meters of the ground surface. The top 3 meters was cased with solid PVC pipe and backfilled with bentonite chips. Boring B2-02 was cased with slotted PVC pipe and backfilled with #8 sand to within 6 meters of the ground surface. The top 6 meters was cased with solid PVC pipe and backfilled with bentonite chips. A copy of the boring logs along with a legend is included as Attachment 4 and 5. A copy of the Log of Test Borings from the 1996 plans for Bridge No. 51-0316, Attachment 6, is also attached for reference. It should be noted that the proposed bridge structure that is shown on the 1996 Log of Test Borings is 20 to 26 meters downstream of the current revised proposed bridge location.

Geology

The dominant physical feature of the region is the Santa Ynez Mountain Range, which lies to the north of the project site. Most of the structural trends in the area are oriented east-west with the Rincon Creek thrust fault zone located with the project limits. The lowlands are structural lows and the hills are anticlines or upfaulted blocks.

The project site can be characterized as varying depths of overburden overlying the Plio-Pleistocene continental deposits of Casitas Formation. The Casitas formation consists of two members. The lower member, which was found below the roadbed elevation, is predominantly gray to reddish clay, silt, and sand in fairly regular beds. The upper member, which is exposed in the cuts just westbound of the proposed structure, is crudely bedded flanglomerate, cobble, gravel, and pebble silty sand.

The borings that were drilled at either end of the existing bridge structure revealed the depth of the Casitas formation from the existing roadbed elevation. The overburden soils encountered in the borings varied in depth from 4.6 to 5.5 meters in Borings B1-02 and B2-02. The overburden soils encountered in the borings were generally loose to medium dense silty and clayey sands with gravels and cobbles encountered from a depth of 2.5 meters to the top of the Casitas formation.

Groundwater

Groundwater was encountered during the field investigation at a depth 3.5 meters in boring B1-02 and 3.8 meters in boring B2-02 below the existing ground surface. At the north end this would equate to a groundwater elevation of 33.8 meters and at the south end of the existing structure this would equate to a groundwater elevation of 33.1 meters. As is shown on the attached borings logs, Attachment 5, these water levels were encountered during July of 2002. It is very likely that these groundwater elevations will rise during the winter and spring. Rincon Creek runs year round and the creek flow line is approximately at an elevation 33 meters at the existing bridge. There is no information about the surface water in the creek channel but due to the porous nature of the overburden soils adjacent to the creek it is reasonable to assume the groundwater may reach the height of the highest anticipated level in the creek. Groundwater levels will continue to be monitored through the winter months and into next summer.

As-Built Data

This bridge was constructed in 1927 and no As-Built data was available. Contract Plans dated October, 1924, Document No. 50001024, were located but there were no construction notes or as-built notes on the contract documents.

Seismic Study and Liquefaction Evaluation

Seismic design recommendations have been developed for the proposed bridge by the Office of Earthquake Engineering and their findings are presented in the above referenced report.

Scour Evaluation

An in-depth search for existing scour potential information was conducted. Several references to scour have been stated in the previous reports referenced above. In the 1995 *Foundation Investigation* report the local scour was estimated to extend to an elevation of 29.9 meters (98 feet) which is approximately 7.5 meters below the existing roadbed grade and 2.8 meters into the Casitas formation. Based on a discussion with Mark Palmer in Geotechnical Services it is possible for local scour to extend into the Casitas formation. Although this information is provided in the Foundation report it was not generated from Geotechnical Services. Most likely this information came from the Office of Hydraulics in the Division of Engineering Services. Hydraulics did not have any record of making this recommendation so it was not possible to verify this information for the proposed bridge location.

In the 2000 *Preliminary Geologic Recommendations* report no estimate of scour is provided. Instead, it is requested that scour information be provided to this office at the time of the request for foundation recommendations.

Several reports were also found in the preliminary files held by the District 5 design engineer David Beard. A report PR No. 17 dated June 24, 1987 stated that the bottom of the existing footing was at 32.4 meters (106.4 feet) and that 0.6 meters of scour was noted in the channelbed during April of 1987. A second report, Preliminary Report by SS Wang dated November 15, 1995, stated that the abutment scour may be negligible and that contraction scour is calculated to be 0.5 meters based on FHWA HEC 18 equation.

The pile cap elevation will be dependent upon the depth of scour at the bridge location. The pile cap should be constructed at a depth below the anticipated depth of scour and the pile cap construction will require an excavation to the bottom of the pile cap. If the scour depth is confirmed to extend to an elevation of 29.9 meters, then construction of the pile cap below the groundwater surface should be expected since groundwater was found at an elevation of 33.8 meters even in July of normal rain year. The hydraulic conductivity of the material is unknown at this time but it is anticipated that the material between the elevations of 29.9 meters and 33.8 meters may be very porous due to the quantity of gravel and cobbles that were encountered during drilling of this zone. If an estimate of the hydraulic conductivity of the material surrounding the proposed excavation is desired for constructability purposes please state this specifically in the Foundation Report request along with the scour potential information. Supplemental drilling, testing, and analysis will be required to estimate the hydraulic conductivity.

Corrosion Evaluation

Samples of several of the encountered soil strata were collected for corrosion testing during the drilling operations of borings B1-02 and B2-02. The sample locations and the test results are shown below with the depth column referring to the depth that the sample was obtained below the existing ground elevation. The water sample was collected from a piezometer that was placed in boring B2-02.

SIC Number	Boring	Material Type	Depth m	Elevation m	pH	Resistivity Ω-cm	Sulfate ppm	Chloride ppm
C421534	B2-02	Water	4	32.9	7.6	640	340	94
C421535	B1-02	Soil	0.3 to 0.6	37 to 36.7	7.5	2240	-	-
C421536	B1-02	Soil	3.5 to5.0	33.8 to 32.3	7.5	620	1000	110
C421537	B2-02	Soil	14 to 15.2	22.9 to 21.7	8.2	1570	-	-
C421538	B2-02	Soil	5 to 6	31.9 to 30.9	8.5	1670	-	-
C421539	B2-02	Soil	20 to 21.3	16.9 to 15.6	8.4	1440	-	-

Table 1: Corrosion Results

CalTrans defines a corrosive material as an area where the soil and water has a minimum resistivity of less than 1000 ohm-cm and either contains more than 500 ppm of chlorides, more than 2000 ppm of sulfates, or has a pH of 5.5 or less. According to this criteria none of the tested soil shown above is considered corrosive. The corrosion results were forwarded to Corrosion Technology Branch for a review. The result of their review is attached as Attachment 7.

Preliminary Foundation Recommendations

It is proposed to construct a single span bridge structure (Bridge No. 51-0316) over Rincon Creek. Design loads are unknown at this time since the structure has changed design teams and it remains unassigned at the time of writing this report. It was assumed that the structure loads would not vary much from the proposed 1996 structure since the structure is approximately the same dimensions. For the 1996 bridge structure the design load is shown as 35 tons; therefore it was proposed to use 70 ton piles. The following foundation types were considered for the support of the bridge structure.

1. H-Piles: Steel H-piles were the proposed foundation type in the 1996 plans and is still considered a viable option. Hard driving should be anticipated since the stratigraphy consists of hard clay layers and very dense sand layers to depth. Depending upon the elevation at which the pile cap is placed, the H piles may encounter a dense layer of cobbles and gravels that was observed within 5.5 meters of the existing ground surface. Driving shoes may be required to protect the pile tips. H-piles are vulnerable to corrosion especially in areas where the H pile has been damaged or deflected by large obstructions. As per the Corrosion Technology Branch, no corrosion mitigation was found necessary for driven steel H-piles. Compared to other pile types, H-piles provide limited lateral or uplift capacity. Additional piles, thicker structural section area, and larger pile caps may be required to resist the design lateral loading. H-piles tend to run when installed in environments where water is present. If the piles run, lugs may be added to the piles in order to achieve bearing at a specified tip elevation.

2. CIDH Piles: CIDH piles can be considered a viable option at this site CIDH piles have high bearing and lateral capacity but constructability issues should be considered very strongly. As with the H-piles the lens of dense cobbles and gravels may be encountered within 5.5 meters of the existing ground surface and whether this lens of cobbles and gravel will be a construction issue will depend upon the elevation of the pile cap. It is recommended to use CIDH piles with a diameter of 406 mm (24 inch) or larger.

   Due to the presence of groundwater at 3.5 meters below the existing ground surface, and the presence of cohesionless material in the Casitas Formation casing or slurry displacement construction methods may be required. Casing or slurry displacement will help prevent water from flowing into the drilled shaft and sand and gravel from caving or heaving. Wet method CIDH construction should be anticipated for this project site.

3. Open-ended Steel Pipe Piles/ CISS Piles: The following recommendation was provided in the above referenced 2000 *Preliminary Geologic Recommendations* report and is still considered valid:

   > Driven steel pipe piles may be used for supports at all support locations. CISS piles are suitable as a pile alternative for this site. Center relief drilling may be used if the pile reaches refusal before the specified tip elevation. CISS piles are suitable for sites that might require high lateral

capacity. In locations where groundwater may be encountered during construction slurry displacement may be required for installation of the piles.

Construction difficulties should be noted. If these piles are to be reinforced and because of the difficulty in cleaning and inspecting the installed shell, Alternative "W" pile is not recommended for this site. If CISS piles are selected for support, only large shells are recommended. If the shells are to be reinforced with steel cages and filled with concrete, drilling through the pipe may require maintaining a hydraulic head in the shell casing. If high groundwater level is encountered at the site, water/slurry pressure head may be required to be maintained in the steel shell above the anticipated potentiometric level of the groundwater to prevent soil blowout from occurring inside the steel shell. CISS piles with thick shells are suitable for sites that might require high lateral capacities.

Large CISS piles with diameter of 610 mm (24 in) or larger may be used for supports at this site. Large diameter CISS piles with pile extension may be used as a pile alternative for the pile cap. These piles may need to be designed for use in corrosive environment. It is recommended that CISS piles be used at the bents with multiple columns. Long single columns with large loads are not recommended. A single column bent with a large load tends to be very deep and is very hard to inspect for defects. Pile load testing will be required at this site. Loads greater than 8.9 MN (1000Tons) per pile are not recommended due to the difficulty in testing and verifying the loads in the field.

4. Driven Concrete Piles/Close ended Steel Pipe Piles: Due to the subsurface stratigraphy, driven concrete and steel pipe piles are not feasible for the bridge structure foundation. It is unlikely that the axial and lateral capacity would be achieved because it is likely that the piles would reach refusal on the layers of hard clay and very dense sand and gravel prior to reaching the specified pile tip elevation.

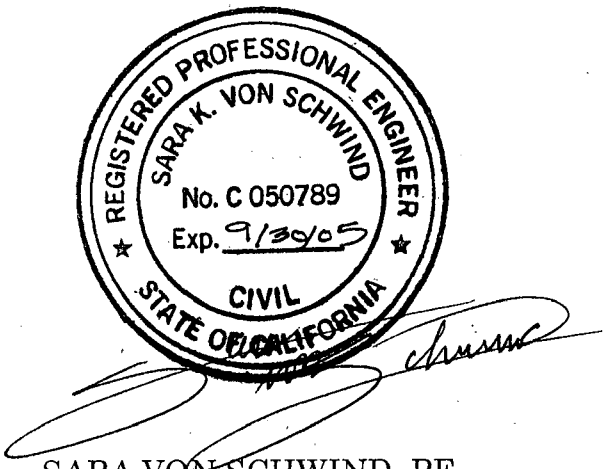
The above discussions are intended to provide preliminary interpretation of the site conditions for the purpose of cost estimates and preliminary planning. H-piles and CIDH piles are considered the most appropriate foundation types for the structure foundation. When the foundation demands are determined, final recommendations will be provided in the Foundation Recommendations Report.

Additional Field Work and Testing

The request for the Foundation Recommendations Report should include the bridge general plan, foundation design loads, the determined lowest elevation of potential scour, and the preferred bridge foundation type. Drilling of additional borings for the Foundation Recommendations Report is not

anticipated unless a more detailed understanding of the groundwater regime is desired. This may require two additional borings and time for testing and analysis to be conducted. Similar work may be necessary for bridge 51-0317.

If you have any questions or comments, please contact Sara von Schwind at (805) 549-3198 (CalNet: 629-3198) or Ron Richman at (805) 549-3385 (CalNet: 629-3385).



SARA VON SCHWIND, PE
Associate Materials & Research Engineer
Geotechnical Design – North
Branch D

Supervised by

RON RICHMAN, CHIEF, PE, CEG
Geotechnical Design – North
Branch D

Attachments (7)
c: RBibbens
DReeves
GSaunders
GDN.02

SKvS/skvs/1_1psfr1

List of Attachments

Attachment 1 ..... Location Map

Attachment 2 ..... Geology Map

Attachment 3 ..... Geology Map Legend

Attachment 4 .....Boring Log Legend

Attachment 5 .....Boring Logs

Attachment 6 .....1995 Log of Test Borings

Attachment 7 ..... Corrosion Review

Notes:

1. Unless Denoted Otherwise, All Dimensions For Measurement Of Length Shown On This Plan Are In Meters.

2. For Complete Right Of Way And Accurate Data, See Right Of Way Record Maps At District Office.

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
05	SB, Ven	150	1.5/2.7		

REGISTERED CIVIL ENGINEER

D. C. Beard
No. 52074
12-31-02
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Caltrans Metric

DATE	REVISED BY	DATE REVISED

CALCULATED/DESIGNED BY

CHECKED BY

PROJECT ENGINEER
D.C. Beard

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans PROJECT DEVELOPMENT

Santa Barbara Co
Ventura Co

102+06.367
97.736

Rincon Creek

Remove Concreted Rock Slope Protection

Conservation Easement

DENSE TREES

"LOL"
R=125 m
Δ=24°28'32"
T=27.112 m
L=53.397 m

7.6 m MBGR Terminal System (Type SRT)

Irrigation Crossovers

B2-02

+54 EB

+32 BB

+35 EB

Rincon

102

Permit To Enter

19 m MBGR Terminal Anchor Assembly (Type SFT)

Rincon Ck. Bridge No. 51-0316

"LOL"
R=125 m
Δ=63°24'40"
T=77.218 m
L=138.342 m

Match Line - See Sheet L-2

Exist R/W

N 33° 19' 58" E

44.093 100

N 53° 46' 2" E

64.8 m MBGR Terminal System (Type ET)

"LOL"
R=166 m
Δ=20°26'03"
T=29.739 m
L=58.846 m

Driveway 1
See Sheet C-2

ORCHARD

Santa Barbara Co
Ventura Co

Rincon Creek

LEGEND

Approximate Boring Location
B2-02

Scale: 1:500

LOCATION MAP
ATTACHMENT 1

LAST REVISION 10-10--02 TIME PLOTTED => 10-OCT-2002 10:24

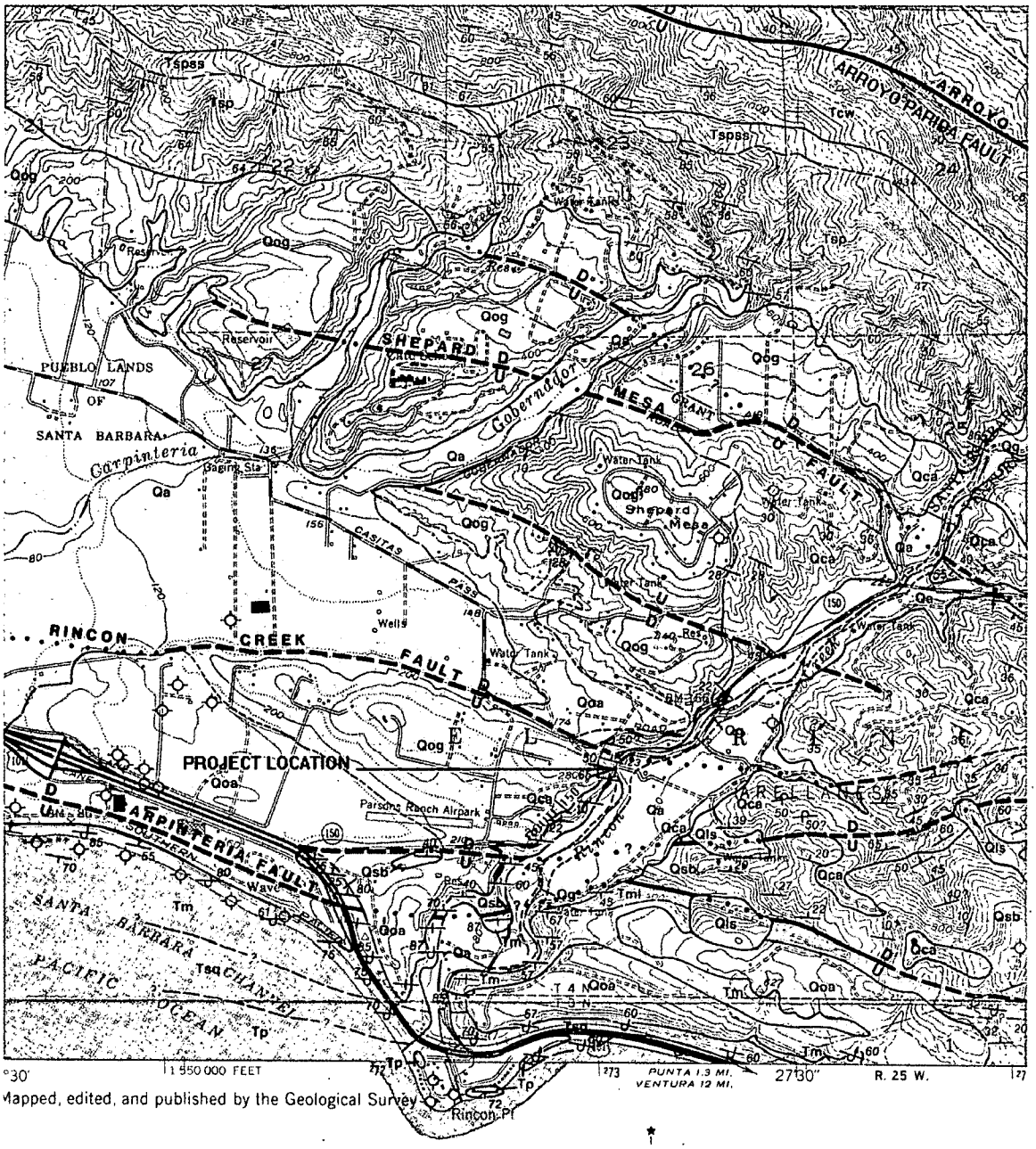
FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => sschwind
DGN FILE => rinconl_10_10.dgn

CU 05245

EA 282801

GEOLOGIC MAP
05-SB-150-1.0/R1.6 PM
05-282801



Mapped, edited, and published by the Geological Survey

SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETRE

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS



QUADRANGLE LOCATION

GEOLOGIC MAP OF THE (IN PART)
WHITE LEDGE PEAK QUADRANGLE

SANTA BARBARA and VENTURA COUNTIES, CALIFORNIA

ATTACHMENT 2

GEOLOGIC MAP LEGEND

WHITE LEDGE PEAK QUADRANGLE

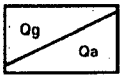
LEGEND

QUATERNARY

Holocene

?

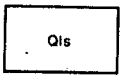
Pleistocene



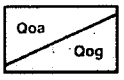
SURFICIAL SEDIMENTS

Qg *stream channel deposits, mostly gravel and sand*

Qa *alluvium; unconsolidated flood-plain deposits of silt, sand and gravel*



LANDSLIDE DEBRIS

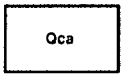


OLDER DISSECTED SURFICIAL SEDIMENTS

Qos *remnants of weakly consolidated older alluvial deposits of gravel, sand and silt*

Qog *cobble-boulder tan gravel and fanglomerate deposits composed largely of sandstone detritus*

UNCONFORMITY



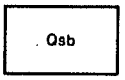
CASITAS FORMATION

nonmarine; early to middle(?) Pleistocene age

Qca *weakly consolidated alluvial deposits: gray to tan cobble-boulder gravel and gray to reddish sand and clay*

TERTIARY & QUATERNARY

Pliocene & Pleistocene



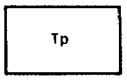
SANTA BARBARA FORMATION

shallow marine; early Pleistocene and latest Pliocene (?) age

Qsb *massive to bedded, poorly consolidated tan to yellow fossiliferous sand and silt*

UNCONFORMITY

Pliocene

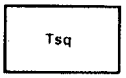


PICO FORMATION

marine; Pliocene age

Tp *massive to bedded gray siltstone, mudstone and minor tan sandstone; sandstone locally pebbly*

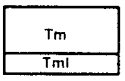
Miocene



SISQUOC SHALE

marine; late Miocene age

Tsq *light gray, silty shale or claystone, locally slightly siliceous and diatomaceous; Delmontian-Mohnian Stages*

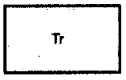


MONTEREY FORMATION
(MODELO FORMATION)

marine; early to late Miocene age

Tm *upper shale unit; white-weathering, thin bedded, hard, platy to brittle siliceous shale; Mohnian Stage*

Tml *lower shale unit: white-weathering, soft, fissile to punky clay shale with interbeds of hard siliceous shale and thin limestone strata; Luisian-Relizian Stages*



RINCON SHALE

marine; early Miocene age

Tr *poorly bedded gray clay shale and siltstone, locally concretionary; Saucesian and upper Zemorrian Stages*

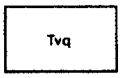
TERTIARY

Oligocene

?

?

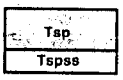
Eocene



VAQUEROS SANDSTONE

shallow marine; early Miocene age

Tvq *massive to thick bedded, light greenish-gray to tan, fine grained sandstone, locally calcareous; Zemorrian Stage*

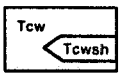


SESPE FORMATION

nonmarine; predominantly Oligocene age

Tsp *maroon, red and green silty shale or claystone with interbedded red sandstone; red arkosic sandstone and conglomerate at base*

Tspss *pink sandstone and minor red claystone*

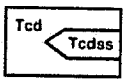


COLDWATER SANDSTONE

marine; late Eocene age

Tcw *hard, tan, bedded arkosic sandstone with minor interbeds of greenish-gray siltstone and shale, local oyster shell beds common in upper part; Narizian Stage*

Tcwsh *greenish-gray siltstone and shale with occasional interbeds of tan sandstone*

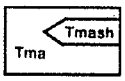


COZY DELL SHALE

marine; late Eocene age

Tcd *dark gray, argillaceous to silty micaceous shale with minor light gray to tan arkosic sandstone; Narizian Stage*

Tcdss *light gray to tan arkosic sandstone with minor interbeds of gray micaceous shale*

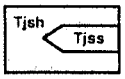


MATILIJA SANDSTONE

marine; middle to late Eocene age

Tma *hard, thick bedded, tan to mottled light greenish-gray arkosic sandstone with thin partings to thick interbeds of gray micaceous shale; lower Narizian (?) and upper Ulatisian (?) Stages*

Tmash *gray micaceous shale with minor tan sandstone interbeds*



JUNCAL FORMATION

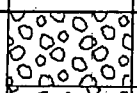
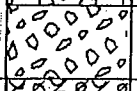
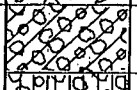
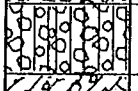
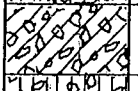
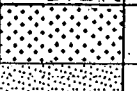
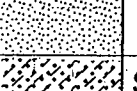
marine; early to middle Eocene age

Tjsh *dark gray micaceous shale with minor thin interbeds of hard, gray-white to tan arkosic sandstone; lower Ulatisian(?) to upper Penutian(?) Stages*

Tjss *hard, gray-white to tan arkosic sandstone with minor interbeds of dark gray micaceous shale*

ATTACHMENT 3

COARSE GRAINED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			Graphic Symbol	Group Symbol	TYPICAL GROUP NAMES
COARSE GRAINED SOILS More than half of materials is larger than 75 x 10^{-3} mm (No. 200) sieve size	GRAVELS More than half of coarse fraction is larger than 4.75 mm (No. 4) sieve size	CLEAN GRAVELS		GW	Well-graded gravel (with sand)
				GP	Poorly graded gravel (with sand)
		GRAVELS WITH SOME FINES		GW-GM	Well-graded gravel with silt (and sand)
				GW-GC	Well-graded gravel with clay (and sand)
				GP-GM	Poorly graded gravel with silt (and sand)
				GP-GC	Poorly graded gravel with clay (and sand)
		GRAVELS WITH FINES		GM	Silty gravel (with sand)
				GC	Clayey gravel (with sand)
	SANDS More than half of coarse fraction is smaller than 4.75 mm (No. 4) sieve size	CLEAN SANDS		SW	Well-graded sand (with gravel)
				SP	Poorly graded sand (with gravel)
		SANDS WITH SOME FINES		SW-SM	Well-graded sand with silt (and gravel)
				SW-SC	Well-graded sand with clay (and gravel)
				SP-SM	Poorly graded sand with silt (and gravel)
				SP-SC	Poorly graded sand with clay (and gravel)
		SANDS WITH FINES		SM	Silty sand (with gravel)
				SC	Clayey sand (with gravel)

Classification of earth material as shown above is based upon field inspection and/or mechanical analysis. Refer to ASTM Designation D-2488-90 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" and D2487 "Standard Test Method for Classification of Soils for Engineering Purposes"

Relative Density	SPT N-value blows/0.3 m	Field Approximation
Very Loose	0 - 4	Easily penetrated 30 cm with 13 mm rebar pushed by hand
Loose	5 - 10	Easily penetrated several cm with 13 mm rebar pushed by hand
Medium dense	11 - 30	Easily to moderately penetrated with 13 mm rebar driven by 2.3 kg hammer
Dense	31 - 50	Penetrated 0.3 m with difficulty using 13 mm rebar driven by 2.3 kg hammer
Very dense	>50	Penetrated only a few cm with 13 mm rebar driven by 2.3 kg hammer

ATTACHMENT 4

FINE GRAINED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS		Graphic Symbol	Group Symbol	TYPICAL GROUP NAMES		
FINE GRAINED SOILS More than half of material is smaller than 75×10^{-3} mm (No. 200) sieve size	INORGANIC FINE GRAINED SOIL		CL	<30% plus No. 200		Lean clay (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy lean clay (with gravel)
					%sand < %gravel	Gravelly lean clay (with sand)
			ML	<30% plus No. 200		Silt (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy silt (with gravel)
					%sand < %gravel	Gravelly silt (with sand)
			CH	<30% plus No. 200		Fat clay (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy fat clay (with gravel)
					%sand < %gravel	Gravelly fat clay (with sand)
			MH	<30% plus No. 200		Elastic silt (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy elastic silt (with gravel)
					%sand < %gravel	Gravelly elastic silt (with sand)
	ORGANIC FINE GRAINED SOIL		OL/OH	<30% plus No. 200		Organic soil (with sand or gravel)
				≥30% plus No. 200	%sand ≥ %gravel	Sandy Organic soil (with gravel)
					%sand < %gravel	Gravelly organic soil (with sand)

Classification of earth material as shown above is based upon field inspection and/or mechanical analysis. Refer to ASTM Designation D-2488-90 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" and D2487 "Standard Test Method for Classification of Soils for Engineering Purposes"

Consistency	Approx. Undrained Shear Strength S_u KN/m^2	(ksf)	SPT N-value blows/0.3 m	Field Approximation
Very Soft	≤12	(<1/4)	<2	Squeezes between fingers when fist is closed; easily penetrated several inches by fist
Soft	13 - 25	(1/4 - 1/2)	2 - 4	Easily molded by fingers; easily penetrated several inches by thumb
Firm	26 - 50	(1/2 - 1)	5 - 8	Molded by strong pressure of fingers; can be penetrated several inches but thumb with moderate effort
Stiff	51 - 75	(1 - 1 1/2)	9 - 15	Dented by strong pressure of fingers; readily indented by thumb by can be penetrated only with great effort
Very stiff	76 - 100	(1 1/2 - 2)	16 - 30	Readily indented by thumbnail
Hard	>100	(>2)	>31	Indented with difficulty by thumbnail

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B1-02	Location: 2.55 m Right of CL Align "REV" : Station 101+42.3	E.A. 05-282801
Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6 -(KP) 1.6/R2.6	Project Description: Rincon Creek Bridges	Page 1 of 6
Date Started: 6-25-02 Completed: 6-26-02	Drill Rig: B-47 Trailer Mounted , #4787	Depth to Water : 3.53 m : 3.57 m Date : 7-9-02 : 7-28-02
Surface Elevation: 37.33	Drill Method/Hammer Type: Mud Rotary/63.5 KN Safety Hammer	
Total Depth (ft.) 90.0 (meters) 27.43	Drillers: Bob Gingell, Bob Eneix, Baird McKnight	
	Logged By: Sara von Schwind/ Dan Appelbaum	

Depth (ft / m)	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
0 / 0										Ground Surface					37.33
										Silty Sand loose, brown, dry, fine grained, with sandstone cobbles					
1															37
2	94mm														
3 / 1										***Silty Sand with gravel*** medium dense, brown, moist, angular, fine to medium sand, angular and rounded fine to coarse gravel					
4															
5															36
6	SPT	1	72%	8,7,7	14										
7 / 2															
8								SM							35
9	94	2								Cobble					
10 / 3															
11	SPT	3	78%	2,2,10	12					No gravels with layers of sandy silt, soft, brown, with black organics					34
12															
13 / 4	94	4	37%							With coarse gravel up to 65 mm diameter, rounded					
14															33
15															

ATTACHMENT 5

Caltrans	SOIL BOREHOLE LOG	Geotechnical Design - North, Branch D
Borehole No. B1-02	*Location:* 2.55 m Right of CL Align. "REV" : Station 101+42.3	E.A. 05-282801
Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6 *-(KP)* 1.6/R2.6	*Project Description:* Rincon Creek Bridges	*Page 2 of 6*

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
											Lean Clay hard, strong brown with gray streaks, moist, highly plastic, with structure (Casitas Formation)					
16		SPT	5	59%	9,14,23	37										
	5										strong brown					
17							431									32
18		94	6	68%							[Casing Depth]					
19																
	6															
20																
		SPT	7	46%	11,13,21	34			CL							31
21																
22																
23	7	94	8	21%			311									
24																30
25											very dark grayish brown, with thin lenses of silty SAND, very dark grayish brown					
		SPT	9		21,30,48	>70	>431									
26	8										Graded into					
		94	10	60%					SC		***Clayey SAND*** very dense, very dark grayish brown, fine, angular					
27																29
28											[Drilling mud surfacing in area of drilling. A total of 18 feet of casing was driven to stop circulation loses.]					
29		94	11	100%												
	9															
30																

Caltrans	SOIL BOREHOLE LOG	Geotechnical Design - North, Branch D
Borehole No. B1-02	Location: 2.55 m Right of CL Align. "REV" : Station 101+42.3	E.A. 05-282801
Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6 -(KP) 1.6/R2.6	Project Description: Rincon Creek Bridges	Page 3 of 6

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
		SPT	12	100%	67	>70					Alternating Lenses of					
31											**Sandy Lean CLAY and Clayey SAND** sandy lean clay, hard, dark gray, and clayey sand very dense, very dark grayish brown, fine grained, angular, cemented. Lenses may vary from 0.6m to 1.2 m in thickness					28
32																
33	10	94	13	87%												
34																27
35		SPT	14	74%	35,70	>70										
36	11								SC/CL							
37																26
38		94	15	38%												
39	12															
40											same alternating lenses as thin as 0.15 m lenses with black organics in the clay					
		SPT	16	100%	27,70/14cm	>70										25
41																
42											**Clayey SAND** very dense, very dark grayish brown, fine grained angular, cemented					
43	13	94	17	88%												
44									SC							24
45																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B1-02

Location: 2.55 m Right of CL Align. "REV" : Station 101+42.3

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6 *-(KP)* 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
46	14	SPT	18	83%	52,50/8cm	>70			SC		***Clayey SAND*** very dense, very dark grayish brown, fine grained angular, cemented					
47																23
48		,94	19	35%												
49	15															
50		SPT	20	88%	29,50/10cm	>70										22
51											0.3 m lense of dark bluish gray, fine to coarse angular and rounded					
52																
53	16	94	21	46%												
54																21
55		SPT	22	100%	50/14cm	>70										
56	17										***Poorly graded SAND with silt*** very dense, gray, moist, fine grained, non-plastic					
57																20
58		94	23						SP							
59	18															
60																19

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B1-02

Location: 2.55 m Right of CL Align. "REV" : Station 101+42.3

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6 -(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sampler: Sample Number	Sampler: Recovery/Length %	Sampler: Blows per 150mm	Sampler: N (SPT)	Sampler: Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Test Results: Wet Unit Weight (KN/cubic meter)	Test Results: Water Content (%)	Test Results: Liquid Limit (%)	Test Results: Plastic Limit (%)	Elevation (m)
61		SPT	24	87%	8,10,>50	>70	>431				***Sandy Lean CLAY*** hard, brownish gray, slightly moist, low plasticity, sand fraction is very fine grained					
62	19															
63		94	25	19%					CL		***Lean CLAY with Sand*** hard, brown with gray lenses of fine sand, slightly moist, moderate plasticity					18
64																
65		SPT	26	100%	60/15cm	>70					Alternating Layers of					
66	20										***Sandy CLAY and Clayey SAND*** hard, grayish brown, slightly moist, low to moderate plasticity, sands are very fine grained					
67									SC/CL							17
68		94	27	11%												
69	21															
70		SPT	28	100%	35,75/6cm	>70					***Sandy Lean CLAY*** hard, brown, slightly moist, low plasticity very fine sands					16
71																
72	22															
73		94	29	100%					CL							15
74																
75																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B1-02

Location: 2.55 m Right of CL Align. "REV" : Station 101+42.3

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.0/R1.6
-(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
	23										**Sandy Lean CLAY** hard, brown, slightly moist, low plasticity very fine sands					
76																14
77		94	30	96%												
78																
	24										*End of Borehole = 90 feet Installed 80 ft of 1.5 inch slotted PVC capped with 10 ft of 1.5 inch solid PVC. Backfilled with #8 Sand and sealed with bentonite chips. (Top of Pipe Elevation 37.33 m)*					
79																
80									CL							13
81																
82	25	94	31	100%												
83																12
84																
85		SPT	32	100%	70/9cm	>70										
	26															
86																11
87																
88		94	33	70%												
	27															
89																10
90																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02	*Location:* 8.5 m Left of CL Align. "REV" : Station 101+18.5	*E.A.* 05-282801
Dist.-County-Rt.-PM 05-SB-150-1.1/1.6 *-(KP)* 1.6/R2.6	*Project Description:* Rincon Creek Bridges	*Page 1 of 6*
Date Started: 6/26/02 *Completed:* 6/27/02	*Drill Rig:* Trailer Mounted B-47, C# 4787	*Depth to Water* : 3.78 m : 3.79 m : *Date* : 7/9/02 : 7/23/02 :
Surface Elevation: 36.85 m	*Drill Method/Hammer Type:* Mud Rotary/ 63.5 kg Safety Hammer	
Total Depth (ft.) 83.5 *(meters)* 25.45	*Drillers:* Bob Gingell, Bob Enelx, Baird McKnight	
	Logged By: Dan Appelbaum, Sara von Schwind	

Depth (ft / m)	Sampler/Bit	Sampler: Sample Number	Sampler: Recovery/Length %	Sampler: Blows per 150mm	Sampler: N (SPT)	Sampler: Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Test Results: Wet Unit Weight (KN/cubic meter)	Test Results: Water Content (%)	Test Results: Liquid Limit (%)	Test Results: Plastic Limit (%)	Elevation (m)
0 ft / 0 m										Ground Surface					36.85
1	94mm		0												
2															
3 / 1															36
4															
5															
6	SPT	1	0	6,6,17	23			SC		***Clayey SAND*** medium dense, brown, moist, low plasticity, fine grained, angular, poorly graded					35
7 / 2															
8	94mm		23					CL		***Sandy Lean CLAY with gravel and cobbles*** brown, moist, low plasticity, poorly graded fine sand, gravels and cobbles appear to be sandstone, gray and brown, fine grained					
9										***Sandstone Cobbles and Boulders*** greenish-gray, black, brown, hard, subrounded					34
10 / 3															
11								GP							
12	94mm	2	13												
13 / 4															33
14															
15								SP-SC		***Poorly Graded SAND with gravel and Clay*** very dense, brown with lenses of gray, moist, slight plasticity, fine grained, gravel is subrounded					

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6 -(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sampler: Sample Number	Sampler: Recovery/Length %	Sampler: Blows per 150mm	Sampler: N (SPT)	Sampler: Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Test Results: Wet Unit Weight (KN/cubic meter)	Test Results: Water Content (%)	Test Results: Liquid Limit (%)	Test Results: Plastic Limit (%)	Elevation (m)
16	5	SPT	3	0	12,33,50	>70			SP-SC		**Poorly Graded SAND with gravel and Clay** very dense, brown with lenses of gray, moist, slight plasticity, fine grained, gravel is subrounded					32
17																
18		94mm		37					GP		**Poorly graded GRAVEL** gray, black, brown, red, coarse to medium, subrounded					
									CL		**Sandy Lean CLAY** hard, brown, slightly moist, low plasticity, with fine grained sand (Casitas Formation)					
19	6										**Poorly graded SAND with clay** very dense, brown, slightly moist, slightly plastic, fine grained					31
20		SPT	4	100	30,50/12cm	>70										
21																
22																30
23	7	94mm		37												
24																
25		SPT	5	100	70/12cm	>70			SP-SC		[Lost circulation at 7.6 m and never regained circulation]					29
26	8															
27																
28		94mm		81												28
29	9															
30																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6
-(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
31		SPT	6	0	38,50/21cm	>70			RX		***Sandstone Layer*** grayish-tan, very hard, fresh					
											Poorly graded SAND very dense, grayish brown, moist, non-plastic, fine grained					
32		94mm	7	100												27
	10															
33									SP							
34		94mm		100												
35											dark reddish brown, with lenses of sandy lean clay and sandy silt up to 0.15 m thickness					
		SPT	8	97	32,70	>70			SP/CL							26
36											***Silty SAND*** very dense, dark reddish brown, moist, angular, fine grained with layers of lean clay and silt up to 0.15 m thickness					
	11															
37																
38		94mm	9	100												
39																25
	12															
40		SPT	10	100	50/11cm	>70					Grayish brown and dark reddish brown with some lenses of silty sand with gravel, grayish brown fine subrounded gravel					
41																
42									SM							24
	13	94mm	11	36												
43																
44																
45																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6 *-(KP)* 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
											Up to 0.6 m lenses of lean clay, dark reddish brown, hard, moist, with black organics					
46	14	SPT	12	97	31,70	>70										23
47									SM/C							
48		94mm	13	55												
49	15															22
50		SPT	14	87	68	>70					***Poorly graded SAND*** very dense, dark gray, wet, fine grained, angular, cemented, with occassional black organics					
51																
52																21
53	16	94mm	15	9					SP							
54																
55		SPT	16	100	54	>70					Very fine grained with lenses of silt, hard, dark gray, moist					20
56	17															
57																
58		94mm	17	39					SP/ML							19
59	18															
60																

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6 -(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sample Number	Recovery/Length %	Blows per 150mm	N (SPT)	Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Wet Unit Weight (KN/cubic meter)	Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Elevation (m)
		SPT	18	100	34,70	>70					Very fine grained with lenses of silt, hard, dark gray, moist					
61																
62																18
	19															
63		94mm	19	36												
64																
									CL		***Lean CLAY*** hard, dark reddish brown, moist, highly plastic with structure					
65		SPT	20	100	51	>70	>431				***SILT interbedded with Lean CLAY*** silt, hard, dark reddish brown, moist interbedded with lean clay, hard dark reddish brown, moist with occassional black organics					17
	20															
66																
67																
		94mm	21	66			>431									
68																
																16
69	21								CL/ML							
70																
		SPT	22	100	42,50/10cm	>70	>431									
71																
																15
72																
	22															
73		94mm	23	100												
74																
75																14

Caltrans

SOIL BOREHOLE LOG

Geotechnical Design - North, Branch D

Borehole No. B2-02

Location: 8.5 m Left of CL Align. "REV" : STA 101+18.5

E.A. 05-282801

Dist.-County-Rt.-PM 05-SB-150-1.1/1.6
-(KP) 1.6/R2.6

Project Description: Rincon Creek Bridges

Depth ft	Depth m	Sampler/Bit	Sampler: Sample Number	Sampler: Recovery/Length %	Sampler: Blows per 150mm	Sampler: N (SPT)	Sampler: Pocket Pen. (kpa)	Torvane (kpa)	USCS	Graphic Log	Description of Material (consistency, color, texture moisture content)	Test Results: Wet Unit Weight (KN/cubic meter)	Test Results: Water Content (%)	Test Results: Liquid Limit (%)	Test Results: Plastic Limit (%)	Elevation (m)
76	23	94mm	24	0												
77											***Clayey SAND*** very dense, dark reddish brown, fine grained, angular, with occassional coarse grained, rounded, very cemented					
78		94mm	25	71												13
79	24								SC							
80		SPT	26	100	70/11cm	>70										
81											Fine to coarse grained					
82	25	94mm	27	100												12
83																
84											End of Borehole					
85											***End of Borehole = 83.5 feet Installed 60 feet of 1.5 inch slotted PVC capped with 20 feet of 1.5 inch solid PVC. Backfilled with #8 sand and sealed with bentonite chips. (Top of pipe Elevation 36.89 m)***					11
86	26															
87																
88																10
89	27															
90																

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	150	1.1		

REGISTERED ENGINEER-CIVIL — R. MAHALLATI, No. 49374, Exp. 9-30-98, CIVIL, STATE OF CALIFORNIA

PLANS APPROVAL DATE

Caltrans Metric

Revisions made to this Log of Test Borings from original 1988 Log of Test Borings are:

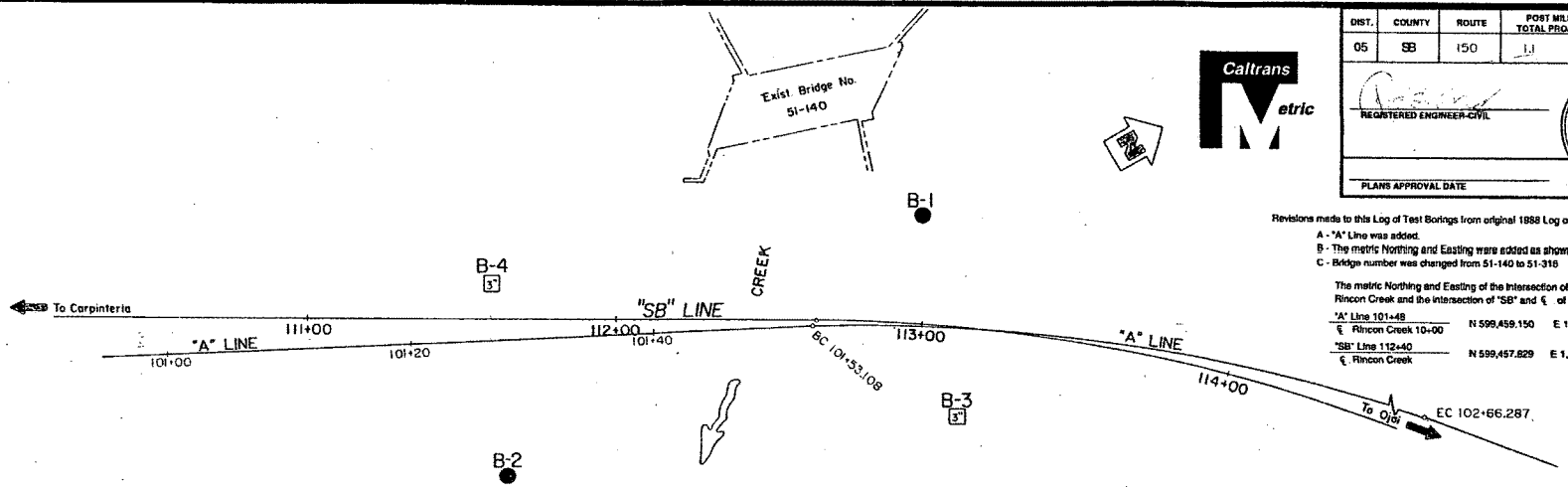
A - "A" Line was added.

B - The metric Northing and Easting were added as shown below.

C - Bridge number was changed from 51-140 to 51-316

The metric Northing and Easting of the intersection of "A" and ℄ of Rincon Creek and the intersection of "SB" and ℄ of Rincon Creek are:

"A" Line 101+48 ℄ Rincon Creek 10+00	N 599,459.150	E 1,864,953.599
"SB" Line 112+40 ℄ Rincon Creek	N 599,457.829	E 1,864,952.357



BENCH MARK

TBM "B" Elev. 121.75

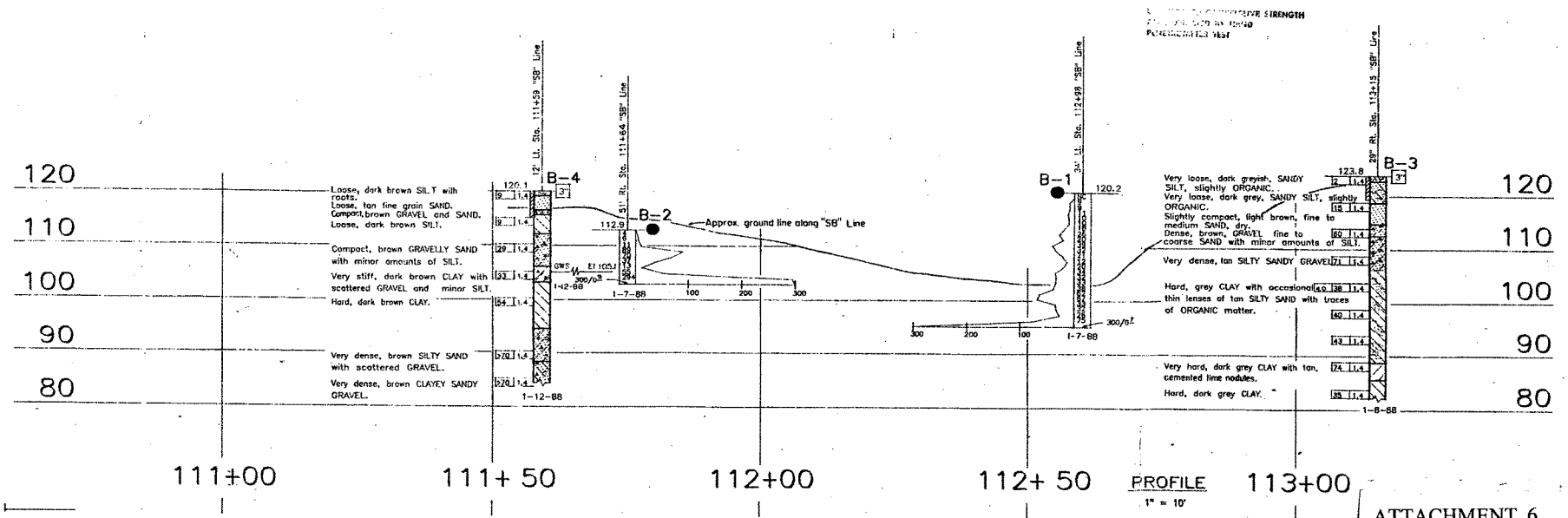
Set-On Found chiseled ⌀ top

N.E. Wingwall 64' Lt. "SB" 112+85

PLAN

"SB" LINE 1" = 20'

"A" LINE 1 " 200.

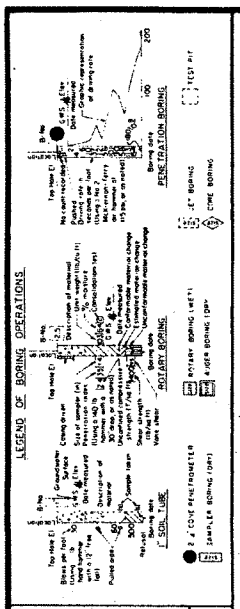


PROFILE

1" = 10'

ATTACHMENT 6

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

GRAVEL; SAND; SILT; CLAY; SILTY CLAY or CLAYEY SILT or ORGANIC MATTER; FILL MATERIAL; IGNEOUS ROCK; SEDIMENTARY ROCK; METAMORPHIC ROCK; SANDY CLAY or CLAYEY SAND; SANDY SILT or SILTY SAND

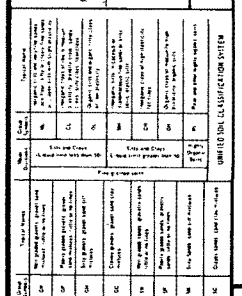
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Penetration (Blows/Ft.)	Granular	Cohesive
0-4	Very loose	Very soft
5-9	Loose	Soft
10-19	Slightly compact	Medium stiff
20-35	Compact	Very stiff
35-69	Dense	Hard
>70	Very dense	Very hard

UNIFIED CLASSIFICATION SYSTEM



DRAWN BY	bruce cohoton 1-88	FIELD INVESTIGATION BY	CHARGE UNIT	EXPEND. AUTHOR	SPEC. DESIGN
CHECKED BY		Quinn H. Miller 632			

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

State of CALIFORNIA DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN — Noel J. Sims 43024 PROJECT ENGINEER REGISTERED CIVIL ENGINEER NO.

BRIDGE NO. 51-316

POST MILE 1.1

RINCON CREEK BRIDGE

LOG OF TEST BORINGS

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2

CU 05

Disregard prints bearing earlier revision dates

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: SARA VON SCHWIND
Associate Materials & Research Engineer
Geotechnical Design / North / Branch D

Date: October 3, 2002

File: 05-SB-150-1.6/R2.6
Rincon Creek Bridge
Br. No. 51-0316
EA: 05-282801

From: DOUGLAS M. PARKS
Chief
Corrosion Technology Branch
Engineering Services

Subject: Corrosion Review for Rincon Creek Bridge

We have completed our corrosion mitigation review for the Rincon Creek Bridge project outlined in a September 16, 2002, memorandum sent to Doug Parks of the Corrosion Technology Branch. Our review is based on corrosion test results of soil and water samples, information from the Log of Test Borings, and the California Department of Transportation (Department) Bridge Design Specifications, Article 8.22 (July 2000) and Interim Memo to Designers 10-5 (December 2000).

Project Description

The project site is located on Route 150 in Santa Barbara County. It is proposed to replace the existing bridge, No. 51-140, with a wider bridge, No. 51-316, to accommodate the new traffic lanes. At this time, it is proposed that the bridge foundations will either consist of CIDH piles or driven steel H-piles. The pile cap for the foundations will be constructed 22 feet (6.7 meters) below the existing ground surface, which is below the existing ground water table of approximately 10 feet (3 meters).

Corrosion Review

The Department defines a corrosive area as an area where the soil and/or water has a minimum resistivity of less than 1000 ohm-cm, and either contains more than 500 ppm of chlorides, more than 2000 ppm of sulfates, or has a pH of 5.5 or less.

Subsurface soil samples were obtained and tested for pH, minimum resistivity, sulfate concentration, and chloride concentration in accordance with CTM 643, CTM 417, and CTM 422. The soil sample test results are as follows:

The pH level of the soil ranged from 7.5 to 8.4, and the minimum resistivity of the soil was 620 ohm-cm. The sulfate concentration of the soil ranged from 340 ppm to 1000 ppm, and the chloride concentration of the soil ranged from 94 ppm to 110ppm.

A water sample was also collected at the site and tested for pH, minimum resistivity, sulfate concentration, and chloride concentration. The water sample test results are as follows:

The pH level of the water was 7.6, and the minimum resistivity of the water was 640 ohm-cm. The sulfate concentration of the water was 340 ppm, and the chloride concentration of the water was 94 ppm.

The soil and water present at the site are non-corrosive to the proposed foundation elements.

Corrosion Recommendations

In order to maintain a 75-year design life for the structure, the proposed structure elements should be designed according to the following provisions:

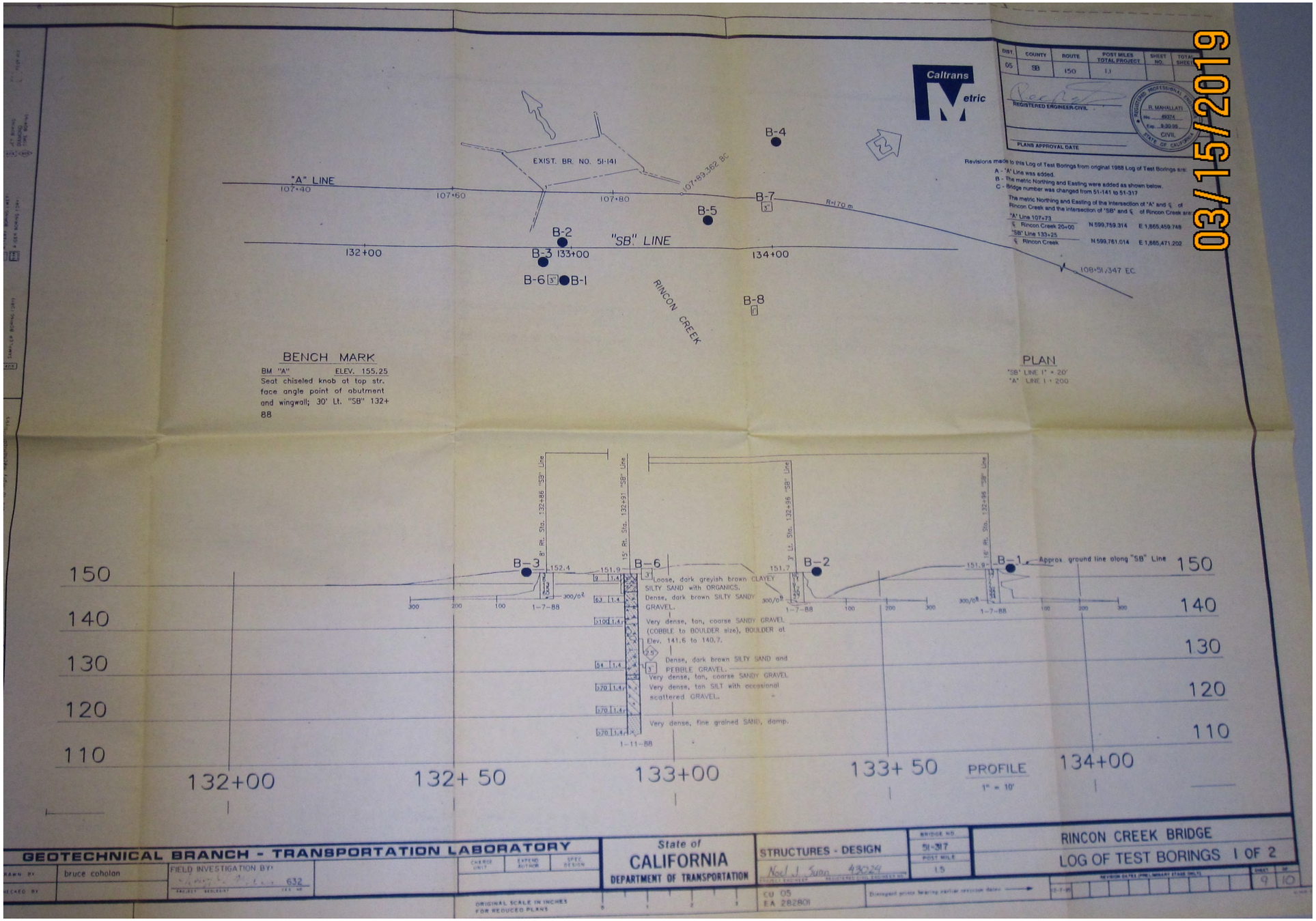
- Reinforced concrete at this site should be designed in accordance with BDS Table 8.22.2 (July 2000).

- If driven steel H-piles are used, no corrosion mitigation measures are required.

If you have any questions regarding our comments, please contact Mike Piepoli of my staff at (916) 227-7068.

Attachment

c: Mike Piepoli, Susan Hall, Arron Rambach, Corrosion Technology Branch



BRIDGE 5-SB-0137 LOTB, SHEET 1 of 2

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. A-1

BAJADA Geosciences, Inc.

Project no. 1901.0101

Caltrans Metric

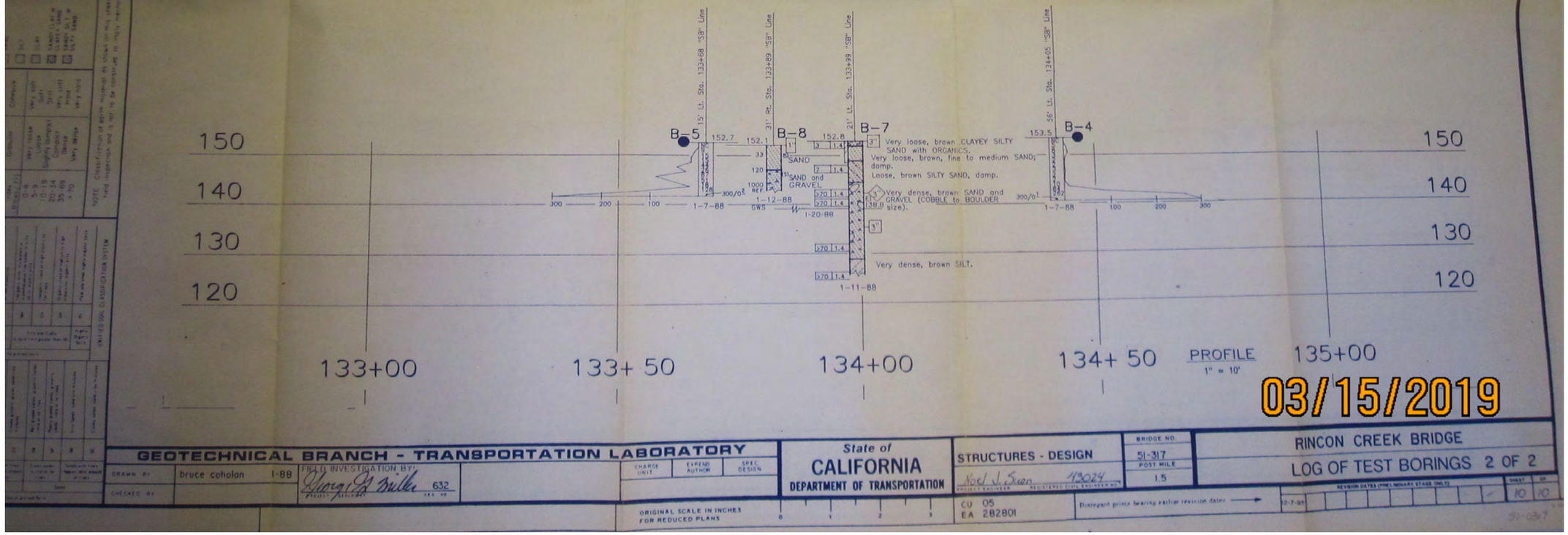
DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
05	SB	150	1.1		

REGISTERED ENGINEER-CIVIL

R. MAHALLATI
No. 69374
Exp. 9-30-96
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

FOR PLAN VIEW, SEE LTB SHEET 1 OF 2



03/15/2019

GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY

DRAWN BY: bruce coholon 1-88
CHECKED BY:
FIELD INVESTIGATION BY: Gregg A. Miller 632

State of CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STRUCTURES - DESIGN
Noel J. Swan 13024

BRIDGE NO. 51-317
POST MILE 1.5

CU 05
EA 282801

RINCON CREEK BRIDGE
LOG OF TEST BORINGS 2 OF 2

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

Disregard prints bearing earlier revision dates

12-7-95

SHEET 10 OF 10

51-0137

BRIDGE 5-SB-0137 LOTB, SHEET 2 of 2

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No. A-2

BAJADA Geosciences, Inc.

Project no. 1901.0101

APPENDIX B

Historic Aerial Photographs



Scale undetermined

C-430, FRAME A-23, 1929

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.1

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

C-4950, FRAME SF-145, 1937

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.2

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

C-9800, FRAME 1059, 1945

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.3

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

HA-AN, FRAME 6-20, 1956

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.4

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

HB-FV, FRAME 39, 1965

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.5

BAJADA Geosciences, Inc.

Project no.
1901.0101



Scale undetermined

HB-NN, FRAME 21, 1969

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.6

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

HB-RD, FRAME 1, 1970

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.7

BAJADA Geosciences, Inc.

Project no.

1901.0101



Scale undetermined

HB-SY, FRAME 41, 1971

Santa Barbara-Ventura Tie-In Pipeline
Casitas Municipal Water District
Water Works Engineers
Santa Barbara & Ventura Counties, CA

Plate No.

B-1.8

BAJADA Geosciences, Inc.

Project no.
1901.0101

APPENDIX E

Oil Development Data



TRAK Environmental Group
4125 Market Street No 19
Ventura California 93003

Telephone 805 650 5333
Facsimile 805 650 7213

TRAK

SAMPLING AND ANALYSIS WORKPLAN

Rincon del Mar Ranch
Ventura County, California

prepared for

Mr. David C. Salter
Voluntary Cleanup Program
Ventura County Environmental Health Division
800 South Victoria, L1730
Ventura, California

by

TRAK Environmental Group, Inc.
Project Number 366

Bradford S. Newman, R.G.
President

REGISTERED GEOLOGIST
BRADFORD S. NEWMAN
3562
STATE OF CALIFORNIA

and

PHR Environmental Consultants, Inc.

Robert Cashier
Senior Vice President
Project Manager

April 7, 1997

97366001

TRAK

CONTENTS

Section		Page
	INTRODUCTION	1
I	**BACKGROUND**	2
	SITE DESCRIPTION AND HYDROGEOLOGY	2
	PREVIOUS INVESTIGATIONS	2
	PREVIOUS SOIL SAMPLING IN STEEL SHED	3
	PREVIOUS CORRECTIVE ACTION IN STEEL SHED	5
II	**SAMPLING AND ANALYSIS WORKPLAN**	6
	GENERAL DESCRIPTION	6
	SCOPE OF WORK	7
	AUTHORIZATION TO PROCEED	
	REFERENCES	14

APPENDIXES

A. HEALTH AND SAFETY PLAN
B. QUALITY ASSURANCE/QUALITY CONTROL PLAN

ILLUSTRATIONS

Figure

1 Site Location Map
2 Location of Ranch Headquarters and Remote Sampling Locations
3 Ranch Headquarters Area, with Locations of Former Oilwell Facilities and Former Petroleum Tank Area
4 Steel Shed, with Area of Excavation and Confirmation Sample Locations

INTRODUCTION

This sampling program is to be conducted on portions of an agricultural property known as the Rincon Del Mar Ranch, located just inland of the Pacific Ocean at the Ventura County-Santa Barbara County line in California (Figure 1). The purpose of the sampling is to verify the results of previous soil sampling conducted during various site investigations and remediation activities. This work has been requested by Ventura County Environmental Health Division (VCEHD) and is to be fulfilled in accordance with provisions of the Voluntary Cleanup Program (VCP) administered by VCEHD.

The sampling program has been discussed previously with VCEHD by representatives of PHR Environmental Consultants, Inc., and TRAK Environmental Group, Inc. The major tasks of this sampling program conform to phases of the VCP which include the following:

1. Prepare the documentary requirements as specified by VCEHD for the VCP Project 3146549, Exhibit C Scope of Work. These requirements include the preparation of a Health and Safety Plan (VCP Task 3), Sampling and Analysis Workplan (VCP Task 5.1) and Quality Assurance/Quality Control (QA/QC) Plan (VCP Task 16).

2. Conduct the tasks specified in the Sampling and Analysis Workplan, upon approval of VCEHD and in accordance with VCP Task 5.2. Upon completion of the field activities, a Site Characterization Report will be prepared in accordance with the requirements of VCP Task 5.3.

The majority of the work to be conducted involves the implementation of the Sampling and Analysis Workplan and the pertinent features of this proposed work are discussed in following sections.

1 BACKGROUND

SITE DESCRIPTION AND HYDROGEOLOGY

The property is a 611-acre ranch located generally east of Bates Road and Highway 150, and north of U.S. Highway 101 (Figure 1). The property lies mostly within Ventura County (604 acres) at a position where the northwestern boundary of Ventura County adjoins that of Santa Barbara County. The property does not have a street address, but the mailing address is Post Office Box 1281, Carpinteria, California 93104.

The property consists of avocado orchards, a flower growing area, a wood lot, and several hundred acres of undeveloped acreage. The ranch headquarters area, in which the soil removal and verification sampling activities occurred, is located adjacent to the wood lot operations near the northwest corner of the property (Figure 2). The ranch headquarters area consists of several structures, including the steel shed, a combination office/breezeway equipment storage area/shed, other storage sheds, mobile homes, two aboveground storage tanks, and the site of former oilwells and production tanks (Figure 3). The ranch occupies hilly terrain inland from the Pacific Ocean, and is bounded on the northwest by the flood plain of Rincon Creek. In the vicinity of the ranch headquarters, the gentle slope that leads down to Rincon Creek is situated at an elevation of about 200 feet above mean sea level and at the remote locations in the hilly terrain, elevations range from about 400 feet to 800 feet.

Previous investigations (Reference 1) have reported the depth to groundwater to be in excess of 100 feet below the ground surface. Groundwater gradient over much of the site is southerly with drainage to the Pacific Ocean. In the vicinity of the ranch headquarters, the gradient is probably westerly to northwesterly, with drainage toward Rincon Creek.

PREVIOUS INVESTIGATIONS

Previous investigations have included a Phase I Environmental Site Assessment (Reference 2) and a Phase II investigation (Reference 1), both conducted by PHR. Contaminated soil identified by the Phase II investigation at ten separate sites on the ranch was excavated by TRAK and transported from the site on December 1 and 2, 1994 (Reference 3).

Several areas that either had been previously recommended for additional evaluation by the PHR Phase I ESA or by subsequent reconnaissance were the focus for a follow-up project conducted by TRAK. Areas identified for further soil sampling included the locations of facilities associated with oil exploration and production in the vicinity of the ranch headquarters. Other areas recommended for sampling and corrective action included the remote location of a landfill near the southern boundary of the property, the storage sites of chlordane, and areas of oil-stained soil beneath two diesel ASTs at the ranch headquarters. This work was conducted during the period of May 2 to 13, 1996 and a summary of the corrective action was prepared by TRAK (Reference 4).

As a follow-up to the May 1996 corrective action and sampling, TRAK recommended that additional assessment be completed. To further evaluate the vertical extent of mixed crude-oil/diesel contaminated soils in the former oil production area, four borings were augered on July 17, 1996, including two at the location of the former tank farm, one in the vicinity of oilwell 1 and one at oilwell 3. These borings were drilled to depths of 40 to 60 feet below grade to acquire soil samples beneath

the areas of surficial petroleum hydrocarbon contamination and to evaluate the groundwater conditions at the site (Reference 5).

It was also necessary to transport from the site and properly dispose of various hazardous wastes which had been segregated and temporarily stored in the steel shed. Subsequent to the hazardous waste segregation which occurred in May 1996, additional hazardous materials were identified at various locations on the ranch, and it became necessary to include those additional materials in the transport/disposal project. Materials from remote locations were transported to a central area adjacent to the steel shed by ranch personnel for sorting by TRAK personnel. Most of the sorting, segregation, and consolidation efforts were conducted during various days of May and June 1996.

On June 10, 1996, the consolidated hazardous materials were packed into appropriate containers, labeled, profiled, and manifested for shipment. Transport from the site occurred on July 16, 1996, and copies of all pertinent documents were included in a summary report prepared by TRAK (Reference 5).

PREVIOUS SOIL SAMPLING IN STEEL SHED

After the previously sorted hazardous wastes had been packed for transport and the wood/metal debris had been transferred out of the way, the dirt floor of the steel shed was sampled on June 27 and 28, 1996. To access all of the dirt floor, the rail cars were rolled out of the shed temporarily.

Soil sampling was conducted at depths of about 0.5 feet, 1.5 feet, and 3.5 feet below grade utilizing a hand auger in accordance with TRAK standard operating procedures. Ten locations were sampled: two to three locations in each of the three bays of the shed for a total of eight and two locations under the rail cars as shown in Figure 4. The two shallowest samples (0.5, 1.5 foot) from each location were chemically analyzed by EPA Method 8015m (TPH) and EPA Method 8080 (organochlorine pesticides), with the deeper sample (3.5 feet) from borings HA5 and HA7 analyzed for TPH due to elevated concentrations at the 1.5 foot depth.

Soil samples from three locations (HA2, HA3, and HA9) were non-detect for TPH or TEPH. Five other locations (HA1, HA4, HA6, HA8, and HA10) exhibited TEPH concentrations ranging from 38 mg/kg to 650 mg/kg in soil samples from 0.5 feet below grade, but were non-detect at the deeper depths of 1.5 feet below grade. The GC chromatograms for the petroleum hydrocarbons at 0.5 feet in these soils were characteristic of heavy crude-oil or motor oil.

One location (HA7) exhibited significant TEPH concentrations at the 0.5 and 1.5 foot depths of 28,000 mg/kg and 1800 mg/kg respectively and with GC chromatograms characteristic of aged diesel fuel. TEPH at the deepest interval (3.5 feet) in HA7 was non-detect. The other location with vertically significant TPH or TEPH in soils was HA5, with concentrations that decreased downward from 570 mg/kg at 1.5 feet to 120 mg/kg at 3.5 feet.

Organochlorine pesticides were not detected in soils from eight of the ten steel shed floor locations. In the other two locations, organochlorine pesticides were detected in soils at 0.5 feet below grade but were non-detect at the deeper intervals of 1.5 feet. At locations HA7, the significant pesticides included 4,4'-DDT (100,000 µg/kg), 4,4'-DDE (1,800 µg/kg), and 4,4'-DDD (26,000µg/kg). At location HA10, there was a trace concentration of 4,4-DDE (10 µg/kg) detected.

PREVIOUS CORRECTIVE ACTION IN STEEL SHED

On September 5, 1996, soil was excavated from two areas in the northeastern corner of the steel shed. These areas are shown in Figure 4 and are described as follows:

1. An area of approximately 32 square feet located between the easternmost rails was excavated to a depth of about 3 feet below grade. This soil was contaminated with organochlorine pesticides downward to depths of about 1 foot, and also by diesel fuel downward to depths of about 3 feet.

2. A second area of approximately 42 square feet immediately adjacent to the easternmost rails and located between the westernmost rails was excavated to depths of about 0.5 to 1 foot below grade. The soil was contaminated by a surface accumulation of dry, granular organochlorine pesticide.

The soil was packed into four, one-cubic yard boxes on September 5, 1996. Two boxes contained the organochlorine pesticide-contaminated soils from the shallower soils of the easternmost excavation, and from the westernmost excavation. Two other boxes contained the diesel fuel contaminated soils removed from the deeper portions of the easternmost excavation. The soil wastes were labeled, profiled, manifested and transported from the site on September 16, 1996 for recycling (Reference 6).

Four verification soil samples were collected in the easternmost excavation on September 5, 1996, in accordance with TRAK Standard Operating Procedure. Two of these samples were located in the base of the excavation at a depth of 3 feet below grade, and two more were located in the western and northern sidewalls at a depth of about 2 feet as shown in Figure 4. One soil sample was collected from the westernmost excavation at a depth of about 1 foot below grade.

Chemical analysis by EPA Method 8015m (TPH) and EPA Method 8080 (organochlorine pesticides) was conducted on the four samples from the easternmost excavation. The westernmost excavation sample was chemically analyzed for TPH by EPA Method 8015m. There were no detectable concentrations of TPH as diesel in the five verification soil samples taken from the two excavations. There were no detectable organochlorine pesticide concentrations in the four soil samples taken from the easternmost excavation (Reference 6).

Upon confirmation that the base and sidewalls on the excavations did not exhibit evidence of contamination by diesel fuel or organochlorine pesticides, the excavations were backfilled. Backfill was conducted by hand, utilizing native soil from elsewhere on the site.

II SAMPLING AND ANALYSIS WORKPLAN

GENERAL DESCRIPTION

Additional sampling has been requested by VCEHD to verify the results of previous soil sampling, conducted during various site investigations and remediation activities. The additional sampling has been suggested as means to ascertain any extent of suspected contamination at locations which exhibited detectable analyte concentrations or as a means to verify non-detect results in samples which had been run at dilution factors greater than one. Each of these areas is more fully discussed.

Area 1: Former Aboveground Fuel Tank

Also analyze for TPHd full spectrum

Previous soil sample S-2 (6/16/94) was collected from ground surface at location approximately 3 feet NW of tank cradle (Figure 3). Analysis indicated detectable TPH diesel and lead concentration of 540 ppm. Proposed soil sampling and chemical analysis will be conducted at three locations at depths of 0.5 feet and 1.5 feet below grade in vicinity of tank cradle to attempt verification of previous sample results and to evaluate lateral or vertical extent. Chemical analysis on a total of six samples to be for total lead by EPA Method 7420.

A If TL => 50 mg/kg smpl is to be analyzed for organic Pb TPHd

Area 2: Former Remote Weed Oil Tanks

Also analyze for TPHd (S15 27000 mg/kg TPHd)

At two locations in the hillside areas of the ranch, weed oil tanks formerly existed (Figure 2). Each of these locations was sampled on June 16, 1994, with samples S-14 and SS-14 from the highest tank site and sample S-15 from the lower tank site. Pesticides were not detected at either location, but dilution factors of 3 (S-14 and SS-14) and 100 (S-15) have been questioned as possibly masking trace concentrations. Each of these former tank sites were remediated by excavation of approximately 0.5 cubic yard of soil. Proposed soil sampling and chemical analysis will be conducted at a location adjacent to the remediated soil area of each tank sit at depths of 0.5 feet and 1.5 feet below grade. At a second location at each tank site, but removed to a distance of approximately 50 feet away, samples will be collected and chemically analyzed from depths of 0.5 and 1.5 feet below grade for evaluation of background conditions. Chemical analysis on a total of eight samples to be for organochlorine pesticides by EPA Method 8080, at the lowest dilution factor feasible. Smpl S15 contained 27,000 mg/kg TPHd.

Area 3: Remote Landfill

Soil samples S-16 and SS-16 were collected on June 16, 1994, and exhibited detectable TPH, 4,4-DDD, 4,4'-DDE, 4;4'-DDT, endrin and endosulfon I. These samples were taken from the surface and at a depth of about 1 foot in a brushy ravine which had been used as a landfill (Figure 2). Proposed soil sampling and chemical analysis will be conducted at five locations, laterally spaced over the ground surface of the landfill. Each location will be bored by hand-auger to a depth of at least 5 feet below grade, with continuation to deeper depths if the soil cuttings indicate the deeper presence of trash or rubble. At least two samples from each auger hole will be chemically analyzed for TPH by EPA Method 8015m, characterized as

to hydrocarbon type; and at least two samples from each auger hole will be analyzed for organochlorine pesticides by EPA Method 8080 for a total of ten samples.

Area 4: Steel Shed

TPH= 9400

Soil samples were collected at various locations in the dirt floor of the steel shed on June 27, 1996 and chemically analyzed for organochlorine pesticides (Figure 4). At three of the locations which reported ND, analyses were conducted utilizing dilution factors greater than 1, including HA4-0.5 at a factor of 100, and four of the other samples from HA4, HA5, and H6 at a factor of 10. Proposed soil sampling and chemical analysis will be conducted at each of the three questioned locations, at depths of 0.5 feet and 1.5 feet below grade. Chemical analysis on a total of six samples to be for organochlorine pesticides by EPA Method 8080, a the lowest dilution factor feasible.

Specific tasks involved with these general requirements are summarized in the following scope of work:

SCOPE OF WORK

This work will be conducted in accordance with the requirements, protocols, and procedures of the regulatory agencies having jurisdiction over the site as well as other local, state, and federal agency requirements.

1. Conduct activities in accordance with a site specific Health and Safety Plan, a Sampling and Analysis Workplan, and a QA/QC Plan in accordance with VCP Project 3146549 Exhibit C. The Health and Safety Plan and QA/QC Plan are included in Appendices A and B, respectively, of this Sampling and Analysis Workplan.

2. Conduct preliminary reconnaissance of remote landfill area to evaluate accessibility and nature of proposed sampling. Conduct necessary discussions with regulatory staff.

3. Conduct soil sampling activities at the four areas previously described. Samples to be collected by hand auger, properly capped, sealed and transported under chain-of-custody to a California certified laboratory. Auger holes to be backfilled with soil cuttings.

4. Soil samples to be chemically analyzed as follows:

   a. Organochlorine pesticides by EPA Method 8080 for samples from Area 2, (8 samples), Area 3 (10 samples), and Area 4 (6 samples) for a total of 24 samples.

   b. Total petroleum hydrocarbon (TPH) with hydrocarbon characterization by EPA Method 8015m for 10 samples for area 3.

   c. Total lead by EPA Method 7420 for 6 samples from Area 1.

5. Prepare a site assessment report which documents field activities, sampling procedures, and analytical results in accordance with requirements of VCP Task 5.3. The report will discuss site specific conditions and include site maps with data in tabular form.

AUTHORIZATION TO PROCEED

This Sampling and Analysis Workplan, with appendices Health and Safety Plan and QA/QC Plan, is submitted for review and comment by VCEHD under the provisions of the Voluntary Cleanup Program. Upon VCEHD concurrence with the scope of work, including acceptable modification, the work will be in.

REFERENCES

1. Preliminary Subsurface Soil Sampling for Rincon dl Mar Ranch, Santa Barbara, California. PHR Environmental Consultants, Inc. (July 11, 1994).

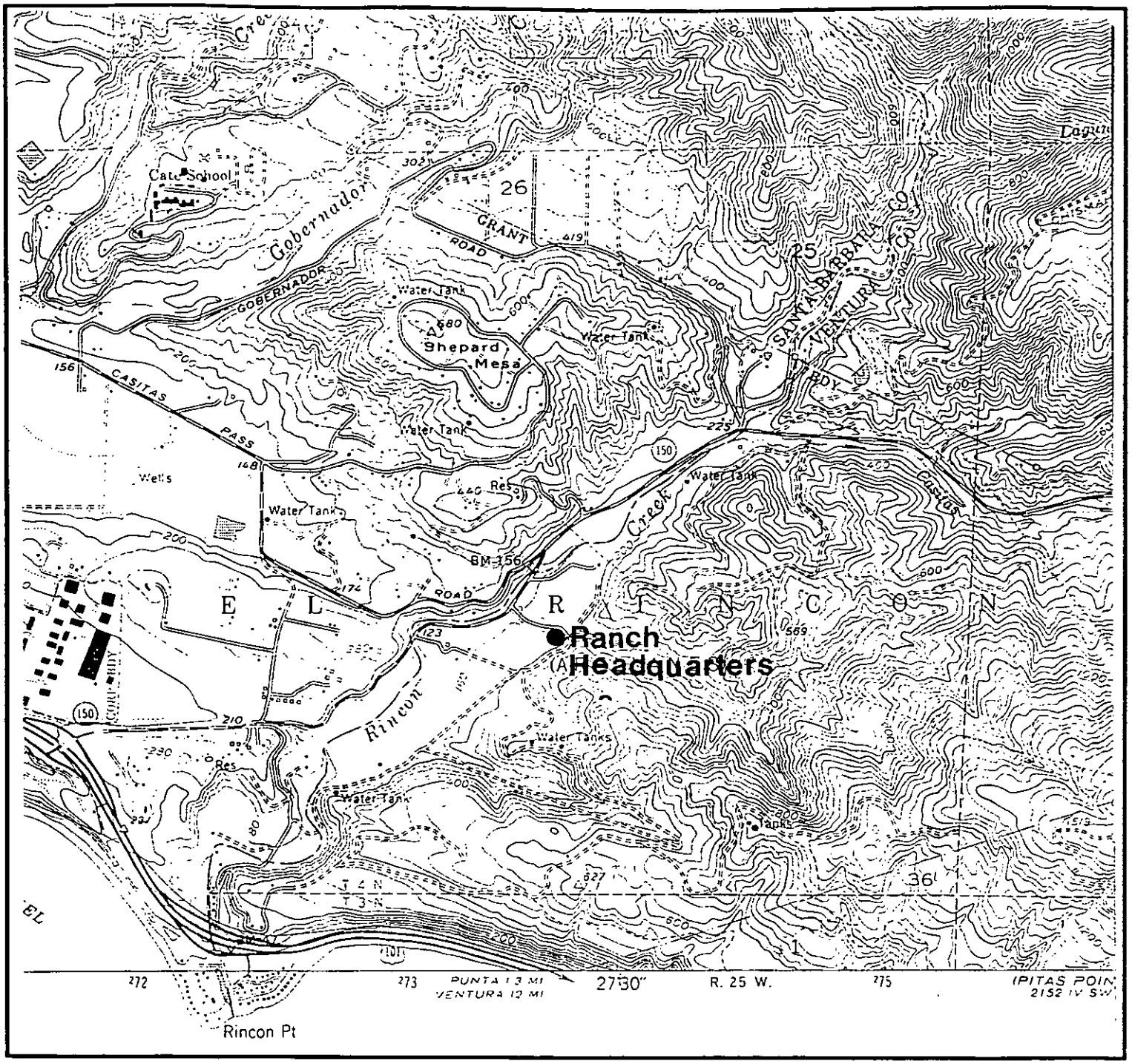
2. Phase I Environmental Site Assessment; Rincon del Mar Ranch, Ventura County, California. PHR Environmental Consultants, Inc. (May 5, 1994).

3. Soil Excavation and Sampling Report, Rincon del Mar Ranch, Ventura County, California. TRAK Environmental Group, Inc. (January 23, 1995).

4. Corrective Action and Sampling Report, Rincon del Mar Ranch, Ventura County, California. TRAK Environmental Group, Inc. (June 7, 1996)

5. Additional Corrective Action and Sampling Report, Rincon del Mar Ranch, Ventura County, California. TRAK Environmental Group, Inc. (July 28, 1996)

6. Steel Shed Soil Corrective Action and Sampling Report, Rincon del Mar Ranch, Ventura County, California. TRAK Environmental Group, Inc. (September 25, 1996).



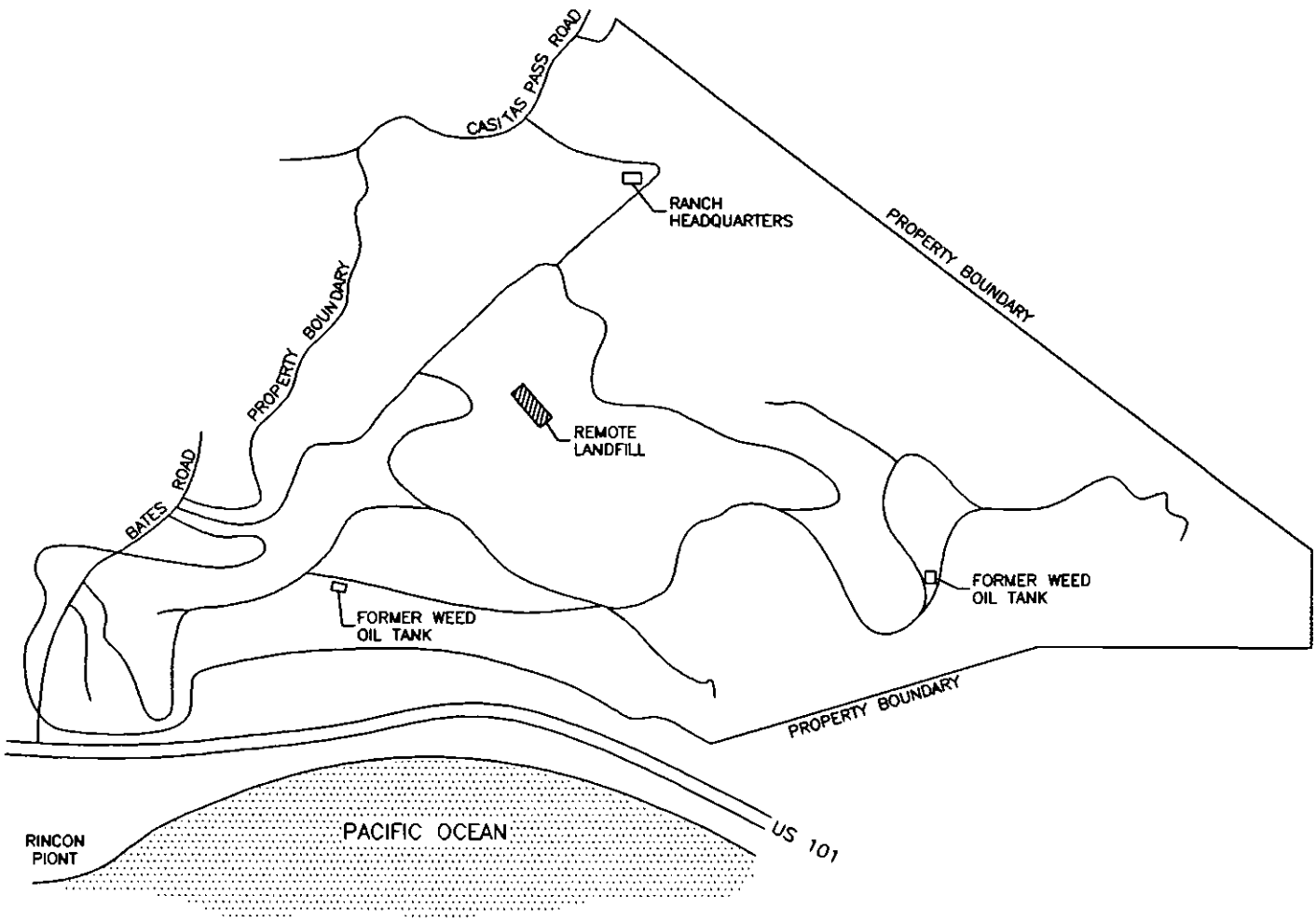
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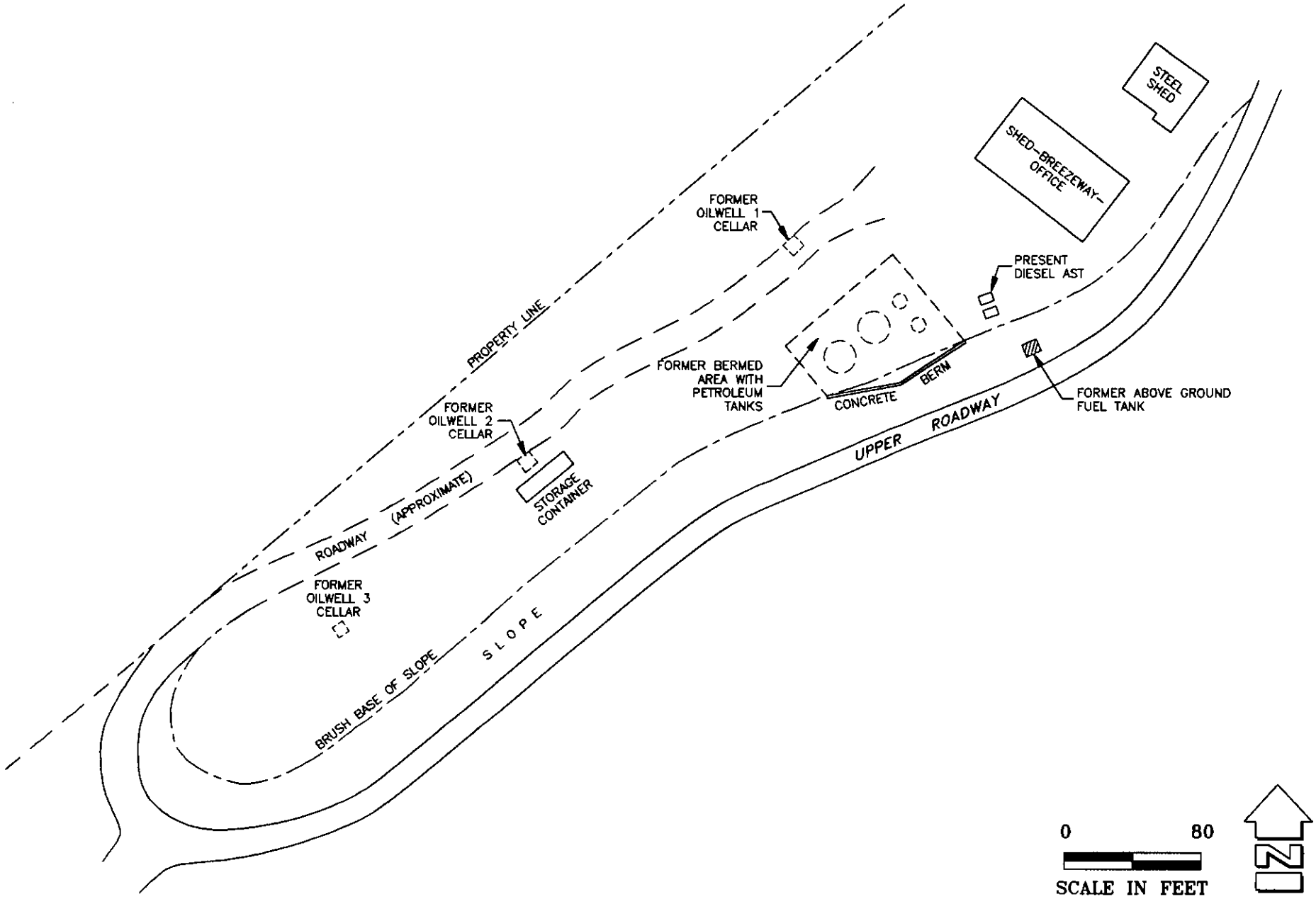


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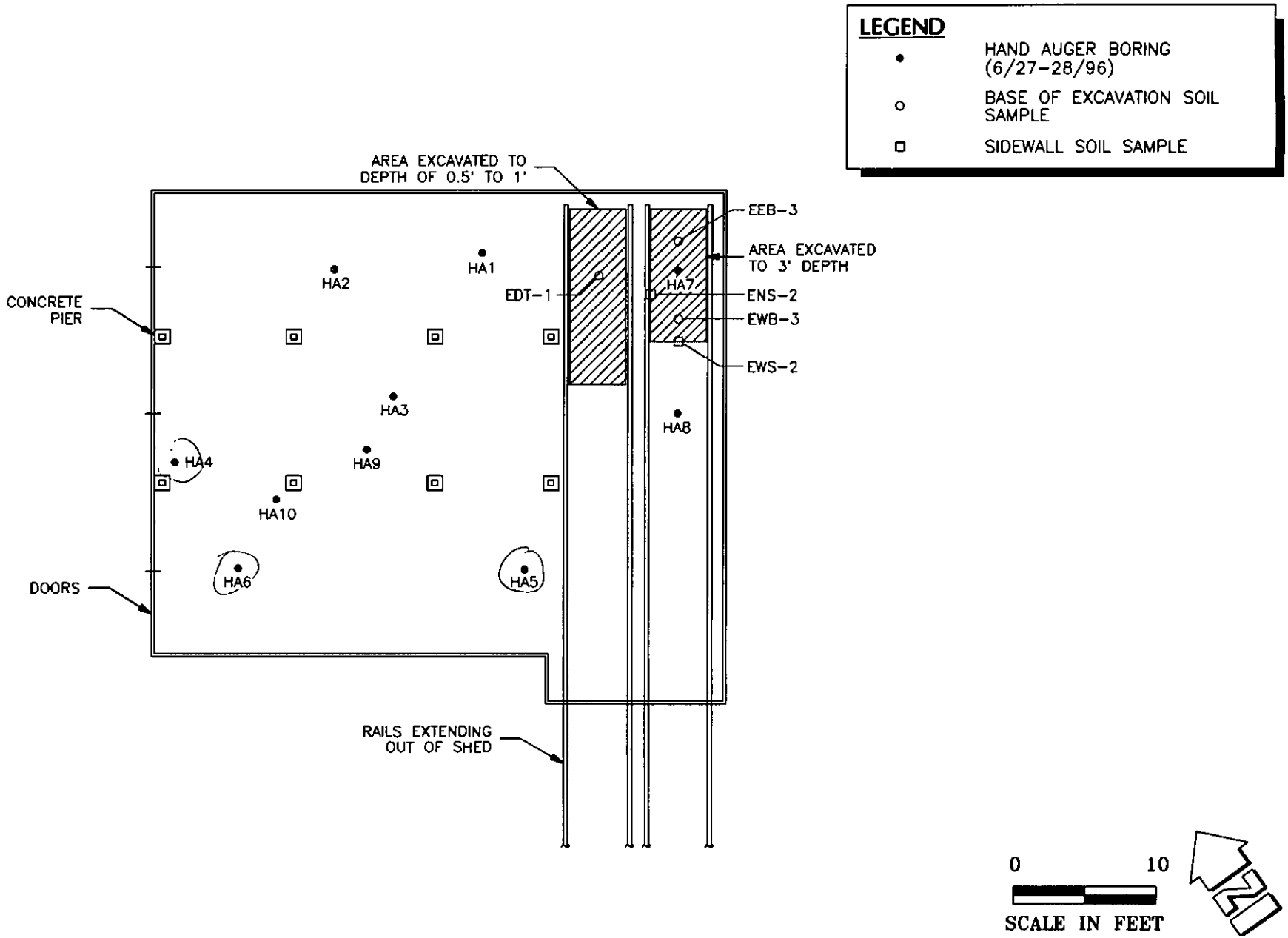
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TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCONS2 SOURCE:	DATE: 12/23/94	LOCATION OF RANCH HEADQUARTERS AND REMOTE SAMPLING LOCATIONS RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 2



TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON3A DATE: 6/4/96 SOURCE:	**RANCH HEADQUATERS AREA, WITH LOCATION OF FORMER OILWELL FACILITIES AND FORMER PETROLEUM TANK AREA** RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	**FIGURE** 3



TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON6B DATE: 7/29/96 SOURCE:	**STEEL SHED, WITH AREA OF EXCAVATIONS AND CONFIRMATION SAMPLE LOCATIONS** RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 4

APPENDIX A

HEALTH AND SAFETY PLAN

Site Address: East of Bates Road, Santa Barbara County

Business Occupying Site: 611 acre ranch

Name of Owner: Gregory Canova-Parker, Esq., Court Appointed Referee

Owner Contact: Mr. Robert Cashier Phone #: (805) 379-9552

Field Activities: Soil Sampling

The purpose of this Health & Safety Plan (HASP) is to designate basic safety requirements to be followed by TRAK Environmental Group, Inc., employees during site operations. This plan supplies site specific information regarding potential hazards on-site and the location of the nearest emergency services.

KEY PERSONNEL AND RESPONSIBILITIES

Site Safety Officer: Jeff Johnson
Phone #: (805) 650-5333

The Site Safety Officer (SSO) is responsible for site safety, response operations, selecting appropriate personal protective equipment, monitoring on-site hazards and workers for signs of excess exposure to contamination, heat or cold stress, and fatigue, and protection of the public. The SSO is responsible for ensuring compliance with this HASP, communicating its requirements to TRAK employees and subcontractors, reporting any accidents or incidents, and stopping work on-site if dangerous conditions exist.

Project Manager: Mr. Brad Newman
Phone #: (805) 650-5333

The Project Manager (PM) is responsible primarily for site characterization and supplying site specific information. The PM delegates authority and coordinates on-site activities and functions.

PERSONNEL TRAINING

All TRAK personnel working on-site have been respirator fit tested per OSHA regulations and have the following training:

- Formal or on-the-job training for tasks assigned on-site.
- 40 Hour Hazardous Waste Operations & Emergency Response Training per 29 CFR 1910.120.
- Annual 8 Hour Hazardous Waste Operation & Emergency Response Training.
- American Red Cross First Aid and CPR Certification.

Training documentation is maintained on-site by each TRAK employee involved with site activities and is readily available for inspection.

MEDICAL SURVEILLANCE

All TRAK personnel are required to participate in a Medical Surveillance Program in which a TRAK approved physician certifies:

a. The employee is capable of wearing respiratory protection and using any appropriate PPE necessary.
b. The employee is fit for duty at hazardous waste sites.
c. Adequate medical screening tests have been obtained which address the contaminants associated with this site.

The Physician's Statement is maintained with the training documentation for each individual employee.

HAZARD ANALYSIS

The physical hazards present on-site include:

a. Occupational noise exposure from mechanical equipment.
b. Physiological stresses due to the use of PPE.
c. Injury due to movement of mechanized equipment or large, heavy tools.
d. Injury or incident due to nearby traffic.
e. Tripping over equipment or tools.

The chemical hazards expected to be encountered on-site include inhalation of soil dust, fuel oils, motor oils, gasolines. Trace levels of pesticides or insecticides may be present in the soil. Petroleum hydrocarbons may be encountered. Volatile organics are not expected to be encountered. Pesticides, insecticides and herbicides consisting of Simzine, Protocol, Round Up, and Malathion have been applied on-site in the past. Zinc phosphate, manganese and amonium nitrate were applied to the avocado trees as fertilizers.

EFFECTS OF EXPOSURE

Motor oils, hydraulic oil, and fuel oil - At low concentrations there should not be any negative health effects. If contact is made, wash hands, and other affected areas with warm water and soap.

Pesticides and insecticides - Very low concentrations of these compounds are expected in the soils on-site. Low level exposure to pesticides and insecticides could cause headaches, with visual disturbance, blurred vision, and sweating. Extreme exposure can cause muscle weakness, respiratory failure, coma, and possibly death. Routes of entry are by skin or eye contact with vapors, mists inhalation of fumes or swallowing. Absorprtion occurs very rapidly in the skin and syptoms begin almost immediately.

Lead - Lead may be present in trace concentrations from the use of gasoline. Lead is toxic and can be of concern if swallowed or inhaled. Lead is not expected to be encountered. Notice is being given because it may be present in trace concentration in the soil.

EXPOSURE MONITORING

It is not anticipated that exposure to any on-site contaminants will exceed the permissible exposure level. However, as a precautionary measure, exposure monitoring will be conducted. An organic vapor meter (OVM) will be utilized to monitor levels of volatile organic vapor concentrations at the anticipated source as well as in the breathing zone. Should the PEL be exceeded in the breathing zone or as the SSO so directs, respirators must be donned. If OVM reading exceeds 1,000 ppm, the use of an air purifying respirator is not appropriate and personnel shall withdraw from the site.

PERSONAL PROTECTIVE EQUIPMENT

The level of protection required during on-site operations may fluctuate depending on site conditions which will be continually monitored and evaluated by the SSO. Level "D" protection is required as a norm unless altered by the SSO. If site conditions change, Level C protection may be required. Level "D" protection includes:

- Steel toe safety boots
- Coveralls, shirt and jeans
- Safety glasses
- Gloves (nitrile and/or leather as necessary)
- Air purifying respirator (if necessary)
- Hard hat

In addition, each TRAK employee shall maintain a stocked safety bag containing emergency eye wash solution, a first aid kit, spare PPE, and other safety items which may become necessary.

WORK ZONES AND SECURITY MEASURES

To facilitate minimum exposure to dangerous toxic vapors and/or physical hazards, only authorized personnel are allowed within the exclusion zone at the job site. Zones shall be designated by TRAK staff who will also be responsible for security within these zones.

a. Exclusion Zone -- This zone is comprised of the area where potential contamination exists or exposure may occur. The exclusion zone will be defined by orange cones, safety tape, barricades, or any combinations thereof. Only TRAK personnel and TRAK subcontractors with required training are allowed within this zone.

b. Contamination Reduction Zone -- This zone serves as the transition area between the exclusion zone and clean areas. Decontamination of sampling and PPE are to occur within this zone. This zone shall be observed, however, depending on the size of the project, this zone may not actually be marked with cones, etc.

c. Support Zone -- This zone is a clean area where equipment, supplies, materials and the HASP are kept. Contaminated PPE and/or equipment should not be brought into this area. PPE is not required in this zone.

GENERAL SAFETY RULES

If contamination splashes in eye, use emergency eye wash solution and flush affected eye for a period of not less than 15 minutes.

Smoking, eating, drinking, chewing gum, or other activities which may facilitate transfer of contamination to the face is not allowed in the exclusion zone.

Hands must be thoroughly washed before taking a break, eating, using the restroom, etc.

A fire extinguisher will be available on-site for small fires deemed manageable by TRAK staff.

DECONTAMINATION AND DISPOSAL

TRAK's standard operating procedures establish practices that minimize contact with potentially contaminated materials. Decontamination procedures are utilized if there is suspected or known contamination of equipment, supplies, instruments or tools. Soap and water will be used to remove contamination. Contaminated washwater will be disposed of in accordance with procedures outlined in the California State LUFT Program Reference Manual.

EMERGENCY PROCEDURES

TRAK personnel are trained and certified in first aid and will have first aid provisions on-site should any minor accident or injury occur. For all accidents or injuries of a nature other than minor, the individual will be transported immediately to the nearest hospital with emergency services.

Emergency Telephone Numbers

Fire/Police/Ambulance	911
Ventura County Medical Center 3291 Loma Vista Road Ventura, California 93003 (See attached hospital route map)	(805) 652-6000

Directions to Ventura County Medical Center:

From the site, go south on Highway 101 to Seaward. Take Seaward north to Main, turn right on Main proceed to Loma Vista, turn left on Loma Vista.

California Poison Control Center - Los Angeles	(213) 222-3212
Chemtrec	(800) 424-9300
Underground Service Alert	(800) 422-4133
TRAK Environmental Group, Inc.	(805) 650-5333

EMERGENCY CONTACT LIST

Lori Eranio	Robert Eranio (H) (805) 647-5603 (W) (805) 482-2001
Doreen Hughes-Amendt	Dorothy & Frank Wilson (H) (805) 488-1828 (W) (805) 483-2453
Jeff Johnson	Christine Johnson (H) (805) 525-5182
Richard Jones	Bruna Jones (H) (805) 642-5576
Corey McTigue	Linda McTigue (H) 644-0508 (W)
Brad Newman	Sharon Newman (H) (805) 648-4675
Mark Surgett	Meredith Surgett (H) (805) 985-7349 (W) (805) 389-2786
Tracie Waller	Tom Waller (H) (805) 642-5637 (W) (805) 652-0219

SIGN-OFF SHEET

Rincon del Mar Ranch
East of Bates Road
Santa Barbara County

TRAK Personnel:

I certify that I have read and understand this Health and Safety Plan and am trained to perform tasks to which I have been assigned.

Subcontractors:

* Chemical and safety hazards on this job may require respiratory, eye, or skin protection. You are required to provide all necessary personal protective equipment for your own use.

* In the event of a spill or uncontrolled release, you are to evacuate the area, report the release, and do not enter until declared safe by the TRAK Site Safety Officer.

* Any unsafe conditions in your work area must be brought to the attention of the TRAK authority on-site before work begins.

I understand the hazards in my work area. I know how to report an emergency or fire and evacuate safely. **I agree to comply with all safety requirements necessary to perform my duties and have reviewed this site safety plan.**

Name (printed)	Signature	Date	Company

APPENDIX B

QUALITY ASSURANCE/QUALITY CONTROL PLAN

Confirmation that the site activities were conducted in accordance with this plan is indicated by the verification initialing of the appropriate QA/QC elements.

FIELD SAMPLING AND DATA ACQUISITION _____

TRAK Environmental Group, Inc. was founded to provide the highest quality and most cost-effective services in the environmental engineering and consulting industry. This Quality Assurance/Quality Control (QA/QC) Plan has been developed to specify procedures and protocol which are acceptable to clients and meet or exceed regulatory agency requirements.

The QA/QC procedures to be followed are designed to guarantee the quality and cost-effectiveness of workmanship and to ensure the collection and analysis of data of sufficient quality and quantity to satisfy investigative and/or remedial objectives. TRAK personnel are trained in and follow all QA/QC procedures. Further, TRAK ensures that all contractors participating in its projects shall also be required to follow QA/QC procedures.

The following QA/QC elements have been incorporated throughout TRAK workplans:

- Drilling and soil sampling procedures to preserve sample integrity and prevent cross contamination
- Groundwater sampling procedures to preserve sample integrity
- Chain-of-custody procedures to confirm and document sample identity
- Equipment handling and calibration to validate precision and accuracy in measurement and analyses
- Decontamination procedures to protect personnel and prevent cross contamination and spreading of contamination

DRILLING AND SOIL SAMPLING _____

Drilling will be subcontracted by TRAK to a licensed and insured drilling contractor. Drilling activities will be directed and supervised at all times by trained and experienced TRAK personnel. Boring and monitoring well locations are determined by TRAK geologists and are indicated in the site specific scope of work. If drilling locations are specified by a client, the boring will be installed within three feet of specification. No well or boring shall be installed closer than five feet from any underground storage tank to prevent undermining of backfill material which could cause a tank rupture. To avoid damaging hidden obstacles such as product lines, conduits, water lines, etc., TRAK will hand excavate to a depth of at least five feet prior to installing wells or borings. An area larger than the diameter of the boring will be investigated prior to drilling. Thereafter, a modified California split spoon sampler will be driven

into the soil. Typically, the sampler will contain brass sampling tubes. The sampler will be driven eighteen inches into the ground at the bottom of the boring with a 140 pound weight falling a vertical distance of approximately thirty inches. The sampling tubes will be removed from the sampler and split in the field. One brass tube will be retained for soil classification and one will be sealed with Teflon lines caps for lab analyses. The samples will be immediately labeled with the following information:

- Company name
- Project name
- Date of collection
- Sample ID number

Samples which will be submitted for chemical analyses are placed in a cooler with ice until they are received by a state certified laboratory. Samples to be utilized for soils classification will be examined and classified in accordance with the Unified Soil Classification System. The selected sample will be screened for the presence of gasoline using visual examination and headspace vapor testing with an Organic Vapor Meter calibrated to isobutylene. A detailed boring log will be kept for each boring. Which includes the following information:

- Project name and number
- Boring/well number
- Soil sample log
- OVM readings
- Drill method
- Soil lithologic description
- Monitoring well construction details

GROUNDWATER MONITORING WELL CONSTRUCTION

The groundwater monitoring wells will be constructed in accordance with the guidelines of the lead agency. Prior to beginning work at the site, TRAK will obtain well construction permits from the appropriate permitting agency.

A geologist from our staff will direct and observe the subcontractor in construction of the groundwater monitoring wells. The screened portion of the well will consist of machine slotted (0.020-inch slot width) four inch diameter, Schedule 40 PVC casing with 20 feet of screen installed below the groundwater table and 10 feet of screen installed above the groundwater table interface. The casing will be flush threaded at the joints. The bottom of each well casing will be fitted with a threaded PVC end plug and the top of each well will be fitted with a locking well cap.

The annular space of each well will be backfilled with No. 3 Monterey Sand to approximately two feet above the slotted casing. Approximately three to five feet of bentonite will be placed above the sand. The remaining annulus of each well will be backfilled with a cement bentonite grout or bentonite chips to grade. A flush-grade traffic box will be installed to protect the well casing.

GROUNDWATER WELL DEVELOPMENT

The groundwater monitoring well will be developed using a surge block provided by the drillers to settle the sand pack prior to setting the seal. Purging to the well should result in the removal of approximately four well volumes of water unless the well goes dry. Development and purged water collected during development of the monitoring wells will be stored in DOT approved 55-gallon drums.

GROUNDWATER EVALUATION

The depth of groundwater relative to the monitoring well casing will be measured using a water level indicator or a product/groundwater interface probe. The elevations of the well casing will be surveyed by a California-licensed land surveyor to the nearest 0.01 foot relative to an established bench mark. Groundwater elevations will be calculated by subtracting the measured water table depth from the casing elevations.

GROUNDWATER SAMPLING

The proposed groundwater monitoring wells will be purged prior to sample collection with a pump or by manual bailing. Approximately four well volumes of water will be removed from each well prior to sampling. TRAK will collect groundwater samples from each well after groundwater in the well has recharged a minimum of 80 percent of its static level. A Teflon bailer will be used to collect groundwater samples. The groundwater samples will be transferred into laboratory cleaned sample bottle. The samples will be sealed with Teflon lined plastic caps, labeled, and placed on ice storage. The sampling equipment will be cleaned in a Liquinox solution and rinsed with distilled water before sampling each well. Purged water collected during sampling of the monitoring wells will be stored in a large tank on-site or in DOT approved 55-gallon drums.

SOIL CUTTINGS AND PURGED GROUNDWATER

Soil cuttings generated during drilling will be placed in 55-gallon drums and will remain on-site pending review of laboratory analysis results. The soil and well water will be transported to an appropriate landfill or recycling facility for disposal.

CHAIN-OF-CUSTODY

A chain-of-custody form will be completed in the field to document sample possession. The chain-of-custody is intended to accompany samples on delivery to the laboratory and should include various information including:

- Sample number and project name
- Signature of collector
- Date and time of collection
- Site address
- Laboratory analyses requested
- Signatures of persons involved in the chain of possession
- Remarks concerning possession

Once the sample arrives at the laboratory for analysis, an authorized person (often referred to as the sample custodian) must receive the samples and chain-of-custody and must verify receipt of the sample by adding the following information to the record:

- Signature and title of recipient
- Date sample arrived at laboratory
- Temperature of samples

EQUIPMENT CALIBRATION

- pH meter
- Turbidity meter
- Organic vapor meter (OVM)
- Dissolved oxygen (D.O.) meter

The pH meter, turbidity meter, OVM, and the D.O. meter will be calibrated prior to each work day in accordance with the procedures specified in the owner's manual for each piece of equipment. The results of calibrations and records of repair will be maintained in an equipment log. Calibration instructions for each piece of equipment will be available for guidance when equipment is in use.

Field personnel are responsible for ensuring equipment is functioning properly before use in the field. If equipment malfunction is suspected, the device will be removed from service and tagged to avoid inadvertent use. Faulty equipment will be repaired promptly if possible, recalibrated, and used or replaced with properly working equipment.

DECONTAMINATION

Personnel

Washing facilities will be available to personnel for general decontamination at the work site. Temporary exit from a work area for breaks, lunch, etc., will require the following:

1. Gloves, protective suits and other personal protective clothing must be removed as appropriate.

2. Hands and face must be thoroughly washed.

3. Protective clothing will be stored in such a manner to avoid contamination of inner surfaces and surroundings.

Exit from the site requires appropriate decontamination procedures as described below:

1. All personal protective equipment must be removed at the end of the workday prior to leaving the site.

2. Protective clothing shall either be stored in a manner to preclude contamination of inner surfaces or discarded in an appropriate manner.

3. Thorough washing of the entire body is required as soon as possible after doffing protective outer garments.

Equipment

All field sampling equipment (i.e., hand augers, probes, containers, drilling equipment) will be cleaned prior to and after each use. Decontamination will consist of combinations of steam cleaning and/or detergent wash, drinking quality water rinse, and distilled water rinse. Soil and groundwater sampling tools will be decontaminated by wiping off any visible moisture and/or particulate, washing with a laboratory grade detergent and clean potable water, and final rinsing with deionized/distilled water. All downhole groundwater monitoring and sounding equipment will be decontaminated in like manner prior to use.

Drilling equipment used downhole (i.e., drill bits, auger flites, sampling tubes) will be steam cleaned prior to start of each bore hole to prevent cross contamination.

All well servicing or production equipment used for purging, pumping, and development will be decontaminated prior to and following use in the same manner as downhole drilling equipment. Location of areas for wash down of vehicles and equipment will be determined in accordance with EPA regulations. Contaminated washwater will be disposed of in accordance with procedures outlined in the California State LUFT Program Reference Manual.

RESOURCE MANAGEMENT AGENCY

county of ventura

Environmental Health Division
Donald W. Koepp
Director

April 28, 1997

Mr. Gregory Canova Parker
Seed, Mackall & Cole LLP
1332 Anacapa Street, Suite 200
Santa Barbara, Ca 93101

File #3146549

RINCON DEL MAR RANCH, VENTURA COUNTY, CALIFORNIA

The Ventura County Environmental Health Division (VCEHD) has received the *Sampling and Analysis Workplan* prepared by Trak Environmental Group on April 7, 1997. After reviewing the workplan, the current available data and discussing some unclear points with your consultant, the workplan is approved with the following conditions and comments:

1. An extensive analytical sampling program is necessary to assure that workers on the ranch are not exposed to excess hazard from shallow residual contamination in soil.

2. The additions to the sampling and/or analytical plan are:

   a. In the former service station area, sample SB-1 contained 41,000 mg/kg TPHd and 57,000 mg/kg TRPH and the samples from boring B1 were not analyzed for BTEX or lead. This area should be resampled and the samples analyzed for TPH, BTEX and total lead.

   b. Samples taken from the breezeway and west of the pesticide storage shed were not analyzed for pesticides. Sample S-7 contained 410 mg/kg total lead but no post-excavation samples were analyzed for total lead. Those areas should be resampled and the appropriate analyses run.

3. All the samples to be analyzed for pesticides by Method 8080 are to first be run through cleanup procedures to minimize possible matrix interference and reduce the necessary dilution. For the pesticides of concern, the laboratory we consulted recommended Method 3620 in preference to Methods 3630 or 3640.

4. All TPH analyses are to be run to quantify the full carbon range.

5. Samples that contain TPH concentrations of 5,000 mg/kg or greater are to be analyzed for polynuclear aromatic hydrocarbons and for Title 22 California metals.

6. Any sample that contains a total lead concentration of 50 mg/kg or greater is to be analyzed for organic lead to determine if the lead is naturally occurring.

7. A report detailing the results of this investigation should be submitted within 60 days after completion of field work. The report is to be in the format required by the September 1993 VCEHD LUFT manual. In addition to the figures and information required by the LUFT manual, the report is to include an assessment of impacts that may result from residual contamination, including an evaluation of the potential health risk.

If you have any questions, please contact me at (805) 662-6512.

DAVID C. SALTER
ENVIRONMENTAL HEALTH DIVISION

DCS/jm/jm1248/rdmrnch.dcs

c: Mr. Robert Cashier, PHR Environmental Consultants, Inc.
Mr. Bradford S. Newman, TRAK Environmental Group

TRAK Environmental Group

4125 Market Street No. 19
Ventura, California 93003
Telephone 805 650-5333
Facsimile 805 650-7213

To Dave Salter

Company VCEHD - LUFT From Jeff Johnson

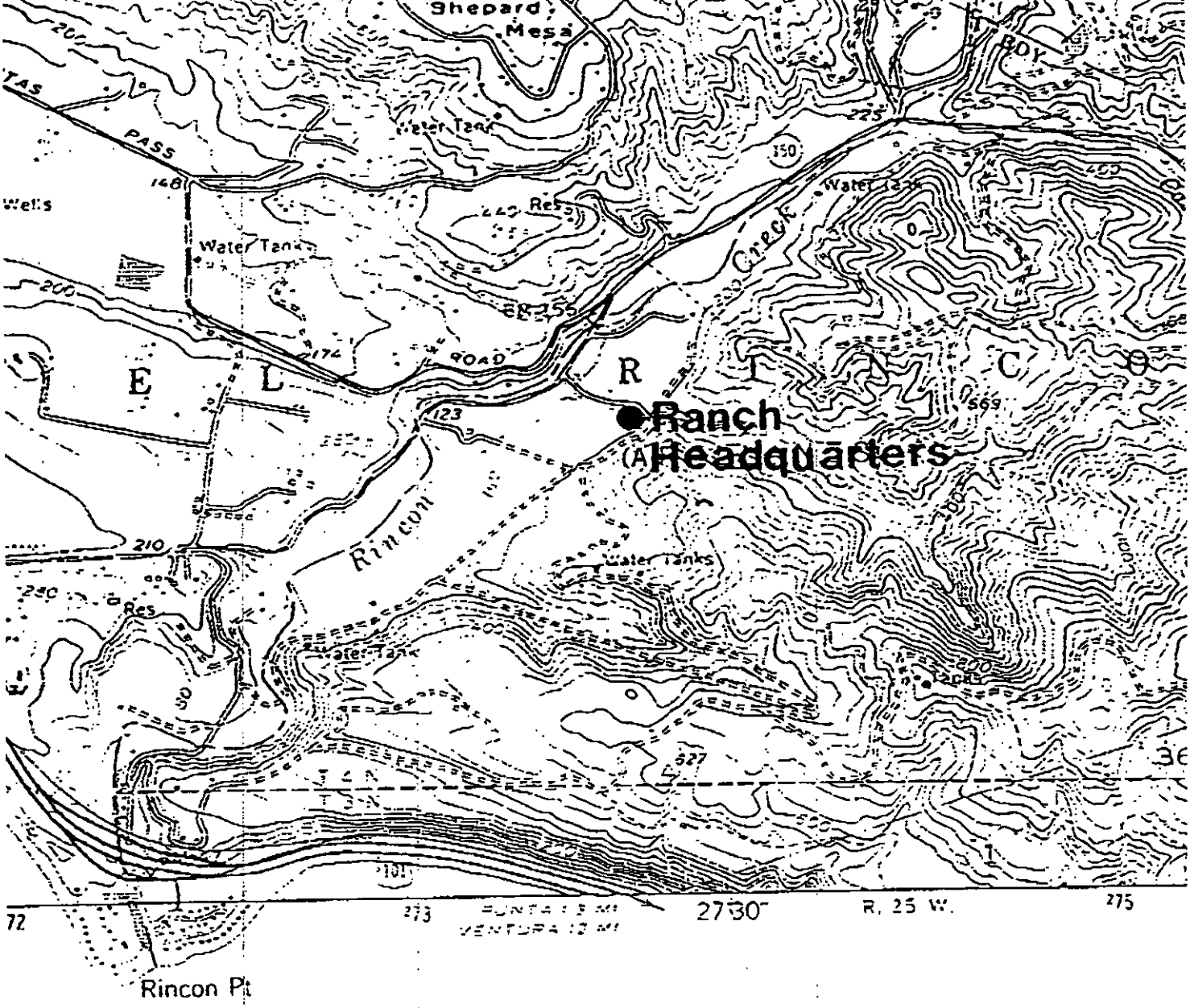
Number fax #: 654-2480 Date 4-28-97

Subject Rincon del Mar Ranch Page 1 of 2

Enclosed is a topographic map showing the location of ranch headquarters. We plan to start quite early on Thursday 5/1. Please call me tomorrow with the time you would like to meet me at the HQ building on Thurs morning.

Thanks!

JTJ



SCALE 1:24000

1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

Environmental Group

Street, # 19
ornia 93003

FILE NAME:	DATE:
RINCONSL	12/15/94

SOURCE:
U.S.G.S. 7 5 MINUTE
TOPOGRAPHIC QUADRANGLE MAP

SITE LOCATION MAP

RINCON DEL MAR RANCH

P.01

TRANSACTION REPORT

APR-28-97 MON 16:24

DATE START	SENDER	RX TIME	PAGES	TYPE	NOTE
APR-28 16:22	805 650 7213	1'23"	2	RECEIVE	OK

County of Ventura
Environmental Health Division • LUFT Program

SITE INVESTIGATION REQUEST

Site # V3146549 Referred To: DCS

Site Name: Rincon del Mar Ranch Date: 05/01/97

Site Location: N of US 101, E of Bates Rd

Project Manager: D Salter Phone:

Responsible Party: Rincon del Mar Ranch Phone:

Consultant Firm: PHR/TRAK Phone:

Appointment Date: 05/01/97 @ 0800 Time:

Type of Work: Sample surface soils for pesticides, borings for HC's

Approved by P.M.:
☑ Yes ☐ No

High Priority:
☑ Yes ☐ No

Description of Work:

Samples:
☐ H_2O ☑ Soil

Analysis:
☑ TPH selected
☑ BTEX selected
☐ Total Lead
☑ Other Pesticides - selected

Report of Investigation:

Left office @ 0730
Arr @ meeting place @ 0755
- Inspected former service station area - truck parked over area to be sampled.
- Inspected Ranch HQ area - proposed sample locations are OK.
- Inspected former trash dump area - staked sample locations.
- Inspected both former weed-oil tank locations, staked sample locations.
- Discussed analytical program - agreement on all points

Left site @ ~ 1000
Arrived @ office @ ~ 1030, turned in car.

Investigated By: DC Salter Date: 05/01/97

V 3146549

PHR
ENVIRONMENTAL
CONSULTANTS, INC.

'97 JUN 16 PM 1:42

June 12, 1997

Mr. David Salter
LUFT Program
County of Ventura Environmental Health Division
800 S. Victoria Avenue
Ventura, CA 93009-1730

Re: Soil Corrective Action and Sampling Report in Fulfillment of the Voluntary Cleanup Program

Dear Mr. Salter:

PHR Environmental Consultants, PHR submits the enclosed report in fulfillment of the Voluntary Cleanup Program requirements for the Rincon Del Mar Ranch. TRAK Environmental Group developed this Soil Corrective Action and Sampling Report in conjunction with PHR.

If you have any questions, please do not hesitate to contact Mr. Newman or myself. I look forward to your earliest response.

Sincerely,

Robert Cashier
Director, Environmental Programs

RC/lh

Enclosure

cc: G. Canova-Parker, Esq.

Respond To: ☐ 5290 Overpass Road, Suite 220 • Santa Barbara, CA 93111-2051 • 805/683-1954 • FAX 805/683-2772
☑ 4195 Thousand Oaks Blvd., Suite 155 • Westlake Village, CA 91362-3812 • 805/379-9552 • FAX 805/379-3143
☐ 74 New Montgomery Street, Suite 335 • San Francisco, CA 94105 • 415/975-8700 • FAX 415/975-8702
☐ 8555 16th Street, Suite 407 • Silver Spring, MD 20910 • 301/608-3656 • FAX 301/608-3659

TRAK Environmental Group
4125 Market Street No 19
Ventura California 93003

Telephone 805 650 5333
Facsimile 805 650 7213

TRAK

Rec'd 06/16/97

SOIL CORRECTIVE ACTION AND SAMPLING REPORT IN FULFILLMENT OF VOLUNTARY CLEANUP PROGRAM

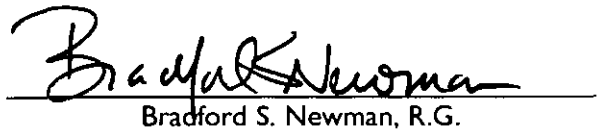
Rincon del Mar Ranch
Ventura County, California

prepared for

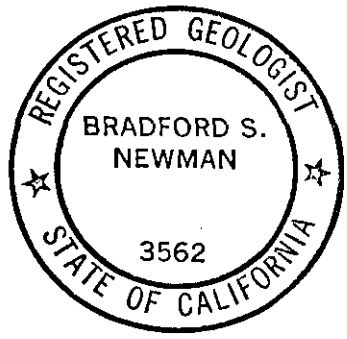
Rincon del Mar Ranch
Gregory Canova-Parker, Esq.
Court-Appointed Referee
c/o Seed, Mackall & Cole
1332 Anacapa Street, Suite 200
Santa Barbara, CA 93101

by

TRAK Environmental Group, Inc.
Project Number 366

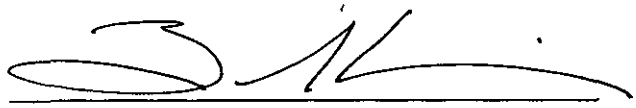


Bradford S. Newman, R.G.
President



and

PHR Environmental Consultants, Inc.



Robert Cashier
Senior Vice President
Project Manager

June 11, 1997

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INTRODUCTION

This sampling and remediation program was conducted on portions of an agricultural property known as the Rincon Del Mar Ranch, located just inland of the Pacific Ocean at the Ventura County-Santa Barbara County line in California (Figure 1). The purpose of the sampling was to verify the results of previous soil sampling conducted during various site investigations and remediation activities. The limited remediation was conducted to remove a small area of oil-stained soil in the vicinity of a former fueling station. This work has been requested by Ventura County Environmental Health Division (VCEHD) and was fulfilled in accordance with provisions of the Voluntary Cleanup Program (VCP) administered by VCEHD.

The sampling and remediation program had been discussed previously with VCEHD by representatives of PHR Environmental Consultants, Inc., and TRAK Environmental Group, Inc. The major tasks of the sampling portion of the program conformed to phases of the VCP which include the following:

1. Prepare the documentary requirements as specified by VCEHD for the VCP Project 3146549, Exhibit C Scope of Work. These requirements include the preparation of a Health and Safety Plan (VCP Task 3), Sampling and Analysis Workplan (VCP Task 5.1) and Quality Assurance/Quality Control (QA/QC) Plan (VCP Task 16).

2. Conduct the tasks specified in the Sampling and Analysis Workplan, upon approval of VCEHD and in accordance with VCP Task 5.2. Upon completion of the field activities, a Site Characterization Report will be prepared in accordance with the requirements of VCP Task 5.3.

The majority of the work that was conducted involved the implementation of the Sampling and Analysis Workplan dated April 7, 1997, and was in accordance with the additional requirements as specified by VCEHD in the letter of April 28, 1997. The sampling activities were conducted at six areas including the former aboveground fuel tank, two former weed oil tank sites, the remote landfill, the steel shed, the breezeway and western yard adjacent to the pesticide storage shed, and the former service station site.

This report describes the sampling and remediation work performed, discusses the results of the laboratory analysis, and provides conclusions regarding the completion of assessment and corrective action necessary to complete the Voluntary Cleanup Program.

1 BACKGROUND

SITE DESCRIPTION AND HYDROGEOLOGY

The property is a 611-acre ranch located generally east of Bates Road and Highway 150, and north of U.S. Highway 101 (Figure 1). The property lies mostly within Ventura County (604 acres) at a position where the northwestern boundary of Ventura County adjoins that of Santa Barbara County. The property does not have a street address, but the mailing address is Post Office Box 1281, Carpinteria, California 93104.

The property consists of avocado orchards, a flower growing area, a wood lot, and several hundred acres of undeveloped acreage. The ranch headquarters area, in which much of the soil verification sampling activities occurred, is located adjacent to the wood lot operations near the northwest corner of the property (Figure 2). The ranch headquarters area consists of several structures, including the steel shed, a combination office/breezeway equipment storage area/shed, other storage sheds, mobile homes, two aboveground storage tanks, and the site of former oilwells and production tanks (Figure 3). Other features of the ranch include the former locations of weed oil tanks, a former landfill located in the canyon near the center of the property, and a former service station located near a dwelling adjacent to Bates Road (Figure 2).

The ranch occupies hilly terrain inland from the Pacific Ocean, and is bounded on the northwest by the flood plain of Rincon Creek. In the vicinity of the ranch headquarters, the gentle slope that leads down to Rincon Creek is situated at an elevation of about 200 feet above mean sea level and at the remote locations in the hilly terrain, elevations range from about 400 feet to 800 feet.

Previous investigations (Reference 1) have reported the depth to groundwater to be in excess of 100 feet below the ground surface. Groundwater gradient over much of the site is southerly with drainage to the Pacific Ocean. In the vicinity of the ranch headquarters, the gradient is probably westerly to northwesterly, with drainage toward Rincon Creek.

PREVIOUS INVESTIGATIONS

Previous investigations have included a Phase I Environmental Site Assessment (Reference 2) and a Phase II investigation (Reference 1), both conducted by PHR. Contaminated soil identified by the Phase II investigation at ten separate sites on the ranch was excavated by TRAK and transported from the site on December 1 and 2, 1994 (Reference 3).

Several areas that either had been previously recommended for additional evaluation by the PHR Phase I ESA or by subsequent reconnaissance were the focus for a follow-up project conducted by TRAK. Areas identified for further soil sampling included the locations of facilities associated with oil exploration and production in the vicinity of the ranch headquarters. Other areas recommended for sampling and corrective action included the remote location of a landfill near the southern boundary of the property, the storage sites of chlordane, and areas of oil-stained soil beneath two diesel ASTs at the ranch headquarters. This work was conducted during the period of May 2 to 13, 1996 and a summary of the corrective action was prepared by TRAK (Reference 4).

As a follow-up to the May 1996 corrective action and sampling, TRAK recommended that additional assessment be completed. To further evaluate the vertical extent of mixed crude-oil/diesel

contaminated soils in the former oil production area, four borings were augered on July 17, 1996, including two at the location of the former tank farm, one in the vicinity of oilwell 1 and one at oilwell 3. These borings were drilled to depths of 40 to 60 feet below grade to acquire soil samples beneath the areas of surficial petroleum hydrocarbon contamination and to evaluate the groundwater conditions at the site (Reference 5).

It was also necessary to transport from the site and properly dispose of various hazardous wastes which had been segregated and temporarily stored in the steel shed. Subsequent to the hazardous waste segregation which occurred in May 1996, additional hazardous materials were identified at various locations on the ranch, and it became necessary to include those additional materials in the transport/disposal project. Materials from remote locations were transported to a central area adjacent to the steel shed by ranch personnel for sorting by TRAK personnel. Most of the sorting, segregation, and consolidation efforts were conducted during various days of May and June 1996.

On June 10, 1996, the consolidated hazardous materials were packed into appropriate containers, labeled, profiled, and manifested for shipment. Transport from the site occurred on July 16, 1996, and copies of all pertinent documents were included in a summary report prepared by TRAK (Reference 5).

PREVIOUS SOIL SAMPLING IN STEEL SHED

After the previously sorted hazardous wastes had been packed for transport and the wood/metal debris had been transferred out of the way, the dirt floor of the steel shed was sampled on June 27 and 28, 1996. To access all of the dirt floor, the rail cars were rolled out of the shed temporarily.

Soil sampling was conducted at depths of about 0.5 feet, 1.5 feet, and 3.5 feet below grade utilizing a hand auger in accordance with TRAK standard operating procedures. Ten locations were sampled: two to three locations in each of the three bays of the shed for a total of eight and two locations under the rail cars as shown in Figure 4. The two shallowest samples (0.5, 1.5 foot) from each location were chemically analyzed by EPA Method 8015m (TPH) and EPA Method 8080 (organochlorine pesticides), with the deeper sample (3.5 feet) from borings HA5 and HA7 analyzed for TPH due to elevated concentrations at the 1.5 foot depth.

Soil samples from three locations (HA2, HA3, and HA9) were non-detect for TPH or TEPH. Five other locations (HA1, HA4, HA6, HA8, and HA10) exhibited TEPH concentrations ranging from 38 mg/kg to 650 mg/kg in soil samples from 0.5 feet below grade, but were non-detect at the deeper depths of 1.5 feet below grade. The GC chromatograms for the petroleum hydrocarbons at 0.5 feet in these soils were characteristic of heavy crude-oil or motor oil.

One location (HA7) exhibited significant TEPH concentrations at the 0.5 and 1.5 foot depths of 28,000 mg/kg and 1800 mg/kg respectively and with GC chromatograms characteristic of aged diesel fuel. TEPH at the deepest interval (3.5 feet) in HA7 was non-detect. The other location with vertically significant TPH or TEPH in soils was HA5, with concentrations that decreased downward from 570 mg/kg at 1.5 feet to 120 mg/kg at 3.5 feet.

Organochlorine pesticides were not detected in soils from eight of the ten steel shed floor locations. In the other two locations, organochlorine pesticides were detected in soils at 0.5 feet below grade but were non-detect at the deeper intervals of 1.5 feet. At locations HA7, the significant pesticides included 4,4'-DDT (100,000 µg/kg), 4,4'-DDE (1,800 µg/kg), and 4,4'-DDD (26,000µg/kg). At location HA10, there was a trace concentration of 4,4'-DDE (10 µg/kg) detected.

PREVIOUS CORRECTIVE ACTION IN STEEL SHED

On September 5, 1996, soil was excavated from two areas in the northeastern corner of the steel shed. These areas are shown in Figure 4 and are described as follows:

1. An area of approximately 32 square feet located between the easternmost rails was excavated to a depth of about 3 feet below grade. This soil was contaminated with organochlorine pesticides downward to depths of about 1 foot, and also by diesel fuel downward to depths of about 3 feet.

2. A second area of approximately 42 square feet immediately adjacent to the easternmost rails and located between the westernmost rails was excavated to depths of about 0.5 to 1 foot below grade. The soil was contaminated by a surface accumulation of dry, granular organochlorine pesticide.

The soil was packed into four, one-cubic yard boxes on September 5, 1996. Two boxes contained the organochlorine pesticide-contaminated soils from the shallower soils of the easternmost excavation, and from the westernmost excavation. Two other boxes contained the diesel fuel contaminated soils removed from the deeper portions of the easternmost excavation. The soil wastes were labeled, profiled, manifested and transported from the site on September 16, 1996 for recycling (Reference 6).

Four verification soil samples were collected in the easternmost excavation on September 5, 1996, in accordance with TRAK Standard Operating Procedure. Two of these samples were located in the base of the excavation at a depth of 3 feet below grade, and two more were located in the western and northern sidewalls at a depth of about 2 feet as shown in Figure 4. One soil sample was collected from the westernmost excavation at a depth of about 1 foot below grade.

Chemical analysis by EPA Method 8015m (TPH) and EPA Method 8080 (organochlorine pesticides) was conducted on the four samples from the easternmost excavation. The westernmost excavation sample was chemically analyzed for TPH by EPA Method 8015m. There were no detectable concentrations of TPH as diesel in the five verification soil samples taken from the two excavations. There were no detectable organochlorine pesticide concentrations in the four soil samples taken from the easternmost excavation (Reference 6).

Upon confirmation that the base and sidewalls on the excavations did not exhibit evidence of contamination by diesel fuel or organochlorine pesticides, the excavations were backfilled. Backfill was conducted by hand, utilizing native soil from elsewhere on the site.

SAMPLING AND ANALYSIS WORKPLAN, RECOMMENDED REMEDIATION

Additional sampling had been requested by VCEHD to verify the results of previous soil sampling, conducted during various site investigations and remediation activities. The additional sampling has been suggested in order to ascertain any extent of suspected contamination at locations which exhibited detectable analyte concentrations or as a means to verify non-detect results in samples which had been run at dilution factors greater than one. The remediation was required to complete the corrective action of a small oil-stained soil area near the former fueling station.

The requirements for the areas to be sampled were described by TRAK in the Sampling and Analysis Workplan (Reference 7). This plan was further modified to include additional sampling and remediation required by VCEHD in the workplan approval letter dated April 28, 1997. The six areas of sampling or remediation are summarized as follows:

Area 1: Former Aboveground Fuel Tank

Previous soil sample S-2 (6/16/94) was collected from ground surface at location approximately 3 feet NW of tank cradle (Figure 3). Analysis indicated detectable TPH diesel and lead concentration of 540 ppm. Proposed soil sampling and chemical analysis to be conducted at three locations at depths of 0.5 feet and 1.5 feet below grade in vicinity of tank cradle to attempt verification of previous sample results and to evaluate lateral or vertical extent. Chemical analysis on a total of six samples to be for total lead by EPA Method 7420.

Area 2: Former Remote Weed Oil Tanks

At two locations in the hillside areas of the ranch, weed oil tanks formerly existed (Figure 2). Each of these locations was sampled on June 16, 1994, with samples S-14 and SS-14 from the highest tank site and sample S-15 from the lower tank site. Pesticides were not detected at either location, but dilution factors of 3 (S-14 and SS-14) and 100 (S-15) have been questioned as possibly masking trace concentrations. Each of these former tank sites were remediated by excavation of approximately 0.5 cubic yard of soil. Proposed soil sampling and chemical analysis to be conducted at a location adjacent to the remediated soil area of each tank sit at depths of 0.5 feet and 1.5 feet below grade. At a second location at each tank site, but removed to a distance of approximately 50 feet away, samples to be collected and chemically analyzed from depths of 0.5 and 1.5 feet below grade for evaluation of background conditions. Chemical analysis on a total of eight samples to be for organochlorine pesticides by EPA Method 8080, at the lowest dilution factor feasible, and for total lead by EPA method 7420.

Area 3: Remote Landfill

Soil samples S-16 and SS-16 were collected on June 16, 1994, and exhibited detectable TPH, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endrin and endosulfon I. These samples were taken from the surface and at a depth of about 1 foot in a brushy ravine which had been used as a landfill (Figure 2). Proposed soil sampling and chemical analysis to be conducted at five locations, laterally spaced over the ground surface of the landfill. Each location to be bored by hand-auger to a depth of at least 5 feet below grade, with continuation to deeper depths if the soil cuttings indicate the deeper presence of trash or rubble. At least two samples from each auger hole to be chemically analyzed for TPH by EPA Method 8015m, characterized as to hydrocarbon type; and at least two samples from each auger hole to be analyzed for organochlorine pesticides by EPA Method 8080 for a total of ten samples.

Area 4: Steel Shed

Soil samples were collected at various locations in the dirt floor of the steel shed on June 27, 1996 and chemically analyzed for organochlorine pesticides (Figure 4). At three of the locations which reported ND, analyses were conducted utilizing dilution factors greater than 1, including HA4-0.5 at a factor of 100, and four of the other samples from HA4, HA5, and H6 at a factor of 10. Proposed soil sampling and chemical analysis to be conducted at each of the three questioned locations, at depths of 0.5 feet and 1.5 feet below grade. Chemical analysis on a total of six samples to be for organochlorine pesticides by EPA Method 8080, at the lowest dilution factor feasible.

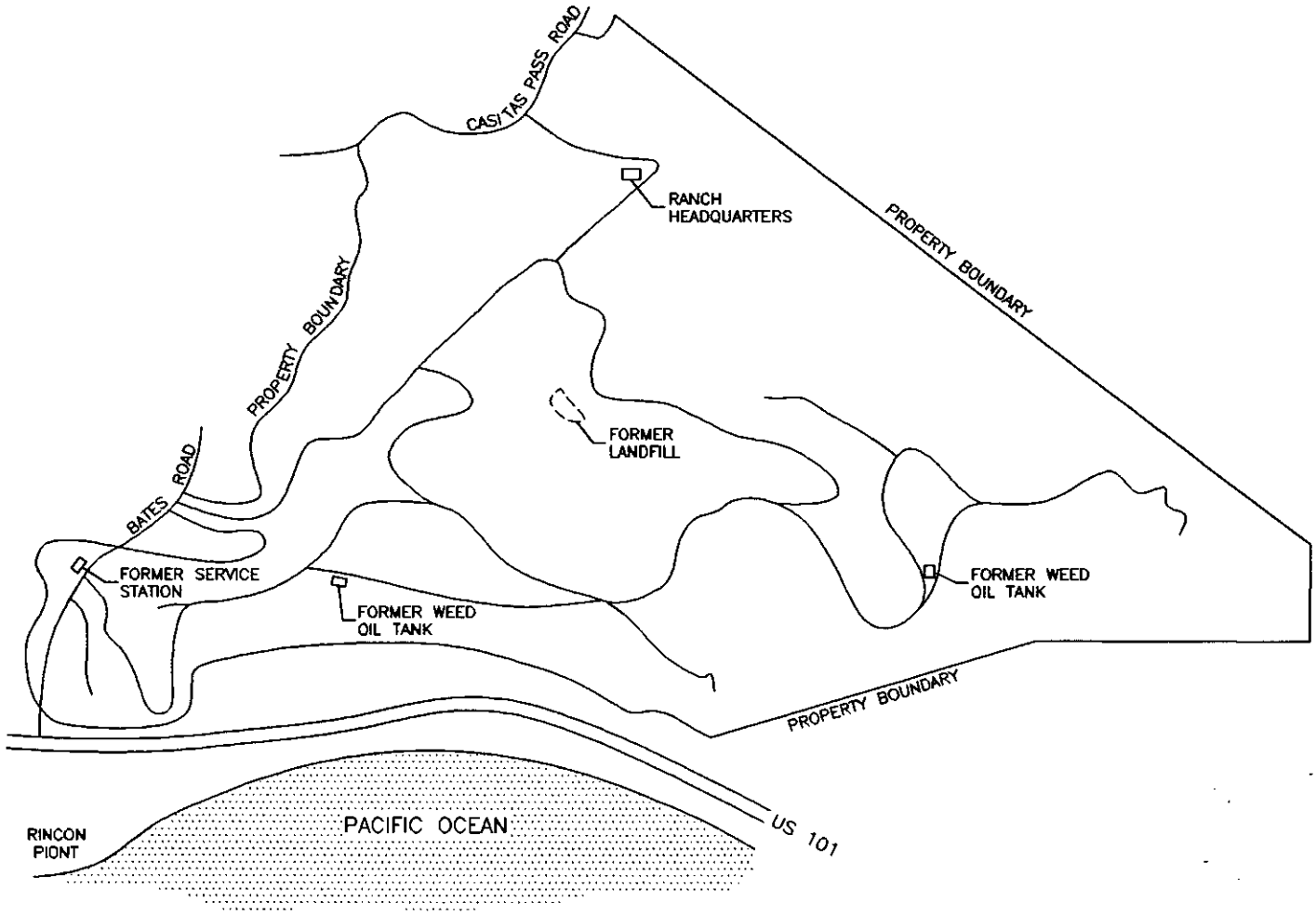
Area 5: Breezeway and Western Yard of Pesticide Storage Shed

Previous soil sampling from this area did not include analyses for pesticides, and verification samples collected after the soil remediation of December 1994 were not analyzed for lead (Figure 5). To remedy this, four hand auger borings are located to sample soils at depths of 2.5 to 5 feet below grade with analyses for organochlorine pesticides by EPA Method 8080 and lead by EPA Method 7420.

Area 6. Former Service Station Area

Previous soil sample SB-1 from a surface-stained area of soil in the vicinity of the former fueling station (Figure 2) contained elevated TPHd (41,000 ppm) and TRPH (51,000 ppm), but was not analyzed for BTEX or lead. Corrective action was planned to excavate an area of 3 feet by 3 feet and to a depth of 3 feet. Confirmation samples to be collected: one from the excavation base and one from the sidewall and analyzed for TPH fuel fingerprint, BTEX, and lead. Excavation to be backfilled using clean fill and the excavated soil to be properly disposed of at a licensed facility.

Additional requirements of VCEHD stipulated that all samples that are analyzed for organochlorine pesticides by EPA Method 8080 are to be run through cleanup procedures if necessary to minimize possible matrix interference and reduce the necessity for dilution. Also, should any TPH concentration exceed 5,000 ppm, additional analysis for PAH and Title 22 California metals is required, and organic lead is to be tested if total lead concentrations exceed 50 ppm.

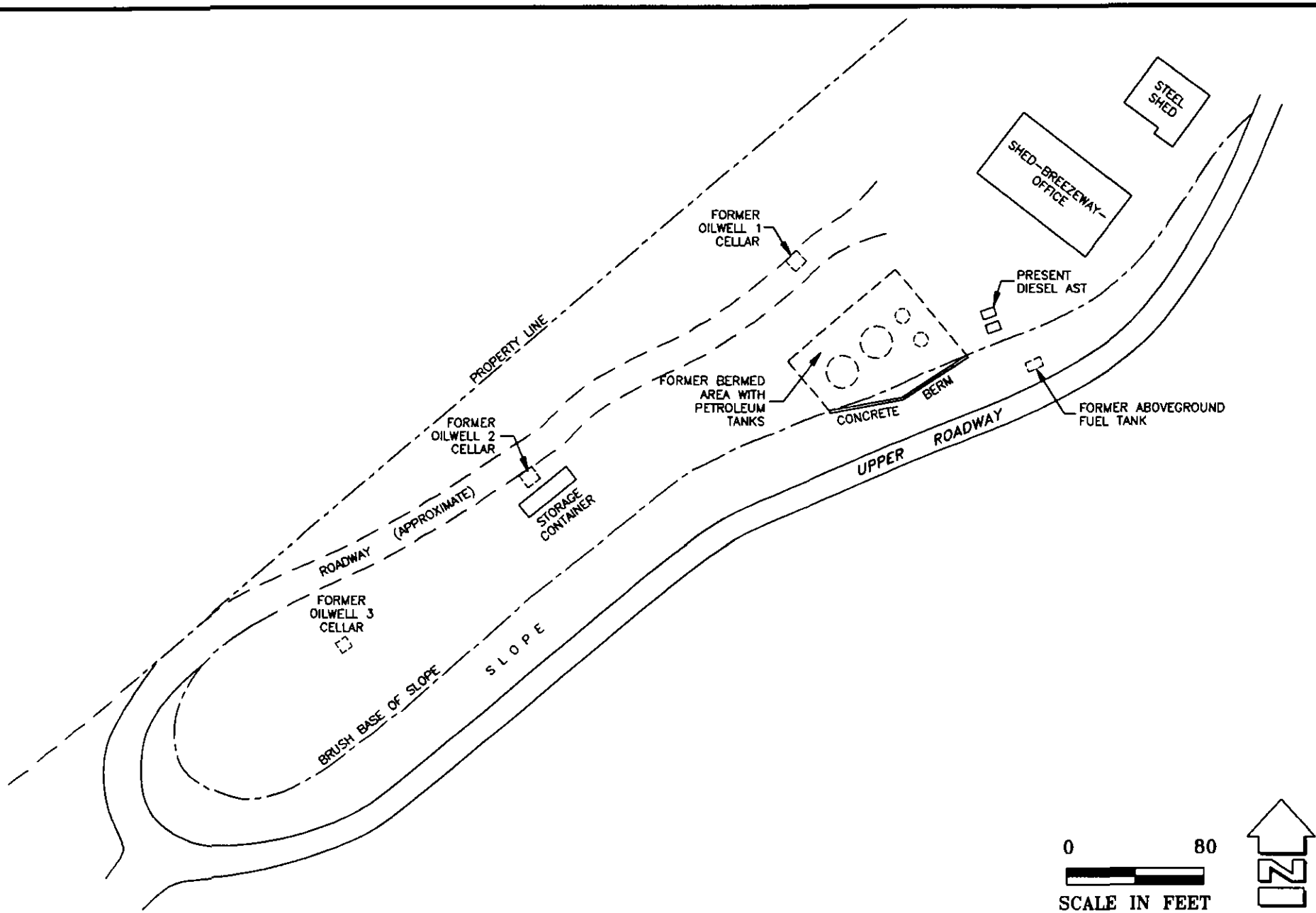


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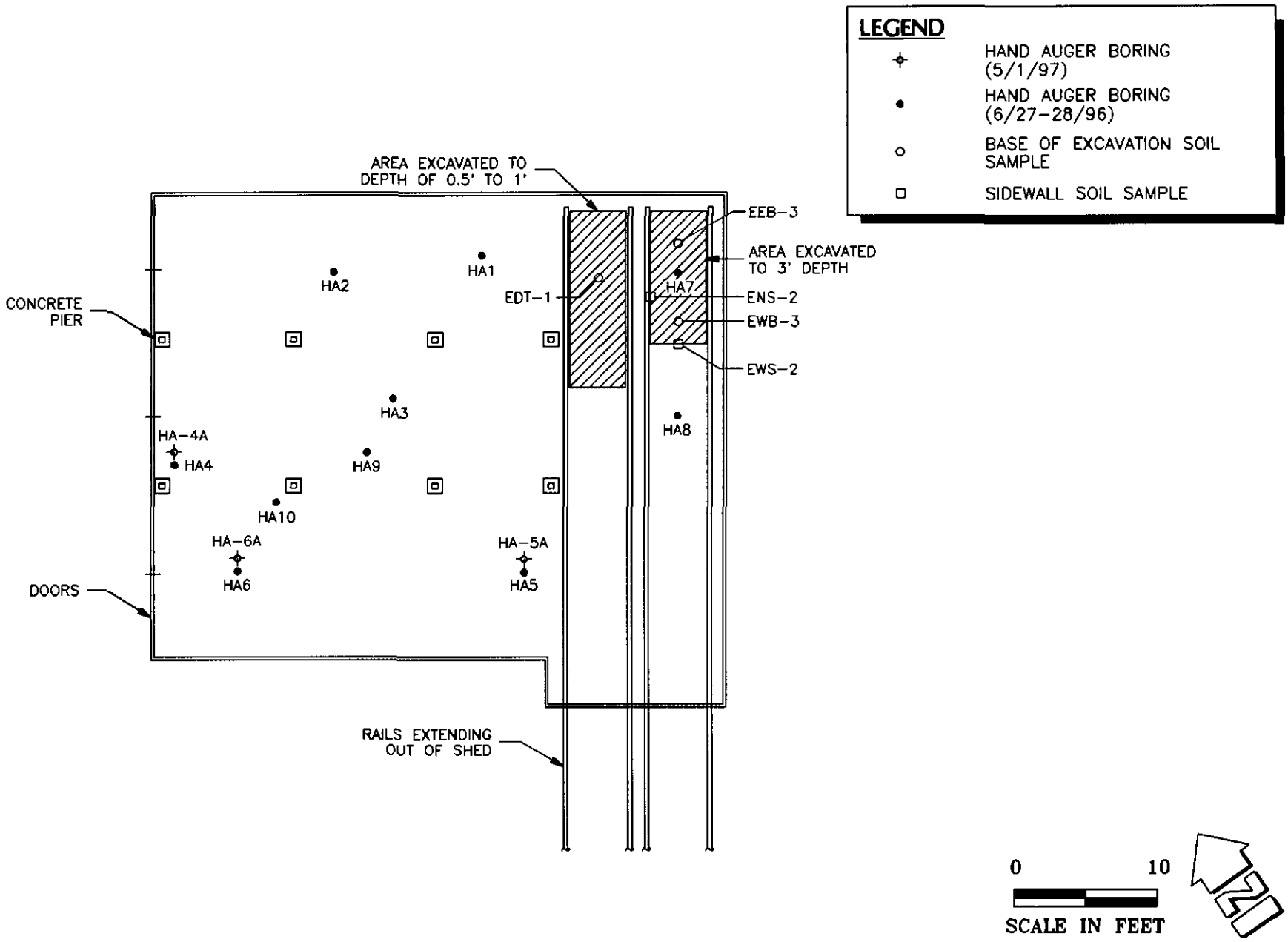
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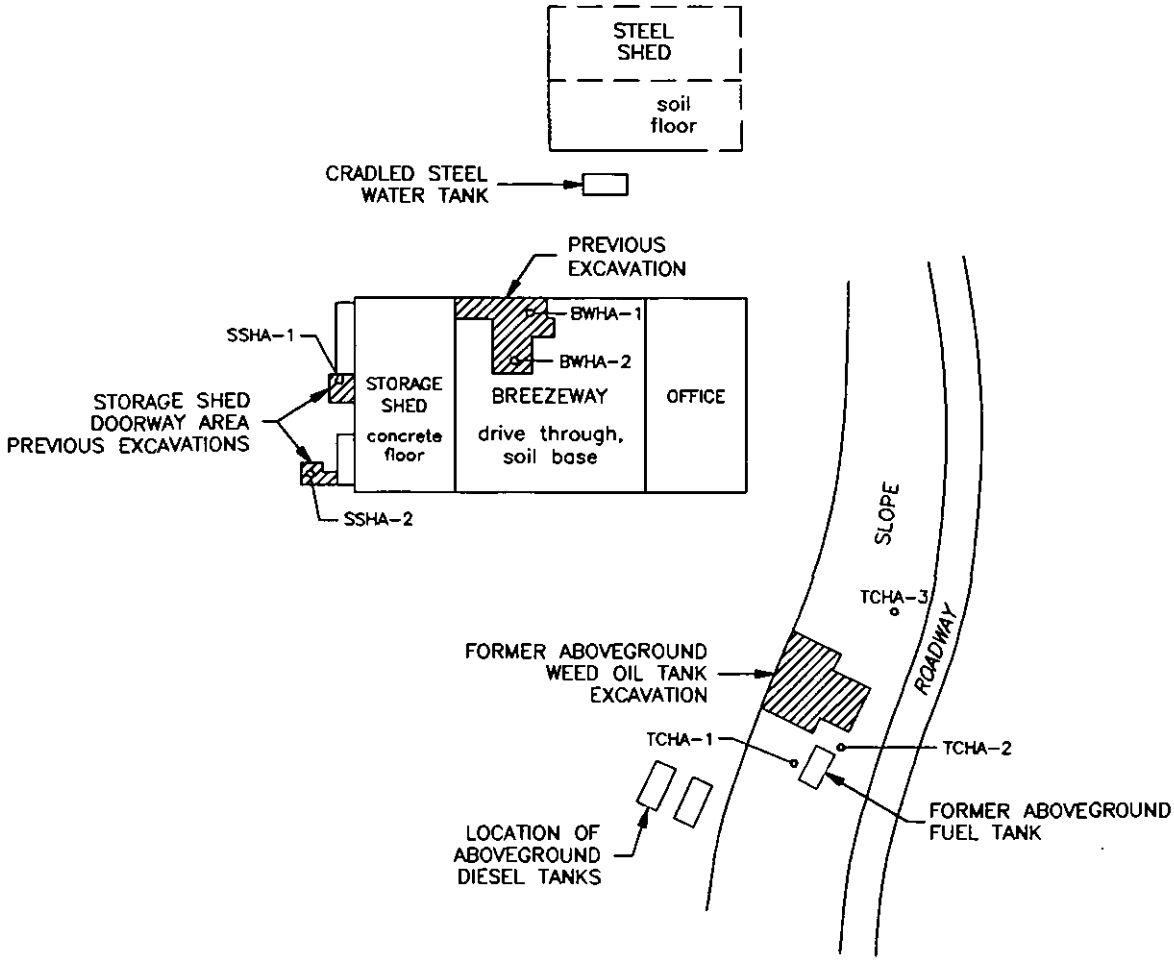
TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCONS2	DATE: 12/23/94	LOCATION OF RANCH HEADQUARTERS AND REMOTE LOCATIONS RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 2
	SOURCE:			



TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON3A	DATE: 6/4/96	RANCH HEADQUATERS AREA, WITH LOCATION OF FORMER OILWELL FACILITIES AND FORMER PETROLEUM TANK AREA RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 3
	SOURCE:			



TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON6B	DATE: 7/29/96	STEEL SHED, WITH AREA OF EXCAVATIONS AND CONFIRMATION SAMPLE LOCATIONS RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 4
	SOURCE:			



LEGEND

AREA OF REMEDIATION

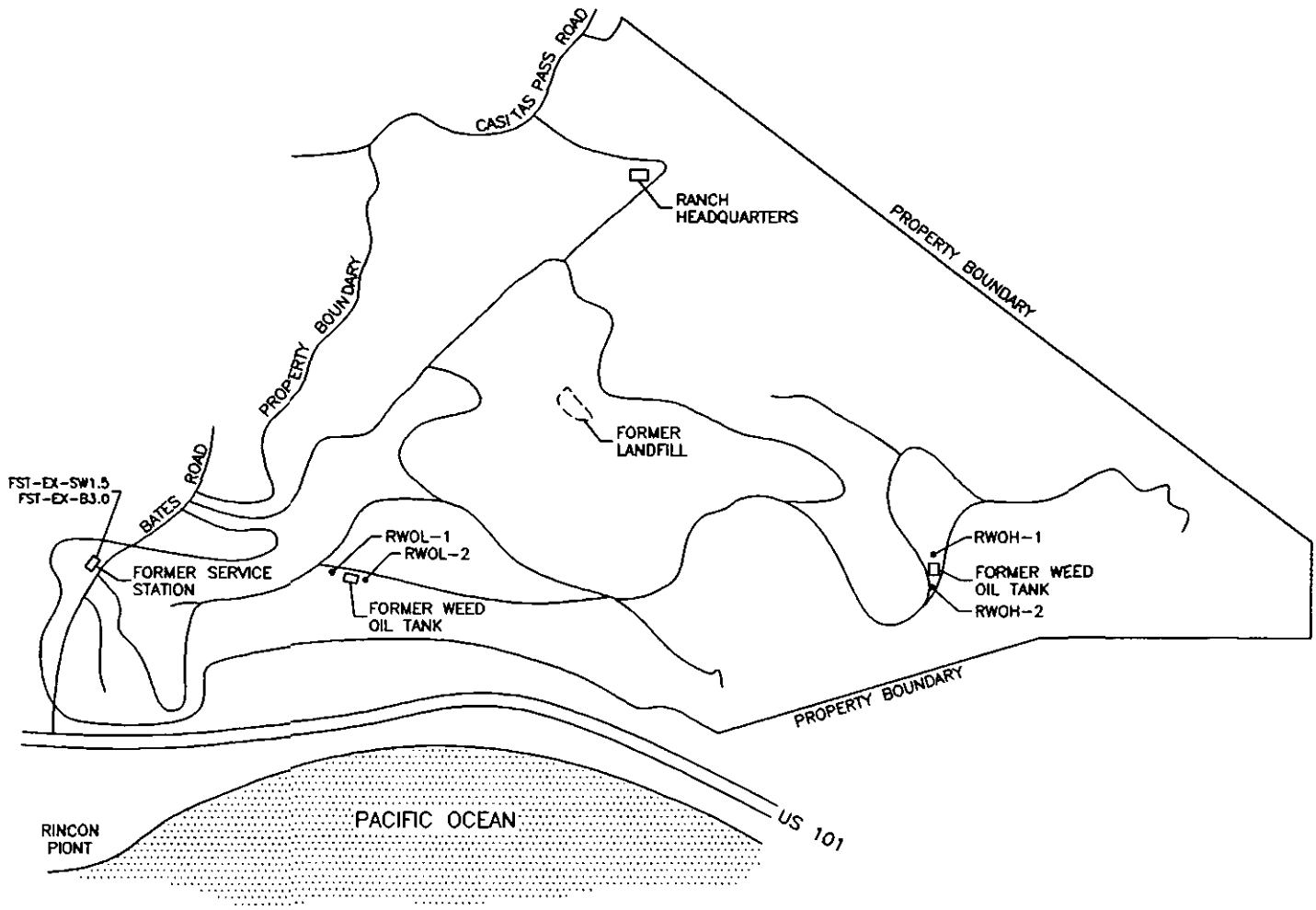
TCHA-3 HAND AUGER LOCATIONS

0 40

APPROX. SCALE IN FEET

N

TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCONS3 DATE: 12/23/94 SOURCE:	SITE MAP OF RANCH HEADQUARTERS, WITH AREAS OF SOIL SAMPLING RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 5



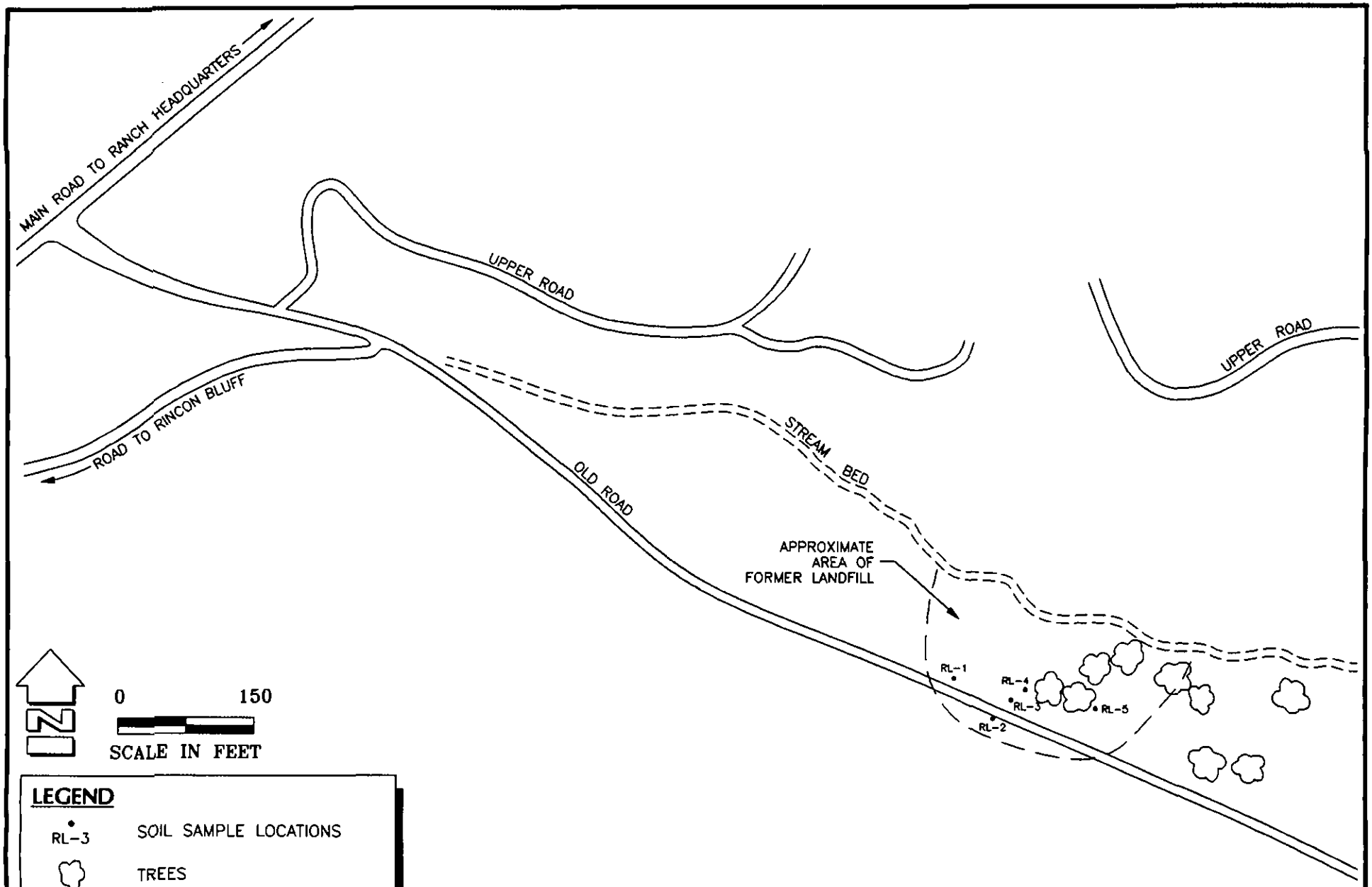
LEGEND

RWOL-1 SOIL SAMPLE LOCATIONS

NOT DRAWN TO SCALE

N

TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON6C	DATE: 12/23/94	LOCATION OF RANCH HEADQUARTERS AND REMOTE LOCATIONS OF SAMPLING AND REMEDIATION RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 6
	SOURCE:			



TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON7A	DATE: 6/11/97	FORMER LANDFILL AREA WITH SAMPLING LOCATIONS	FIGURE 7
	SOURCE:		RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	

II INVESTIGATION AND CORRECTIVE ACTION

SCOPE OF WORK

This work was conducted on May 1 and 2, 1997, in accordance with the requirements, protocols, and procedures of the regulatory agencies having jurisdiction over the site as well as other local, state, and federal agency requirements. General tasks of the sampling and remediation program included the following:

1. Activities were conducted in accordance with a site specific Health and Safety Plan, a Sampling and Analysis Workplan, and a QA/QC Plan in accordance with VCP Project 3146549 Exhibit C. The Health and Safety Plan and QA/QC Plan are included in Appendices A and B, respectively.

2. A preliminary reconnaissance of the remote landfill area was conducted on February 27, 1997, to evaluate accessibility and nature of proposed sampling. Discussions with Mr. David Salter of VCEHD were carried out, and Mr. Salter witnessed the locations of all sampling points on May 1, 1997.

3. A volume of one cubic yard of oil stained soil was excavated from the surface-stained area in the vicinity of the former service station adjacent to Bates Road.

4. Soil sampling activities were conducted at the six areas previously described, including the one cubic-yard soil remediation. Samples were collected by hand auger, properly capped, sealed and transported under chain of custody to Capco Analytical Services, Inc., a California certified laboratory. Auger holes were backfilled with soil cuttings.

5. Soil samples were chemically analyzed as follows with laboratory reports included in Appendix C.

    a. Organochlorine pesticides by EPA Method 8080 for samples from Area 2, (8 samples), Area 3 (10 samples), Area 4 (6 samples), and area 5 (4 samples) for a total of 28 samples.

    b. Total petroleum hydrocarbon (TPH) with hydrocarbon characterization by EPA Method 8015m for samples from Area 3 (10 samples) and Area 6 (2 samples) for a total of 12 samples.

    c. BTEX by EPA Method 8020 for 2 samples from Area 6.

    d. Total lead by EPA Method 7420 for samples from Area 1 (6 samples), Area 2 (8 samples), Area 5 (4 samples) and Area 6 (2 samples) for a total of 20 samples.

RESULTS

A description of the sample locations, the limited soil remediation, and the verification analytic results are summarized for each of the six areas on the ranch.

Area 1: Former Aboveground Fuel Tank

Three borings were hand augered to depths of 1.5 feet below grade at the locations shown on Figure 5. Samples were collected at depths of 0.5 and 1.5 feet and chemically analyzed for total lead with results presented in Table 1. Total lead concentrations are generally in the range of 5 to 7 ppm for the five samples with one shallow sample (TCHA-2 at 0.5 feet) exhibiting a concentration of 33 ppm.

Area 2: Former Remote Weed Oil Tanks

At each of two remote former weed oil tank locations, two borings were hand-augered: one boring adjacent to the area of remediated soil and one at a distance of 50 feet from the former tank. Borings were augered to a depth of 1.5 feet below grade as shown on Figure 6. Samples were collected at depths of 0.5 and 1.5 feet below grade and chemically analyzed for organochlorine pesticides and lead with results presented in Table 2. Trace concentrations of 4,4'-DDE (0.0049 to 0.018 ppm) and 4,4'-DDT (0.0097 to 0.016 ppm) were detected in soils at the lower remote weed oil tank (samples RWOL-1 and RWOL-2). No other organochlorine pesticides were detected with dilution factors of 1.0, and lead was reported in the range of 5.5 to 9.0 ppm.

Area 3: Remote Landfill

Five borings were hand-augered to depths of 4 to 5 feet below grade at the locations shown on Figure 7 (soil borehole logs are presented in Appendix D). Samples were collected at depths of 1 foot and at total depth and chemically analyzed for TPH fuel fingerprint and organochlorine pesticides. Analytical results are presented in Table 3 with gas chromatograms for the detectable hydrocarbons included with the analytical reports in Appendix C.

Low concentrations of petroleum hydrocarbons were detected in soils at three of the five locations. Hydrocarbon characterization indicated trace concentrations in the C_{13}-C_{22} range with low concentrations (26 to 230 ppm) in the C_{23+} range. Gas chromatograph (GC) analysis reveals a close match for the samples with typical GC traces for aged crude oil.

Trace concentrations of 4,4'-DDD (0.0054 to 0.47 ppm) and 4,4'-DDT (0.013 to 1.2 ppm) were detected in soils from three of the five locations; four locations exhibited detectable 4,4'-DDE (0.0048 to 0.38 ppm). No other organochlorine pesticides were detected with dilution factors of 1.0.

Area 4: Steel Shed

Three borings were hand-augered to depths of 1.5 feet below grade at the locations shown on Figure 4. Samples were collected at depths of 0.5 and 1.5 feet and chemically analyzed for organochlorine pesticides with results presented in Table 4. Only one sample at a depth of 0.5 feet (HA-4A) exhibited trace 4,4'-DDT (0.016 ppm) with no other organochlorine pesticides detected at dilution factors of 1.0.

Area 5: Breezeway and Western Yard of Pesticide Storage Shed

Two borings were hand-augered to depths of 5 and 3.5 feet below grade to penetrate the base of remediated soil in the breezeway area (BWHA-1 and BWHA-2 of Figure 5). Two

other borings were hand-augered to depths of 3.5 and 2.5 feet below grade to penetrate the base of remediated soil in two doorway area excavations (SSHA-1 and SSHA-2 of Figure 5). Samples were collected at total depths of the borings and chemically analyzed for organochlorine pesticides and total lead with results presented in Table 5. There were no detectable concentrations of any organochlorine pesticide encountered with dilution factors of 1.0; lead concentrations ranged from 2.8 to 5.1 ppm.

Area 6: Former Service Station Area

An area of soil measuring 3 by 3 feet was excavated to a depth of 3 feet underlying a surface oil stain in the vicinity of a former service station (Figure 6). The one cubic yard of stained soil was loaded into DOT-approved 55 gallon steel drums and transported from the site by Allwaste Environmental Services to Crosby & Overton, Inc., an approved recycling facility in Long Beach, California. Appendix E includes a copy of the non-hazardous waste manifest. The excavation was backfilled with clean native fill.

Verification soil samples were collected from the base (FST-EX-B3.0) at a depth of 3 feet and from the sidewall (FST-EX-SW1.5) at a depth of 1.5 feet. Chemical analysis for TPH fuel fingerprint, BTEX, and total lead was conducted with results presented in Table 6. There were no detectable petroleum hydrocarbons recorded in the verification samples; lead ranged from 3.7 to 3.8 ppm.

III CONCLUSIONS

GENERAL DISCUSSION

Each of the six areas sampled or otherwise remediated had been the subject of recommended actions by VCEHD. These actions have been successfully completed and are summarized by area:

Area 1: Former Aboveground Fuel Tank

Sampling of soils in the vicinity of the former aboveground fuel tank did not generally encounter total lead at concentrations greater than the background conditions. The one sample of slightly elevated total lead (33 ppm) is within the range of background conditions for Southern California and is significantly less than cleanup criteria.

There is no verification of any lateral or vertical extent to the localized indication initially detected by sample S-2 (6/16/94). There is no further assessment or corrective action warranted or recommended for this area.

Area 2: Former Remote Weed Oil Tanks

Soil samples in the vicinities of the former weed oil tanks were analyzed for organochlorine pesticides utilizing laboratory protocols for minimum dilution (factors of 1.0). Trace concentrations of 4,4'-DDT and 4,4'-DDE were detected at only one location at magnitudes typical of agricultural area background conditions. It should also be noted that these concentrations are at least two orders of magnitude lower than Preliminary Remedial Goals (PRGs) established by California EPA (Reference 8). Total lead in the soil samples was found to be typical for background conditions.

There is no further assessment or corrective action warranted or recommended for this area.

Area 3: Remote Landfill

The purpose of sampling the remote landfill area was to follow-up on indications of organochlorine pesticides and TPH detected by previous samples. Each of these two analyte classes will be discussed separately.

Trace concentrations of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were detected at three of the four sample locations in the former landfill. The concentrations were of magnitudes generally two orders lower than published PRGs and are typical of background conditions in agricultural areas. Only one sample (RL-3) exhibited low concentrations which were significant enough to warrant evaluation in comparison to PRGs at follows:

Contaminant	*Sample RL-3 (mg/kg)*	*Preliminary Remedial Goal Residential Soil (mg/kg)*	*Preliminary Remedial Goal Industrial Soil (mg/kg)*
4,4'-DDT	1.2	1.9	7.9
4,4'-DDE	0.38	1.3	5.6
4,4'-DDD	0.47	1.3	5.6

This evaluation verifies that the sample concentrations at location RL-3 are less than PRGs for residential soil and significantly less than the PRGs for industrial soil. There is no further assessment or corrective action warranted or recommended regarding organochlorine pesticides for the area.

The low TPH concentrations that were detected at the landfill (12 to 230 ppm) were interpreted to be indicative of weathered crude oil (hydrocarbon range C_{13}-C_{22} and C_{23+}). This is in accordance with the historical records and geological literature for the Rincon Point area. Historical records mention the presence of tar sands in the canyons east of Rincon Creek which were being worked in 1896 as asphaltum mines (Reference 9). Because the TPH concentrations in the landfill area are indicated to be naturally occurring, there is no further assessment or corrective action warranted or recommended.

Area 4: Steel Shed

Soil samples in the vicinities of three previous hand auger sample locations were evaluated to determine if previous laboratory protocols for higher dilution factors had masked the presence of organochlorine pesticides. The soil samples of the present study did not exhibit detectable organochlorine pesticides other than one trace indication of 4,4'-DDT. It is therefore concluded that the previous confirmation sampling results were valid, and there is no further assessment or corrective action warranted or recommended.

Area 5: Breezeway and Western Yard of Pesticide Storage Shed

Soil samples from borings in the formerly excavated areas of the breezeway and western yard of the pesticide storage shed were analyzed for organochlorine pesticides and total lead to provide additional verification of previous sampling results. Chemical analysis of the present samples did not indicate any detectable organochlorine pesticides; lead was found to be in the range typical for background conditions.

There is no further assessment or corrective action warranted or recommended for these areas.

Area 6: Former Service Station Area

One cubic yard of oil-stained dirt was removed from the area of a surface stain in the vicinity of the former service station. Verification sampling did not indicate any detectable petroleum hydrocarbons remaining, and total lead was found to be typical for background conditions. There is no further assessment or corrective action warranted or recommended for this site.

COMPLETION OF VOLUNTARY CLEANUP PROGRAM

All sampling and remediation requirements have been fulfilled in accordance with the Sampling and Analysis Workplan and the additional specifications of VCEHD. There is no further assessment or corrective action warranted or recommended for any of the six areas that were subject to VCEHD concerns. Accordingly, it is concluded that the Voluntary Cleanup Program for the ranch has been successfully completed, and it is requested that VCEHD issue a No Further Action (NFA) letter which concures with this conclusion.

IV LIMITATIONS

Information provided in this report is for the exclusive use of Rincon del Mar Ranch, Gregory Canova-Parker, Esq., Court-Appointed Referee, c/o Seed, Mackall & Cole, 1332 Anacapa Street, Suite 200, Santa Barbara, California 93101 and the property owners for the determination of appropriate strategies pertaining to the subject property. The report may be made available to prospective buyers of the property and to appropriate regulatory agencies, upon the written approval of client. The interpretations made are based on data from samples acquired. It is possible that undetected contamination exists in areas of the site which were not sampled. This work was performed in accordance with generally accepted practices by geologists and engineers working in this field. No other warranty, either expressed of implied is made.

REFERENCES

1. Preliminary Subsurface Soil Sampling for Rincon dl Mar Ranch, Santa Barbara, California. PHR Environmental Consultants, Inc. (July 11, 1994).

2. Phase I Environmental Site Assessment; Rincon del Mar Ranch, Ventura County, California. PHR Environmental Consultants, Inc. (May 5, 1994).

3. Soil Excavation and Sampling Report, Rincon del Mar Ranch, Ventura County, California. TRAK Environmental Group, Inc. (January 23, 1995).

4. Corrective Action and Sampling Report, Rincon del Mar Ranch, Ventura County, California. TRAK Environmental Group, Inc. (June 7, 1996).

5. Additional Corrective Action and Sampling Report, Rincon del Mar Ranch, Ventura County, California. TRAK Environmental Group, Inc. (July 28, 1996).

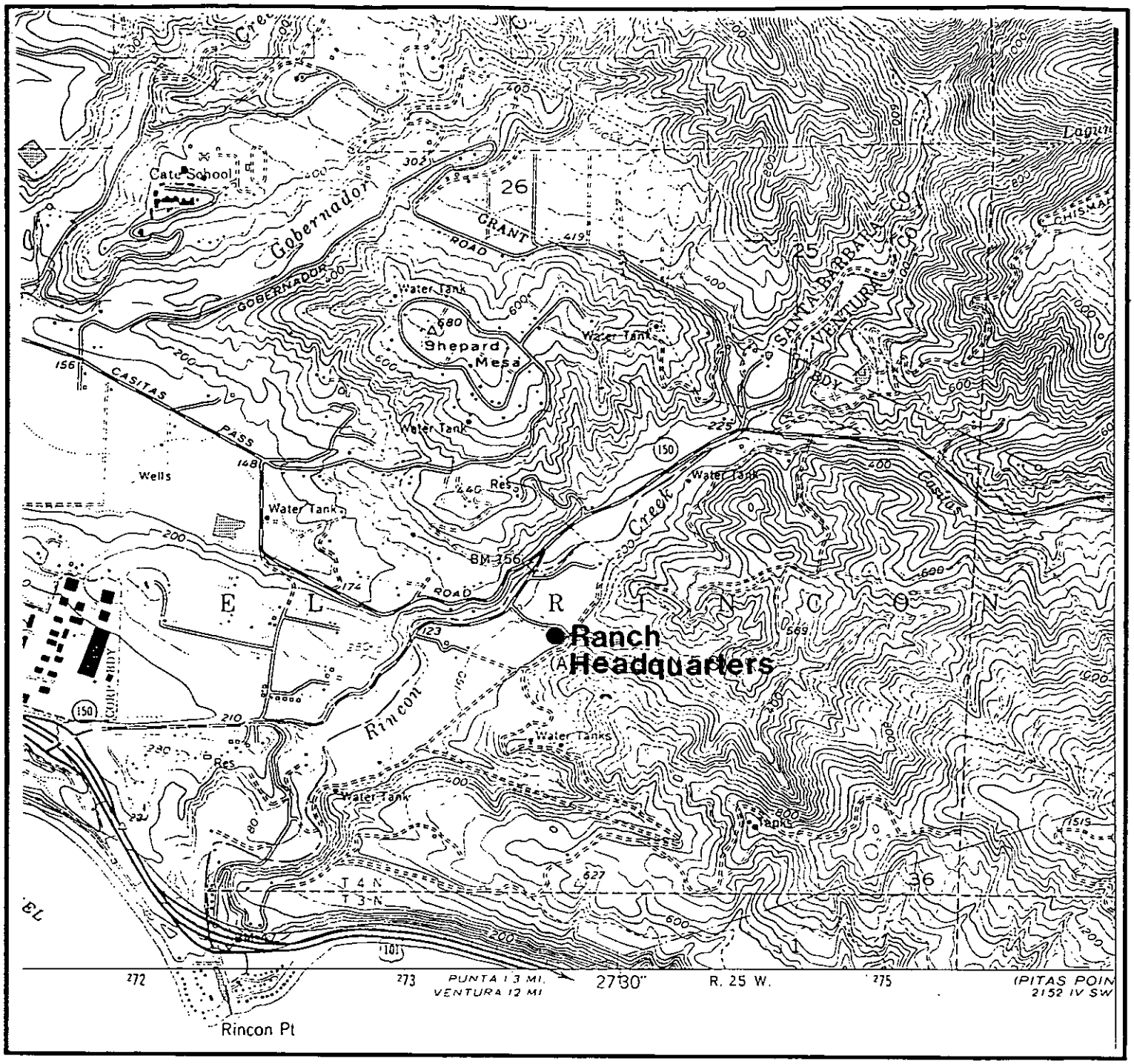
6. Steel Shed Soil Corrective Action and Sampling Report, Rincon del Mar Ranch, Ventura County, California. TRAK Environmental Group, Inc. (September 25, 1996).

7. Sampling and Analysis Workplan, Rincon del Mar Ranch, Ventura County, California. TRAK Environmental Group, Inc. (September 25, 1996).

8. Region 9 Preliminary Remediation Goals (PRGs) 1996. California EPA. (August 1, 1996).

9. Watts, W.L. Oil and Gas Yielding Formations of Los Angeles, Ventura, and Santa Barbara Counties. California State Mining Bureau, Bulletin No. 11. (December 1896).

ILLUSTRATIONS



SCALE 1:24000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

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TRAK *Environmental Group* *4125 Market Street, # 19* *Ventura, California 93003*	FILE NAME: RINCONSL DATE: 12/16/94 SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP WHITE LEDGE PEAK, CA (1981)	**SITE LOCATION MAP** RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	**FIGURE** 1

TABLES

TRAK

Table 1
Soil Analytical Results for Former Aboveground Fuel Tank Area
Rincon del Mar Ranch
Ventura County, California

Boring ID	Sample Date	Depth feet	Total Lead [1] ppm
TCHA-1	05/01/97	0.5	6.4
	05/01/97	1.5	5.1
TCHA-2	05/01/97	0.5	33
	05/01/97	1.5	7.4
TCHA-3	05/01/97	0.5	5.4
	05/01/97	1.5	5.6

Notes:

[1] EPA Method 7421 8015M

ppm = parts per million

Table 2
Soil Analytical Results for Remote Weed Oil Tank Areas
Rincon del Mar Ranch
Ventura County, California

Boring ID	Sample Date	Depth feet	Organochlorine Pesticides [1]				Total Lead [2] ppm
			4,4'-DDD ppm	4,4'-DDE ppm	4,4'-DDT ppm	All Other EPA 8080 Analytes	
RWOH-1	05/01/97	0.5	<0.005	<0.004	<0.007	ND	7.4
	05/01/97	1.5	<0.005	<0.004	<0.007	ND	9.0
RWOH-2	05/01/97	0.5	<0.005	<0.004	<0.007	ND	9.0
	05/01/97	1.5	<0.005	<0.004	<0.007	ND	8.7
RWOL-1	05/01/97	0.5	<0.005	0.013	0.0097	ND	7.6
	05/01/97	1.5	<0.005	0.018	0.016	ND	5.7
RWOL-2	05/01/97	0.5	<0.005	0.0049	<0.007	ND	6.4
	05/01/97	1.5	<0.005	<0.004	<0.007	ND	5.5

Notes:
[1] EPA Method 8080
[2] EPA Method 7421

ppm = parts per million
< = not detected at or above the method reporting limit specified
ND = not detected at or above method reporting limit

Table 3
Soil Analytical Results for Remote Landfill Area
Rincon del Mar Ranch
Ventura County, California

Boring ID	Sample Date	Depth feet	TPH Fuel Fingerprint [1]			Organochlorine Pesticides [2]			
			C_4-C_{12} ppm	C_{13}-C_{22} ppm	C_{23+} ppm	4,4'-DDD ppm	4,4'-DDE ppm	4,4'-DDT ppm	All Other EPA 8080 Analytes
RL-1	05/01/97	1	<0.5	<10	<10	<0.005	0.0072	<0.007	ND
	05/01/97	5	<0.5	22	230	0.0054	0.0049	0.013	ND
RL-2	05/01/97	1	<0.5	<10	<10	<0.005	<0.004	<0.007	ND
	05/01/97	5	<0.5	<10	<10	<0.005	<0.004	<0.007	ND
RL-3	05/01/97	1	<0.5	<10	39	0.47	0.38	1.2	ND
	05/01/97	5	<0.5	<10	<10	<0.005	<0.004	<0.007	ND
RL-4	05/01/97	1	<0.5	22	130	<0.005	0.0048	0.016	ND
	05/01/97	4	<0.5	<10	26	0.0091	0.011	0.038	ND
RL-5	05/01/97	1	<0.5	<10	<10	<0.005	<0.004	<0.007	ND
	05/01/97	5	<0.5	<10	<10	<0.005	0.0053	<0.007	ND

Notes:

[1] EPA Method 8015M

[2] EPA Method 8080

TPH = total petroleum hydrocarbons

ppm = parts per million

< = not detected at or above the method reporting limit specified

ND = not detected at or above method reporting limit

Table 4
Soil Analytical Results for Steel Shed Area
Rincon del Mar Ranch
Ventura County, California

Boring ID	Sample Date	Depth feet	Organochlorine Pesticides [1]			
			4,4'-DDD ppm	4,4'-DDE ppm	4,4'-DDT ppm	All Other EPA 8080 Analytes
HA - 4A	05/01/97	0.5	<0.005	<0.004	0.016	ND
	05/01/97	1.5	<0.005	<0.004	<0.007	ND
HA - 5A	05/01/97	0.5	<0.005	<0.004	<0.007	ND
	05/01/97	1.5	<0.005	<0.004	<0.007	ND
HA - 6A	05/01/97	0.5	<0.005	<0.004	<0.007	ND
	05/01/97	1.5	<0.005	<0.004	<0.007	ND

Notes:
[1] EPA Method 8080
ppm = parts per million
< = not detected at or above the method reporting limit specified
ND = not detected at or above method reporting limit

Table 5
Soil Analytical Results for Breezeway and West of Pesticide Storage Shed
Rincon del Mar Ranch
Ventura County, California

Boring ID	Sample Date	Depth feet	Organochlorine Pesticides [2]				Total Lead [2] ppm
			4,4'-DDD ppm	4,4'-DDE ppm	4,4'-DDT ppm	All Other EPA 8080 Analytes	
BWHA-1	05/01/97	5	<0.005	<0.004	<0.007	ND	5.1
BWHA-2	05/01/97	3.5	<0.005	<0.004	<0.007	ND	2.8
SSHA-1	05/01/97	3.5	<0.005	<0.004	<0.007	ND	4.8
SSHA-2	05/01/97	2.5	<0.005	<0.004	<0.007	ND	4.6

Notes:
[1] EPA Method 8080
[2] EPA Method 7421

ppm = parts per million
< = not detected at or above the method reporting limit specified
ND = not detected at or above method reporting limit

TRAK

Table 6
Soil Analytical Results for Former Service Station Area
Rincon del Mar Ranch
Ventura County, California

Sample ID	Sample Date	Depth feet	TPH Fuel Fingerprint [1]			EPA Method 8020				Total Lead [2] ppm
			C_4-C_{12} ppm	C_{13}-C_{22} ppm	C_{23+} ppm	Benzene ppm	Toluene ppm	Ethylbenzene ppm	Total Xylenes ppm	
FST-EX-SW1.5	05/02/97	1.5	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.010	3.8
FST-EX-B3.0	05/01/97	3.0	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.010	3.7

Notes:
[1] EPA Method 8015M
[2] EPA Method 7421
TPH = total petroleum hydrocarbons
ppm = parts per million
< = not detected at or above the method reporting limit specified
ND = not detected at or above method reporting limit

APPENDIX A

HEALTH AND SAFETY PLAN

Site Address: East of Bates Road, Santa Barbara County

Business Occupying Site: 611 acre ranch

Name of Owner: Gregory Canova-Parker, Esq., Court Appointed Referee

Owner Contact: Mr. Robert Cashier Phone #: (805) 379-9552

Field Activities: Soil Sampling

The purpose of this Health & Safety Plan (HASP) is to designate basic safety requirements to be followed by TRAK Environmental Group, Inc., employees during site operations. This plan supplies site specific information regarding potential hazards on-site and the location of the nearest emergency services.

KEY PERSONNEL AND RESPONSIBILITIES

Site Safety Officer: Jeff Johnson
Phone #: (805) 650-5333

The Site Safety Officer (SSO) is responsible for site safety, response operations, selecting appropriate personal protective equipment, monitoring on-site hazards and workers for signs of excess exposure to contamination, heat or cold stress, and fatigue, and protection of the public. The SSO is responsible for ensuring compliance with this HASP, communicating its requirements to TRAK employees and subcontractors, reporting any accidents or incidents, and stopping work on-site if dangerous conditions exist.

Project Manager: Mr. Brad Newman
Phone #: (805) 650-5333

The Project Manager (PM) is responsible primarily for site characterization and supplying site specific information. The PM delegates authority and coordinates on-site activities and functions.

PERSONNEL TRAINING

All TRAK personnel working on-site have been respirator fit tested per OSHA regulations and have the following training:

- Formal or on-the-job training for tasks assigned on-site.
- 40 Hour Hazardous Waste Operations & Emergency Response Training per 29 CFR 1910.120.
- Annual 8 Hour Hazardous Waste Operation & Emergency Response Training.
- American Red Cross First Aid and CPR Certification.

Training documentation is maintained on-site by each TRAK employee involved with site activities and is readily available for inspection.

MEDICAL SURVEILLANCE

All TRAK personnel are required to participate in a Medical Surveillance Program in which a TRAK approved physician certifies:

a. The employee is capable of wearing respiratory protection and using any appropriate PPE necessary.
b. The employee is fit for duty at hazardous waste sites.
c. Adequate medical screening tests have been obtained which address the contaminants associated with this site.

The Physician's Statement is maintained with the training documentation for each individual employee.

HAZARD ANALYSIS

The physical hazards present on-site include:

a. Occupational noise exposure from mechanical equipment.
b. Physiological stresses due to the use of PPE.
c. Injury due to movement of mechanized equipment or large, heavy tools.
d. Injury or incident due to nearby traffic.
e. Tripping over equipment or tools.

The chemical hazards expected to be encountered on-site include inhalation of soil dust, fuel oils, motor oils, gasolines. Trace levels of pesticides or insecticides may be present in the soil. Petroleum hydrocarbons may be encountered. Volatile organics are not expected to be encountered. Pesticides, insecticides and herbicides consisting of Simzine, Protocol, Round Up, and Malathion have been applied on-site in the past. Zinc phosphate, manganese and amonium nitrate were applied to the avocado trees as fertilizers.

EFFECTS OF EXPOSURE

Motor oils, hydraulic oil, and fuel oil - At low concentrations there should not be any negative health effects. If contact is made, wash hands, and other affected areas with warm water and soap.

Pesticides and insecticides - Very low concentrations of these compounds are expected in the soils on-site. Low level exposure to pesticides and insecticides could cause headaches, with visual disturbance, blurred vision, and sweating. Extreme exposure can cause muscle weakness, respiratory failure, coma, and possibly death. Routes of entry are by skin or eye contact with vapors, mists inhalation of fumes or swallowing. Absorprtion occurs very rapidly in the skin and symptoms begin almost immediately.

Lead - Lead may be present in trace concentrations from the use of gasoline. Lead is toxic and can be of concern if swallowed or inhaled. Lead is not expected to be encountered. Notice is being given because it may be present in trace concentration in the soil.

EXPOSURE MONITORING

It is not anticipated that exposure to any on-site contaminants will exceed the permissible exposure level. However, as a precautionary measure, exposure monitoring will be conducted. An organic vapor meter (OVM) will be utilized to monitor levels of volatile organic vapor concentrations at the anticipated source as well as in the breathing zone. Should the PEL be exceeded in the breathing zone or as the SSO so directs, respirators must be donned. If OVM reading exceeds 1,000 ppm, the use of an air purifying respirator is not appropriate and personnel shall withdraw from the site.

PERSONAL PROTECTIVE EQUIPMENT

The level of protection required during on-site operations may fluctuate depending on site conditions which will be continually monitored and evaluated by the SSO. Level "D" protection is required as a norm unless altered by the SSO. If site conditions change, Level C protection may be required. Level "D" protection includes:

- Steel toe safety boots
- Coveralls, shirt and jeans
- Safety glasses
- Gloves (nitrile and/or leather as necessary)
- Air purifying respirator (if necessary)
- Hard hat

In addition, each TRAK employee shall maintain a stocked safety bag containing emergency eye wash solution, a first aid kit, spare PPE, and other safety items which may become necessary.

WORK ZONES AND SECURITY MEASURES

To facilitate minimum exposure to dangerous toxic vapors and/or physical hazards, only authorized personnel are allowed within the exclusion zone at the job site. Zones shall be designated by TRAK staff who will also be responsible for security within these zones.

a. Exclusion Zone -- This zone is comprised of the area where potential contamination exists or exposure may occur. The exclusion zone will be defined by orange cones, safety tape, barricades, or any combinations thereof. Only TRAK personnel and TRAK subcontractors with required training are allowed within this zone.

b. Contamination Reduction Zone -- This zone serves as the transition area between the exclusion zone and clean areas. Decontamination of sampling and PPE are to occur within this zone. This zone shall be observed, however, depending on the size of the project, this zone may not actually be marked with cones, etc.

c. Support Zone -- This zone is a clean area where equipment, supplies, materials and the HASP are kept. Contaminated PPE and/or equipment should not be brought into this area. PPE is not required in this zone.

GENERAL SAFETY RULES

If contamination splashes in eye, use emergency eye wash solution and flush affected eye for a period of not less than 15 minutes.

Smoking, eating, drinking, chewing gum, or other activities which may facilitate transfer of contamination to the face is not allowed in the exclusion zone.

Hands must be thoroughly washed before taking a break, eating, using the restroom, etc.

A fire extinguisher will be available on-site for small fires deemed manageable by TRAK staff.

DECONTAMINATION AND DISPOSAL

TRAK's standard operating procedures establish practices that minimize contact with potentially contaminated materials. Decontamination procedures are utilized if there is suspected or known contamination of equipment, supplies, instruments or tools. Soap and water will be used to remove contamination. Contaminated washwater will be disposed of in accordance with procedures outlined in the California State LUFT Program Reference Manual.

EMERGENCY PROCEDURES

TRAK personnel are trained and certified in first aid and will have first aid provisions on-site should any minor accident or injury occur. For all accidents or injuries of a nature other than minor, the individual will be transported immediately to the nearest hospital with emergency services.

Emergency Telephone Numbers

Fire/Police/Ambulance	911
Ventura County Medical Center 3291 Loma Vista Road Ventura, California 93003 (See attached hospital route map)	(805) 652-6000

Directions to Ventura County Medical Center:

From the site, go south on Highway 101 to Seaward. Take Seaward north to Main, turn right on Main proceed to Loma Vista, turn left on Loma Vista.

California Poison Control Center - Los Angeles	(213) 222-3212
Chemtrec	(800) 424-9300
Underground Service Alert	(800) 422-4133
TRAK Environmental Group, Inc.	(805) 650-5333

EMERGENCY CONTACT LIST

Lori Eranio	Robert Eranio (H) (805) 647-5603 (W) (805) 482-2001
Doreen Hughes-Amendt	Dorothy & Frank Wilson (H) (805) 488-1828 (W) (805) 483-2453
Jeff Johnson	Christine Johnson (H) (805) 525-5182
Richard Jones	Bruna Jones (H) (805) 642-5576
Corey McTigue	Linda McTigue (H) 644-0508 (W)
Brad Newman	Sharon Newman (H) (805) 648-4675
Mark Surgett	Meredith Surgett (H) (805) 985-7349 (W) (805) 389-2786
Tracie Waller	Tom Waller (H) (805) 642-5637 (W) (805) 652-0219

SIGN-OFF SHEET

Rincon del Mar Ranch
East of Bates Road
Santa Barbara County

TRAK Personnel:

I certify that I have read and understand this Health and Safety Plan and am trained to perform tasks to which I have been assigned.

Subcontractors:

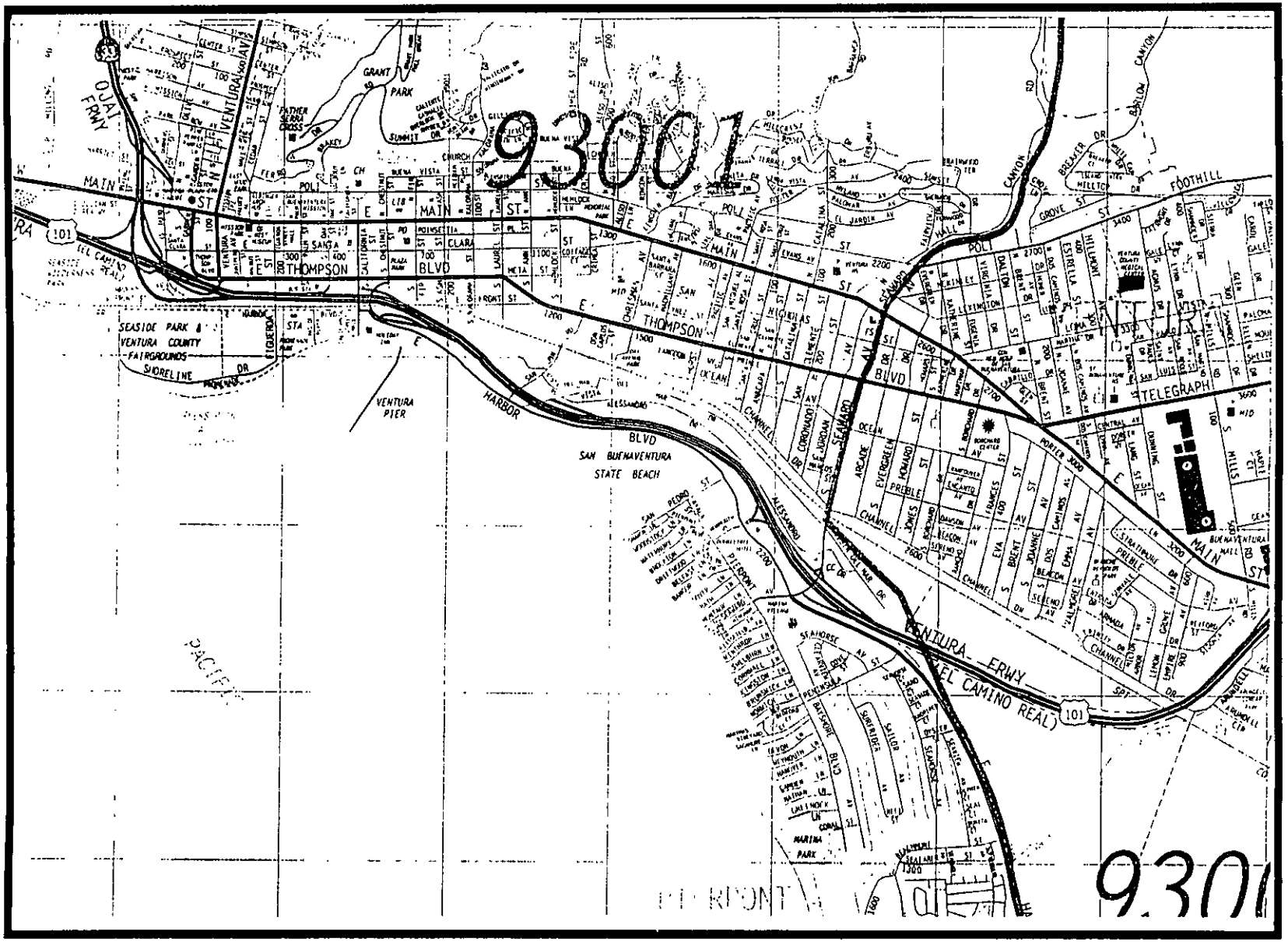
* Chemical and safety hazards on this job may require respiratory, eye, or skin protection. You are required to provide all necessary personal protective equipment for your own use.

* In the event of a spill or uncontrolled release, you are to evacuate the area, report the release, and do not enter until declared safe by the TRAK Site Safety Officer.

* Any unsafe conditions in your work area must be brought to the attention of the TRAK authority on-site before work begins.

I understand the hazards in my work area. I know how to report an emergency or fire and evacuate safely. I agree to comply with all safety requirements necessary to perform my duties and have reviewed this site safety plan.

Name (printed)	Signature	Date	Company
Jeff Johnson	Jeff Johnson	5-1-97	TRAK
Corey McTigue	Corey McTigue	5-1-97	TRAK
Brad Newman	Brad Newman	5/1/97	TRAK



Explanation
□ = Hospital
X = Site

Ventura County Medical Center
3291 Loma Vista Road
Ventura, California
(805) 652-6000

Rincon del Mar Ranch
East of Bates Road
Ventura County

APPENDIX B

QUALITY ASSURANCE/QUALITY CONTROL PLAN

Confirmation that the site activities were conducted in accordance with this plan is indicated by the verification initialing of the appropriate QA/QC elements.

FIELD SAMPLING AND DATA ACQUISITION _____

TRAK Environmental Group, Inc. was founded to provide the highest quality and most cost-effective services in the environmental engineering and consulting industry. This Quality Assurance/Quality Control (QA/QC) Plan has been developed to specify procedures and protocol which are acceptable to clients and meet or exceed regulatory agency requirements.

The QA/QC procedures to be followed are designed to guarantee the quality and cost-effectiveness of workmanship and to ensure the collection and analysis of data of sufficient quality and quantity to satisfy investigative and/or remedial objectives. TRAK personnel are trained in and follow all QA/QC procedures. Further, TRAK ensures that all contractors participating in its projects shall also be required to follow QA/QC procedures.

The following QA/QC elements have been incorporated throughout TRAK workplans:

- Drilling and soil sampling procedures to preserve sample integrity and prevent cross contamination
- Groundwater sampling procedures to preserve sample integrity
- Chain-of-custody procedures to confirm and document sample identity
- Equipment handling and calibration to validate precision and accuracy in measurement and analyses
- Decontamination procedures to protect personnel and prevent cross contamination and spreading of contamination

DRILLING AND SOIL SAMPLING _____

Drilling will be subcontracted by TRAK to a licensed and insured drilling contractor. Drilling activities will be directed and supervised at all times by trained and experienced TRAK personnel. Boring and monitoring well locations are determined by TRAK geologists and are indicated in the site specific scope of work. If drilling locations are specified by a client, the boring will be installed within three feet of specification. No well or boring shall be installed closer than five feet from any underground storage tank to prevent undermining of backfill material which could cause a tank rupture. To avoid damaging hidden obstacles such as product lines, conduits, water lines, etc., TRAK will hand excavate to a depth of at least five feet prior to installing wells or borings. An area larger than the diameter of the boring will be investigated prior to drilling. Thereafter, a modified California split spoon sampler will be driven

into the soil. Typically, the sampler will contain brass sampling tubes. The sampler will be driven eighteen inches into the ground at the bottom of the boring with a 140 pound weight falling a vertical distance of approximately thirty inches. The sampling tubes will be removed from the sampler and split in the field. One brass tube will be retained for soil classification and one will be sealed with Teflon lines caps for lab analyses. The samples will be immediately labeled with the following information:

- Company name
- Project name
- Date of collection
- Sample ID number

Samples which will be submitted for chemical analyses are placed in a cooler with ice until they are received by a state certified laboratory. Samples to be utilized for soils classification will be examined and classified in accordance with the Unified Soil Classification System. The selected sample will be screened for the presence of gasoline using visual examination and headspace vapor testing with an Organic Vapor Meter calibrated to isobutylene. A detailed boring log will be kept for each boring. Which includes the following information:

- Project name and number
- Boring/well number
- Soil sample log
- OVM readings
- Drill method
- Soil lithologic description
- Monitoring well construction details

GROUNDWATER MONITORING WELL CONSTRUCTION

The groundwater monitoring wells will be constructed in accordance with the guidelines of the lead agency. Prior to beginning work at the site, TRAK will obtain well construction permits from the appropriate permitting agency.

A geologist from our staff will direct and observe the subcontractor in construction of the groundwater monitoring wells. The screened portion of the well will consist of machine slotted (0.020-inch slot width) four inch diameter, Schedule 40 PVC casing with 20 feet of screen installed below the groundwater table and 10 feet of screen installed above the groundwater table interface. The casing will be flush threaded at the joints. The bottom of each well casing will be fitted with a threaded PVC end plug and the top of each well will be fitted with a locking well cap.

The annular space of each well will be backfilled with No. 3 Monterey Sand to approximately two feet above the slotted casing. Approximately three to five feet of bentonite will be placed above the sand. The remaining annulus of each well will be backfilled with a cement bentonite grout or bentonite chips to grade. A flush-grade traffic box will be installed to protect the well casing.

GROUNDWATER WELL DEVELOPMENT

The groundwater monitoring well will be developed using a surge block provided by the drillers to settle the sand pack prior to setting the seal. Purging to the well should result in the removal of approximately four well volumes of water unless the well goes dry. Development and purged water collected during development of the monitoring wells will be stored in DOT approved 55-gallon drums.

GROUNDWATER EVALUATION

The depth of groundwater relative to the monitoring well casing will be measured using a water level indicator or a product/groundwater interface probe. The elevations of the well casing will be surveyed by a California-licensed land surveyor to the nearest 0.01 foot relative to an established bench mark. Groundwater elevations will be calculated by subtracting the measured water table depth from the casing elevations.

GROUNDWATER SAMPLING

The proposed groundwater monitoring wells will be purged prior to sample collection with a pump or by manual bailing. Approximately four well volumes of water will be removed from each well prior to sampling. TRAK will collect groundwater samples from each well after groundwater in the well has recharged a minimum of 80 percent of its static level. A Teflon bailer will be used to collect groundwater samples. The groundwater samples will be transferred into laboratory cleaned sample bottle. The samples will be sealed with Teflon lined plastic caps, labeled, and placed on ice storage. The sampling equipment will be cleaned in a Liquinox solution and rinsed with distilled water before sampling each well. Purged water collected during sampling of the monitoring wells will be stored in a large tank on-site or in DOT approved 55-gallon drums.

SOIL CUTTINGS AND PURGED GROUNDWATER

Soil cuttings generated during drilling will be placed in 55-gallon drums and will remain on-site pending review of laboratory analysis results. The soil and well water will be transported to an appropriate landfill or recycling facility for disposal.

CHAIN-OF-CUSTODY

A chain-of-custody form will be completed in the field to document sample possession. The chain-of-custody is intended to accompany samples on delivery to the laboratory and should include various information including:

- Sample number and project name
- Signature of collector
- Date and time of collection
- Site address
- Laboratory analyses requested
- Signatures of persons involved in the chain of possession
- Remarks concerning possession

Once the sample arrives at the laboratory for analysis, an authorized person (often referred to as the sample custodian) must receive the samples and chain-of-custody and must verify receipt of the sample by adding the following information to the record:

- Signature and title of recipient
- Date sample arrived at laboratory
- Temperature of samples

EQUIPMENT CALIBRATION

- pH meter
- Turbidity meter
- Organic vapor meter (OVM)
- Dissolved oxygen (D.O.) meter

The pH meter, turbidity meter, OVM, and the D.O. meter will be calibrated prior to each work day in accordance with the procedures specified in the owner's manual for each piece of equipment. The results of calibrations and records of repair will be maintained in an equipment log. Calibration instructions for each piece of equipment will be available for guidance when equipment is in use.

Field personnel are responsible for ensuring equipment is functioning properly before use in the field. If equipment malfunction is suspected, the device will be removed from service and tagged to avoid inadvertent use. Faulty equipment will be repaired promptly if possible, recalibrated, and used or replaced with properly working equipment.

DECONTAMINATION

Personnel

Washing facilities will be available to personnel for general decontamination at the work site. Temporary exit from a work area for breaks, lunch, etc., will require the following:

1. Gloves, protective suits and other personal protective clothing must be removed as appropriate.

2. Hands and face must be thoroughly washed.

3. Protective clothing will be stored in such a manner to avoid contamination of inner surfaces and surroundings.

Exit from the site requires appropriate decontamination procedures as described below:

1. All personal protective equipment must be removed at the end of the workday prior to leaving the site.

2. Protective clothing shall either be stored in a manner to preclude contamination of inner surfaces or discarded in an appropriate manner.

3. Thorough washing of the entire body is required as soon as possible after doffing protective outer garments.

Equipment

All field sampling equipment (i.e., hand augers, probes, containers, drilling equipment) will be cleaned prior to and after each use. Decontamination will consist of combinations of steam cleaning and/or detergent wash, drinking quality water rinse, and distilled water rinse. Soil and groundwater sampling tools will be decontaminated by wiping off any visible moisture and/or particulate, washing with a laboratory grade detergent and clean potable water, and final rinsing with deionized/distilled water. All downhole groundwater monitoring and sounding equipment will be decontaminated in like manner prior to use.

Drilling equipment used downhole (i.e., drill bits, auger flites, sampling tubes) will be steam cleaned prior to start of each bore hole to prevent cross contamination.

All well servicing or production equipment used for purging, pumping, and development will be decontaminated prior to and following use in the same manner as downhole drilling equipment. Location of areas for wash down of vehicles and equipment will be determined in accordance with EPA regulations. Contaminated washwater will be disposed of in accordance with procedures outlined in the California State LUFT Program Reference Manual.

APPENDIX C

ANALYTICAL LABORATORY REPORTS AND CHAIN OF CUSTODY

Capco Analytical Services Incorporated (CAS)
1536 Eastman Avenue, Suite B
Ventura, CA. 93003
(805) 644-1095

Prepared For: TRAK Environmental
4125 Market Street #19
Ventura, CA 93003

May 9, 1997

ATTENTION: Brad Newman

Laboratory No: 970712
Date Received: 02-MAY-97
Project: Rincon del Mar

Job No: B05333
Sampled By: Client
Sample ID: See Below

RESULTS

On May 2, 1997, thirty-six (36) samples were received for analysis by Capco Analytical Services Inc. The samples were identified and assigned the lab numbers listed below. This report consists of 38 pages excluding the cover letter, and the Chain of Custody.

SAMPLE DESCRIPTION	CAS LAB NUMBER
TCHA1-0.5	97071201
TCHA1-1.5	97071202
TCHA2-0.5	97071203
TCHA2-1.5	97071204
TCHA3-0.5	97071205
TCHA3-1.5	97071206
SSHA1-3.5	97071207
SSHA2-2.5	97071208
FST-EX-SW1.5	97071209
FST-EX-B3.0	97071210
RL1-1	97071211
RL1-5	97071212
RL2-1	97071213
RL2-5	97071214
RL3-1	97071215
RL3-5	97071216
RL4-1	97071217
RL4-4	97071218

Dan A. Farah, Ph.D.
Director - Analytical Operations

This report shall not be reproduced except in full without the written approval of Capco Analytical Services Inc.
The test results reported represent only the items being tested and may not represent the entire material from which the sample was taken.

CAPCO Analytical Services, Inc.

Capco Analytical Services Incorporated (CAS)
1536 Eastman Avenue, Suite B
Ventura, CA. 93003
(805) 644-1095

Prepared For: TRAK Environmental
4125 Market Street #19
Ventura, CA 93003

May 9, 1997

ATTENTION: Brad Newman

Laboratory No: 970712
Date Received: 02-MAY-97
Project: Rincon del Mar

Job No: B05333
Sampled By: Client
Sample ID: See Below

SAMPLE DESCRIPTION	CAS LAB NUMBER
RL5-1	97071219
RL5-5	97071220
RWOH1-0.5	97071221
RWOH1-1.5	97071222
RWOH2-0.5	97071223
RWOH2-1.5	97071224
RWOL1-0.5	97071225
RWOL1-1.5	97071226
RWOL2-0.5	97071227
RWOL2-1.5	97071228
HA4A-0.5	97071229
HA4A-1.5	97071230
HA5A-0.5	97071231
HA5A-1.5	97071232
HA6A-0.5	97071233
HA6A-1.5	97071234
BWHA1-5	97071235
BWHA2-3.5	97071236

Dan A. Farah, Ph.D.
Director - Analytical Operations

This report shall not be reproduced except in full without the written approval of Capco Analytical Services Inc.
The test results reported represent only the items being tested and may not represent the entire material from which the sample was taken.

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: SSHA1-3.5
CAS LAB NO: 97071207
Date Received: 5/02/97
Date Sampled: 5/02/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	90	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: SSHA2-2.5
CAS LAB NO: 97071208
Date Received: 5/02/97
Date Sampled: 5/02/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	95	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 1-1
CAS LAB NO: 97071211
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	**7.2**	**1**	**4**
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	93	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 1-5
CAS LAB NO: 97071212
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/09/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	**5.4**	**1**	**5**
4,4'-DDE	**4.9**	**1**	**4**
4,4'-DDT	**13**	**1**	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	78	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 2-1
CAS LAB NO: 97071213
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	90	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 2-5
CAS LAB NO: 97071214
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	88	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 3-1
CAS LAB NO: 97071215
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/08/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	**470**	**10**	**50**
4,4'-DDE	**380**	**10**	**40**
4,4'-DDT	**1200**	**30**	**200**
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	83	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 3-5
CAS LAB NO: 97071216
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/08/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	83	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 4-1
CAS LAB NO: 97071217
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/09/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	**4.8**	**1**	**4**
4,4'-DDT	**16**	**1**	**7**
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	63	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 4-4
CAS LAB NO: 97071218
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/09/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	**9.1**	**1**	**5**
4,4'-DDE	**11**	**1**	**4**
4,4'-DDT	**38**	**1**	**7**
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	54	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 5-1
CAS LAB NO: 97071219
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/08/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	84	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RL 5-5
CAS LAB NO: 97071220
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/09/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	**5.3**	**1**	**4**
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	82	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RWOH1-0.5
CAS LAB NO: 97071221
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	87	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RWOH1-1.5
CAS LAB NO: 97071222
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	88	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RWOH2-0.5
CAS LAB NO: 97071223
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	77	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RWOH2-1.5
CAS LAB NO: 97071224
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	94	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
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Client: Trak Env.
Sample ID: RWOL1-0.5
CAS LAB NO: 97071225
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	**13**	**1**	**4**
4,4'-DDT	**9.7**	**1**	**7**
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	88	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RWOL1-1.5
CAS LAB NO: 97071226
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	**18**	**1**	**4**
4,4'-DDT	**16**	**1**	**7**
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	90	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RWOL2-0.5
CAS LAB NO: 97071227
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	**4.9**	**1**	**4**
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	74	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: RWOL2-1.5
CAS LAB NO: 97071228
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/06/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	95	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: HA4A-0.5
CAS LAB NO: 97071229
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/07/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	**16**	**1**	**7**
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	96	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: HA4A-1.5
CAS LAB NO: 97071230
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/07/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
2,4,5,6-Tetrachloro-meta-xylene	102	57-133%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: HA5A-0.5
CAS LAB NO: 97071231
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/07/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	97	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: HA5A-1.5
CAS LAB NO: 97071232
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/07/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	76	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: HA6A-0.5
CAS LAB NO: 97071233
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/07/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	85	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: HA6A-1.5
CAS LAB NO: 97071234
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/07/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
2,4,5,6-Tetrachloro-meta-xylene	93	57-133%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: BWHA1-5
CAS LAB NO: 97071235
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/07/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	89	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: BWHA2-3.5
CAS LAB NO: 97071236
Date Received: 5/02/97
Date Sampled: 5/01/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: Soil
Date Extracted: 5/07/97

ORGANOCHLORINE PESTICIDES
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	91	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: Method Blank
CAS LAB NO: 970712-MB
Date Extracted: 5/06/97

Date Analyzed: 5/07/97
Analyst: LA
Sample Matrix: MB for Solid

METHOD BLANK ANALYSIS
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	95	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Sample ID: Method Blank
CAS LAB NO: 970712-MB
Date Extracted: 5/07/97

Date Analyzed: 5/08/97
Analyst: LA
Sample Matrix: MB for Solid

METHOD BLANK ANALYSIS
EPA Method 8080

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg
Aldrin	BQL	1	6
alpha-BHC	BQL	1	3
beta-BHC	BQL	1	3
delta-BHC	BQL	1	3
gamma-BHC	BQL	1	4
4,4'-DDD	BQL	1	5
4,4'-DDE	BQL	1	4
4,4'-DDT	BQL	1	7
Dieldrin	BQL	1	3
Endosulfan I	BQL	1	3
Endosulfan II	BQL	1	3
Edosulfan sulfate	BQL	1	5
Endrin	BQL	1	5
Endrin aldehyde	BQL	1	3
Heptachlor	BQL	1	3
Heptachlor epoxide	BQL	1	4
Methoxychlor	BQL	1	8
Chlordane	BQL	1	10
Toxaphene	BQL	1	60

SURROGATE RECOVERY

Surrogate	% Recovery	Control Limits
Dibutylchlorendate	85	51-129%

BQL: Below Practical Quantitation Limit
PQL: Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env. Analyst: NHA
Lab ID: 970712 Date Received: 5/ 2/97
Matrix: Soil

TOTAL PETROLEUM HYDROCARBONS
EPA METHOD 8015m

Compound	Concentration mg/Kg		Dilution Factor	PQL mg/Kg	Surrogate % Rec.
CAS Lab #: 97071209			**Date Extracted:**	**5/ 5/97**	
Client ID: FST-EX-SW1.5			**Date Analyzed:**	**5/ 5/97**	
TPH - (C4 - C12)	BQL		1.0	0.5	--
TPH - (C13 - C22)	BQL		1.0	10	85
TPH - (C23+)	BQL				
CAS Lab #: 97071210			**Date Extracted:**	**5/ 5/97**	
Client ID: FST-EX-B3.0			**Date Analyzed:**	**5/ 5/97**	
TPH - (C4 - C12)	BQL		1.0	0.5	--
TPH - (C13 - C22)	BQL		1.0	10	80
TPH - (C23+)	BQL				
CAS Lab #: 97071211			**Date Extracted:**	**5/ 5/97**	
Client ID: RL 1-1			**Date Analyzed:**	**5/ 5/97**	
TPH - (C4 - C12)	BQL		1.0	0.5	--
TPH - (C13 - C22)	BQL		1.0	10	74
TPH - (C23+)	BQL				

Surrogate: n-Undecane
Surrogate Control Limits: 55 - 123 %
PQL: Practical Quantitation Limit
BQL: Below Practical Quantitation Limit

N. Abaci
Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Lab ID: 970712
Matrix: Soil

Analyst: NHA
Date Received: 5/ 2/97

TOTAL PETROLEUM HYDROCARBONS
EPA METHOD 8015m

Compound	Concentration mg/Kg	Dilution Factor	PQL mg/Kg	Surrogate % Rec.
CAS Lab #: 97071212		**Date Extracted:**	**5/ 5/97**	
Client ID: RL 1-5		**Date Analyzed:**	**5/ 6/97**	
TPH - (C4 - C12)	BQL	1.0	0.5	--
TPH - (C13 - C22)	22	1.0	10	56
TPH - (C23+)	230			
CAS Lab #: 97071213		**Date Extracted:**	**5/ 5/97**	
Client ID: RL 2-1		**Date Analyzed:**	**5/ 5/97**	
TPH - (C4 - C12)	BQL	1.0	0.5	--
TPH - (C13 - C22)	BQL	1.0	10	69
TPH - (C23+)	BQL			
CAS Lab #: 97071214		**Date Extracted:**	**5/ 5/97**	
Client ID: RL 2-5		**Date Analyzed:**	**5/ 5/97**	
TPH - (C4 - C12)	BQL	1.0	0.5	--
TPH - (C13 - C22)	BQL	1.0	10	79
TPH - (C23+)	BQL			

Surrogate: n-Undecane
Surrogate Control Limits: 55 - 123 %
PQL: Practical Quantitation Limit
BQL: Below Practical Quantitation Limit

N. Abad
Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Lab ID: 970712
Matrix: Soil

Analyst: NHA
Date Received: 5/ 2/97

TOTAL PETROLEUM HYDROCARBONS
EPA METHOD 8015m

Compound	Concentration mg/Kg		Dilution Factor	PQL mg/Kg	Surrogate % Rec.
CAS Lab #: 97071215			**Date Extracted:**	**5/ 5/97**	
Client ID: RL 3-1			**Date Analyzed:**	**5/ 6/97**	
TPH - (C4 - C12)		BQL	1.0	0.5	--
TPH - (C13 - C22)		BQL	1.0	10	74
TPH - (C23+)		39			
CAS Lab #: 97071216			**Date Extracted:**	**5/ 5/97**	
Client ID: RL 3-5			**Date Analyzed:**	**5/ 6/97**	
TPH - (C4 - C12)		BQL	1.0	0.5	--
TPH - (C13 - C22)		BQL	1.0	10	81
TPH - (C23+)		BQL			
CAS Lab #: 97071217			**Date Extracted:**	**5/ 5/97**	
Client ID: RL 4-1			**Date Analyzed:**	**5/ 7/97**	
TPH - (C4 - C12)		BQL	1.0	0.5	--
TPH - (C13 - C22)		22	1.0	10	36*
TPH - (C23+)		130			

* Low recovery due to matrix interference.
Surrogate: n-Undecane
Surrogate Control Limits: 55 - 123 %
PQL: Practical Quantitation Limit
BQL: Below Practical Quantitation Limit

N. Abad
Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env. Analyst: NHA
Lab ID: 970712 Date Received: 5/ 2/97
Matrix: Soil

TOTAL PETROLEUM HYDROCARBONS
EPA METHOD 8015m

Compound	Concentration mg/Kg		Dilution Factor	PQL mg/Kg	Surrogate % Rec.
CAS Lab #: 97071218			**Date Extracted:**	**5/ 5/97**	
Client ID: RL 4-4			**Date Analyzed:**	**5/ 6/97**	
TPH - (C4 - C12)		BQL	1.0	0.5	--
TPH - (C13 - C22)		BQL	1.0	10	80
TPH - (C23+)		26			
CAS Lab #: 97071219			**Date Extracted:**	**5/ 5/97**	
Client ID: RL 5-1			**Date Analyzed:**	**5/ 6/97**	
TPH - (C4 - C12)		BQL	1.0	0.5	--
TPH - (C13 - C22)		BQL	1.0	10	81
TPH - (C23+)		BQL			
CAS Lab #: 97071220			**Date Extracted:**	**5/ 5/97**	
Client ID: RL 5-5			**Date Analyzed:**	**5/ 5/97**	
TPH - (C4 - C12)		BQL	1.0	0.5	--
TPH - (C13 - C22)		BQL	1.0	10	76
TPH - (C23+)		BQL			

Surrogate: n-Undecane
Surrogate Control Limits: 55 - 123 %
PQL: Practical Quantitation Limit
BQL: Below Practical Quantitation Limit

N. Abac
Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env. Analyst: NHA
Lab ID: 970712 Date Received: 5/ 2/97
Matrix: Soil

TOTAL PETROLEUM HYDROCARBONS
EPA METHOD 8015m

Compound	Concentration mg/Kg	Dilution Factor	PQL mg/Kg	Surrogate % Rec.
CAS Lab #: 970712-MB		**Date Extracted:**	**5/ 5/97**	
Client ID: Method Blank		**Date Analyzed:**	**5/ 5/97**	
TPH - (C4 - C12)	BQL	1.0	0.5	--
TPH - (C13 - C22)	BQL	1.0	10	81
TPH - (C23+)	BQL			

Surrogate: n-Undecane
Surrogate Control Limits: 55 - 123 %
PQL: Practical Quantitation Limit
BQL: Below Practical Quantitation Limit

N. Abar
Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env. Analyst: J.C.
Lab ID: 970712 Date Received: 5/ 2/97
Matrix: Soil

AROMATIC VOLATILE COMPOUNDS - EPA Method 8020

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg	Surrogate Rec. (%)
CAS Lab #: 97071209		**Date Analyzed: 5/ 2/97**		
Sample ID: FST-EX-SW1.5				
Benzene	BQL	1	5	--
Toluene	BQL	1	5	--
Ethylbenzene	BQL	1	5	--
Xylenes	BQL	1	10	--
4-Bromofluorobenzene (Surrogate)				95
CAS Lab #: 97071210		**Date Analyzed: 5/ 2/97**		
Sample ID: FST-EX-B3.0				
Benzene	BQL	1	5	--
Toluene	BQL	1	5	--
Ethylbenzene	BQL	1	5	--
Xylenes	BQL	1	10	--
4-Bromofluorobenzene (Surrogate)				98

Surrogate Control Limits: 81 - 111%
PQL: Practical Quantitation Limit
BQL: Below Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services INC. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env. Analyst: J.C.
Lab ID: 970712 Date Received: 5/ 2/97
Matrix: Soil

AROMATIC VOLATILE COMPOUNDS - EPA Method 8020

Compound	Concentration ug/Kg	Dilution Factor	PQL ug/Kg	Surrogate Rec. (%)
CAS Lab #: 970712-MB		**Date Analyzed: 5/ 2/97**		
Sample ID: Method Blank				
Benzene	BQL	1	5	--
Toluene	BQL	1	5	--
Ethylbenzene	BQL	1	5	--
Xylenes	BQL	1	10	--
4-Bromofluorobenzene (Surrogate)				101

Surrogate Control Limits: 81 - 111%
PQL: Practical Quantitation Limit
BQL: Below Practical Quantitation Limit

Principal Analyst

CAPCO Analytical Services, Inc.

Capco Analytical Services Inc. (CAS)
1536 Eastman Avenue, Suite B
Ventura CA 93003
(805) 644-1095

Client: Trak Env.
Lab ID: 970712
Date Received: 5/ 2/97

Sample Matrix: Soil
Date Sampled: 5/ 1/97

TOTAL LEAD ANALYSIS
EPA Method 7421

CAS Lab#	Sample ID	RESULT Pb (mg/Kg)	Date Analyzed	Analyst
97071201	TCHA1-0.5	6.4	5/05/97	C.H.
97071202	TCHA1-1.5	5.1	5/05/97	C.H.
97071203	TCHA2-0.5	33	5/05/97	C.H.
97071204	TCHA2-1.5	7.4	5/05/97	C.H.
97071205	TCHA3-0.5	5.4	5/05/97	C.H.
97071206	TCHA3-1.5	5.6	5/05/97	C.H.
97071207	SSHA1-3.5	4.8	5/05/97	C.H.
97071208	SSHA2-2.5	4.6	5/05/97	C.H.
97071209	FST-EX-SW1.5	3.8	5/05/97	C.H.
97071210	FST-EX-B3.0	3.7	5/05/97	C.H.
97071221	RWOH1-0.5	7.4	5/05/97	C.H.
97071222	RWOH1-1.5	9.0	5/05/97	C.H.
97071223	RWOH2-0.5	8.7	5/05/97	C.H.
97071224	RWOH2-1.5	7.6	5/05/97	C.H.
97071225	RWOL1-0.5	5.7	5/05/97	C.H.
97071226	RWOL1-1.5	6.4	5/05/97	C.H.
97071227	RWOL2-0.5	5.5	5/05/97	C.H.
97071228	RWOL2-1.5	5.2	5/05/97	C.H.
97071235	BWHA1-5	5.1	5/05/97	C.H.
97071236	BWHA2-3.5	2.8	5/05/97	C.H.
970712-MB	Method Blank	BQL	5/05/97	C.H.
970712-MB	Method Blank	BQL	5/05/97	C.H.

PQL: Practical Quantitation Limit
BQL: Below Practical Quantitation Limit
PQL for Lead: 0.6 mg/Kg

Diane Klionsky
Principal Analyst

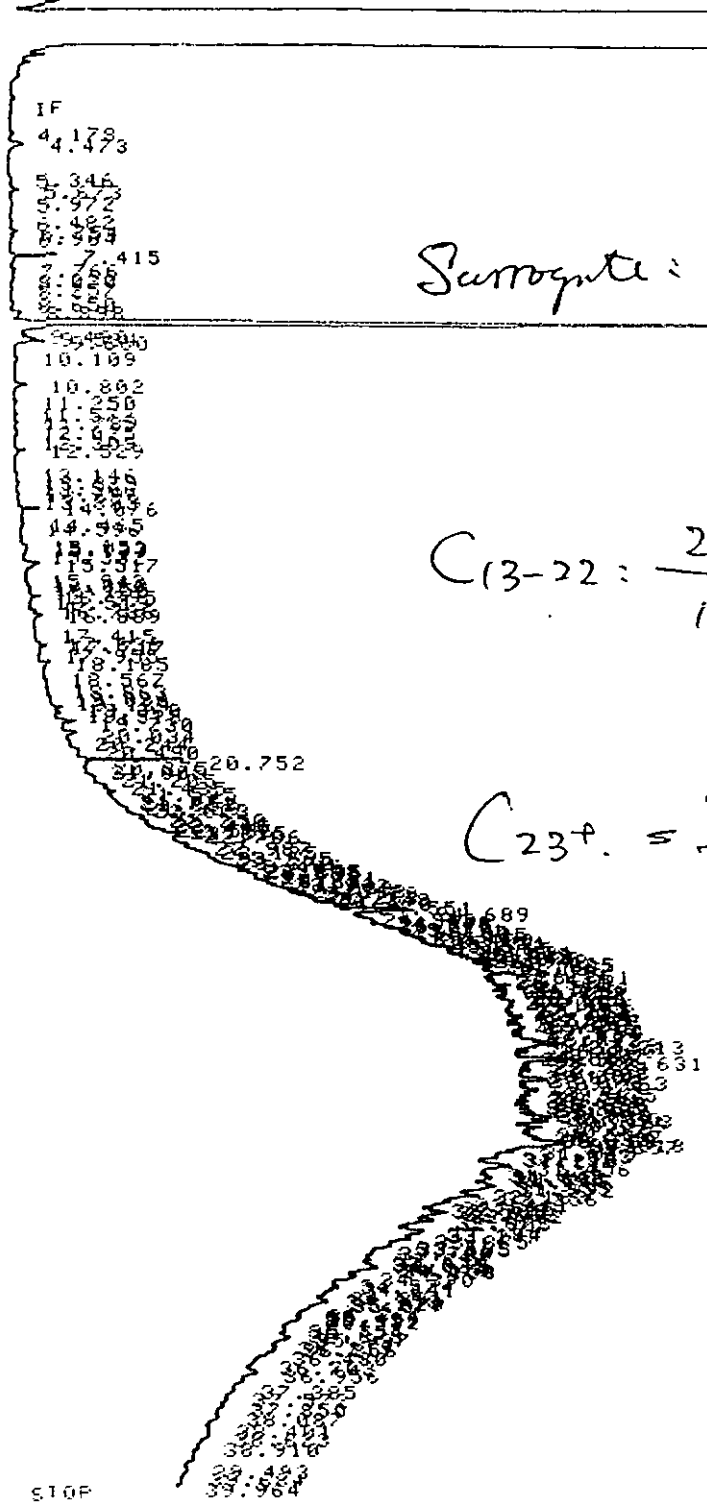
CAPCO Analytical Services, Inc.

RUN # 5258 MAY 6, 1997 03:14:39

START

9707/2-12

(RL 1-5) 1X



$$\text{Surrogate} = \frac{30624}{2746} \times \frac{5\text{ml}}{10000\text{ng}} \times 100 = 5$$

$$C_{13-22} = \frac{28490}{1288} \times \frac{5\text{ml}}{50.01\text{g}} = 22\ \text{mg/K}$$

$$C_{23+} = \frac{2973913 \times 5}{1288 \times 50} \times 1 = 230\ \text{PP}$$

~~See Rerun~~

~~@ 2X~~

per 5/8/97

RUN# 5258 MAY 6, 1997 03:14:39

SAMPLE# 22

FIG#1 8015M mP-1

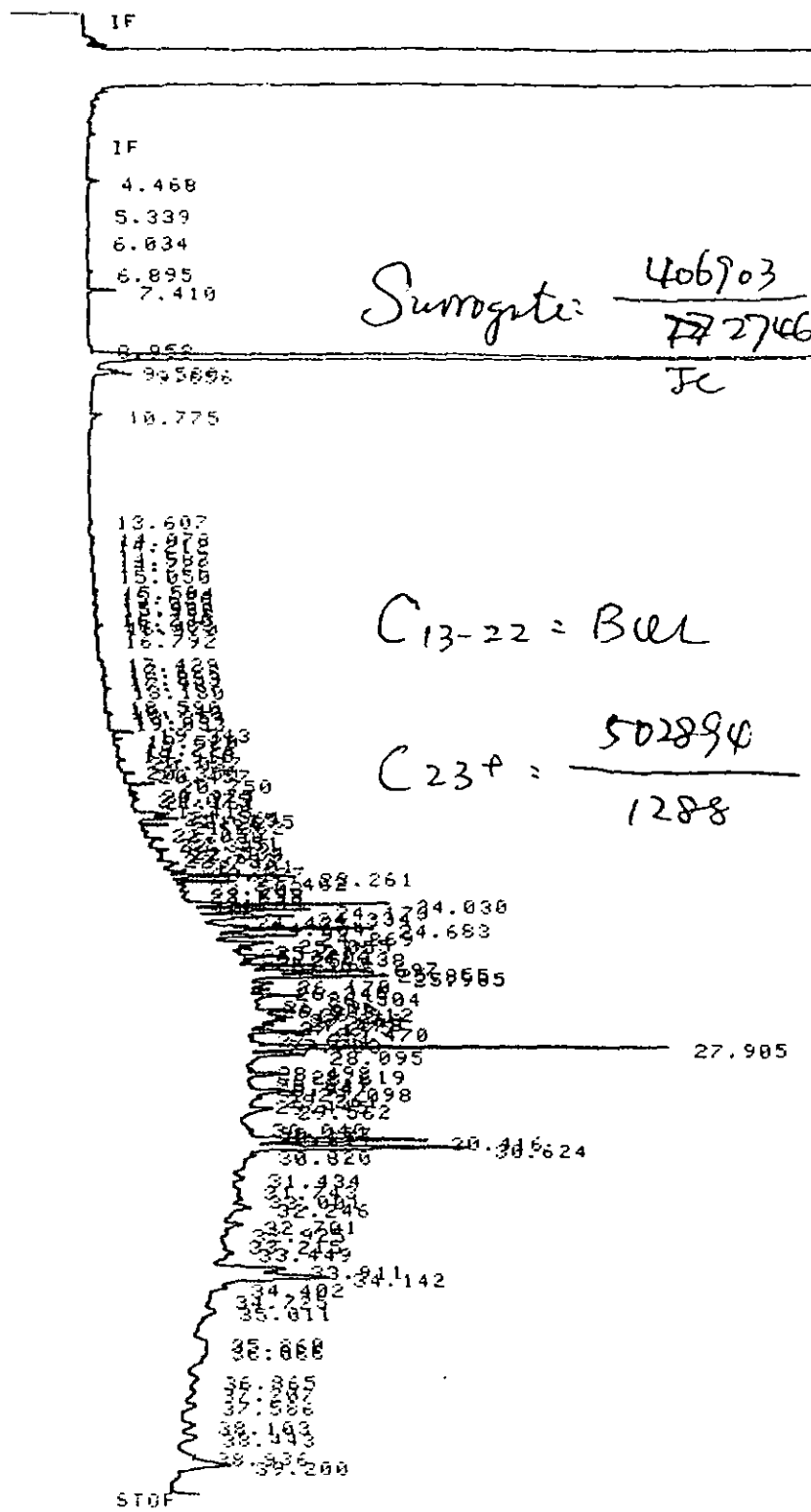
HEIGHT%

RT	HEIGHT	TYPE	WIDTH	HEIGHT%
4.178	354	VV	.112	.000989

9707125
(RL-3-1)

RUN # 5256 MAY 6, 1997 01:45:21

START



Surrogate: $\frac{406903}{\text{~~2746~~}\ \text{Ic}} \times \frac{5\text{ml}}{1000\text{mg}} \times 100 = 74\%$

$C_{13\text{-}22} = \text{Bdl}$

$C_{23+} = \frac{502894}{1288} \times \frac{5\text{ml}}{50.0\text{g}} = 39\ \text{mg/kg}$

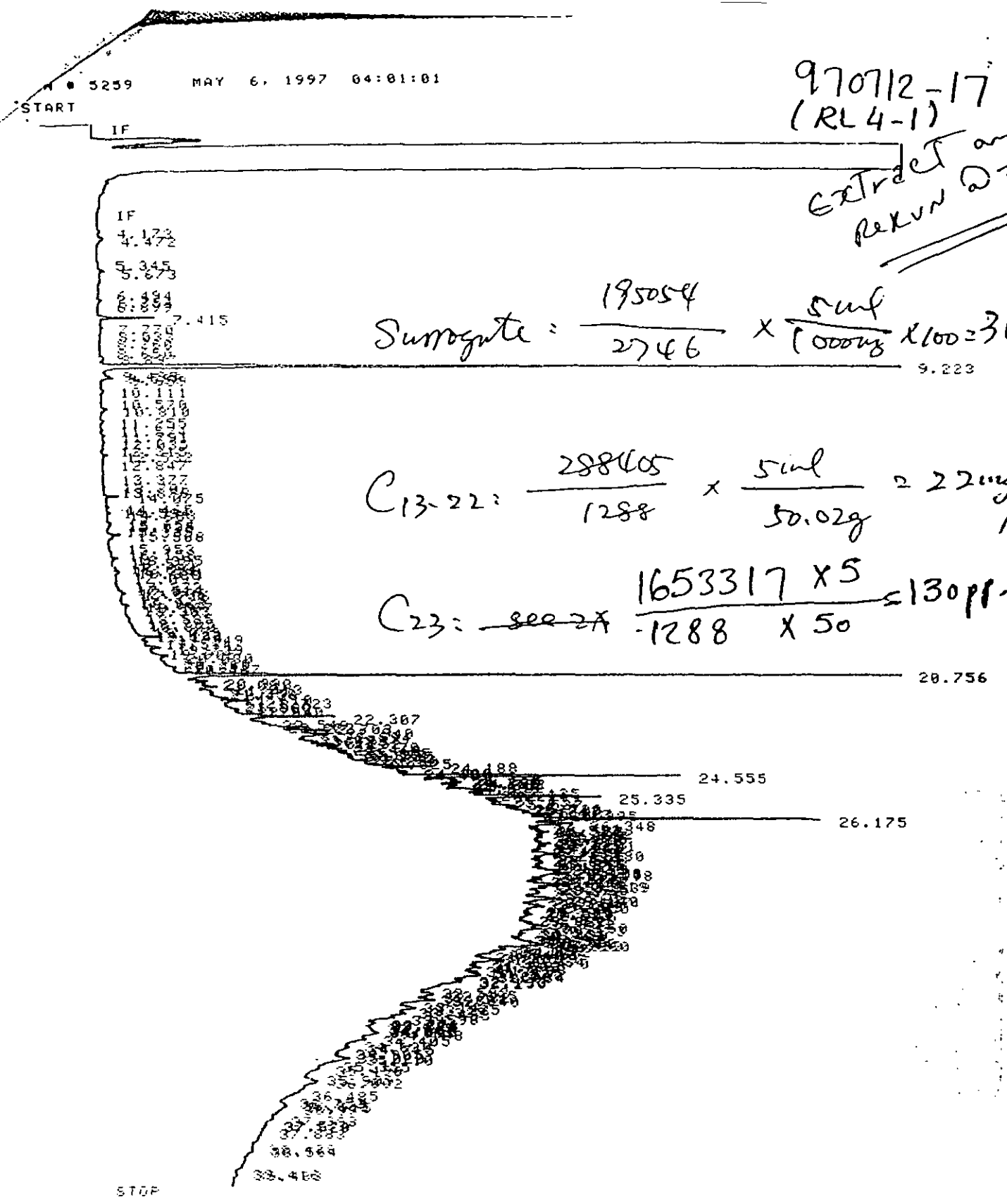
RUN# 5256 MAY 6, 1997 01:45:31

SAMPLE# 38

FID#1 30i5m HP-1

HEIGHT%

RT	HEIGHT	TYPE	WIDTH	HEIGHT%
4.468	713	FF	.102	.36993
5.339	364	FV	.099	.18896



970712-17
(RL4-1)

Extract a
Rerun @

$$\text{Surrogate} = \frac{195054}{2746} \times \frac{5\text{ml}}{10000\text{ug}} \times 100 = 3$$

$$C_{13\text{-}22} = \frac{288405}{1288} \times \frac{5\text{ml}}{50.02\text{g}} = 22\text{ug}$$

$$C_{23} = \text{see 2A} \quad \frac{1653317 \times 5}{1288 \times 50} = 130$$

FOR# 5259 MAY 6, 1997 04:01:01

SAMPLE# 23

FIG#1 8015M HP-1

HEIGHT%

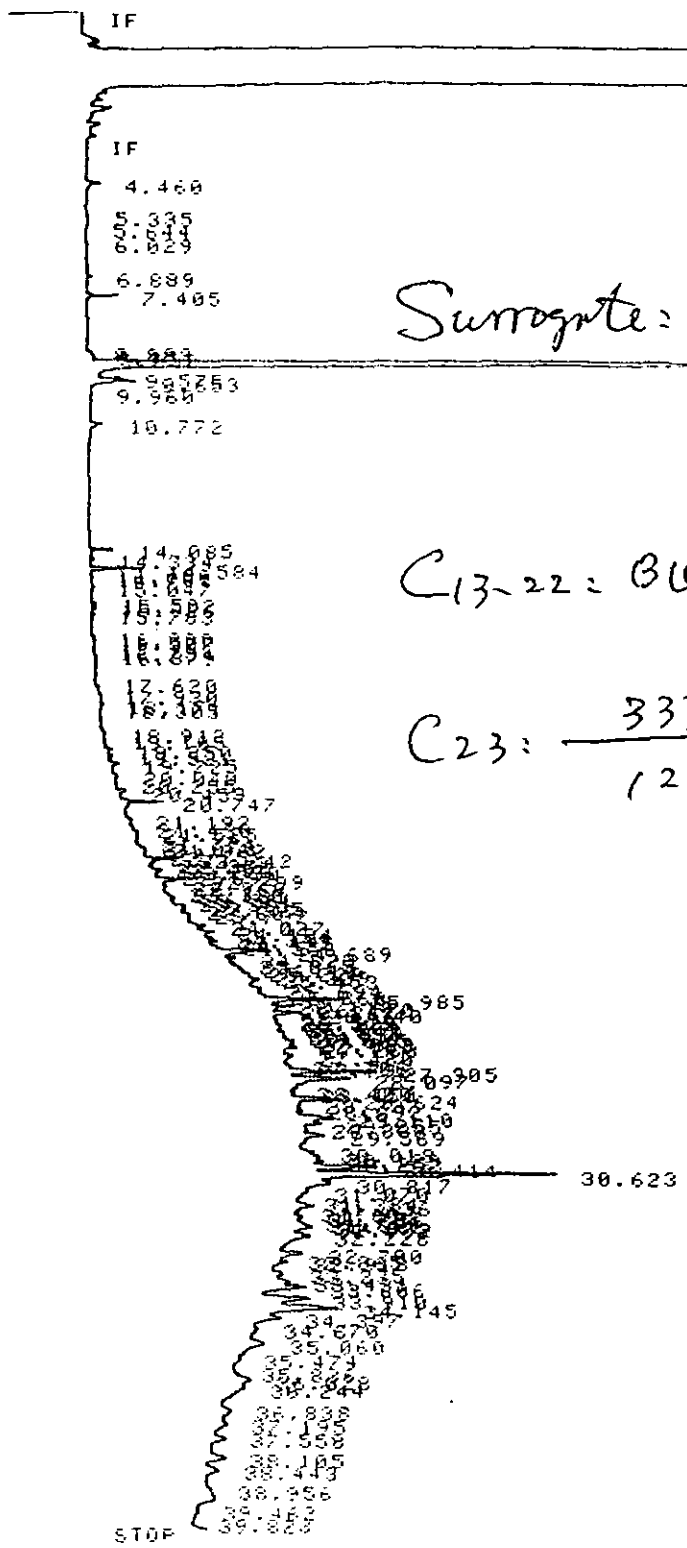
RT HEIGHT TYPE DIST HEIGHT%

RUN # 5255 MAY 6, 1997 01:00:41

START

970712-18

(RL 4-4)



Surrogate: $\frac{43741}{2746} \times \frac{5ml}{1000mg} \times 1002 = 80\%$

C_{13-22}: Blk

$C_{23}: \frac{333000}{1288} \times \frac{5ml}{50.00g} = 26 mg/kg$

RUN# 5255 MAY 6, 1997 01:00:41

SAMPLE# 19

FID#1 50150 mf=1

HEIGHT%

PT	HEIGHT	TYPE	WIDTH	HEIGHT%
4.460	[illegible]	PV	.103	.10094
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

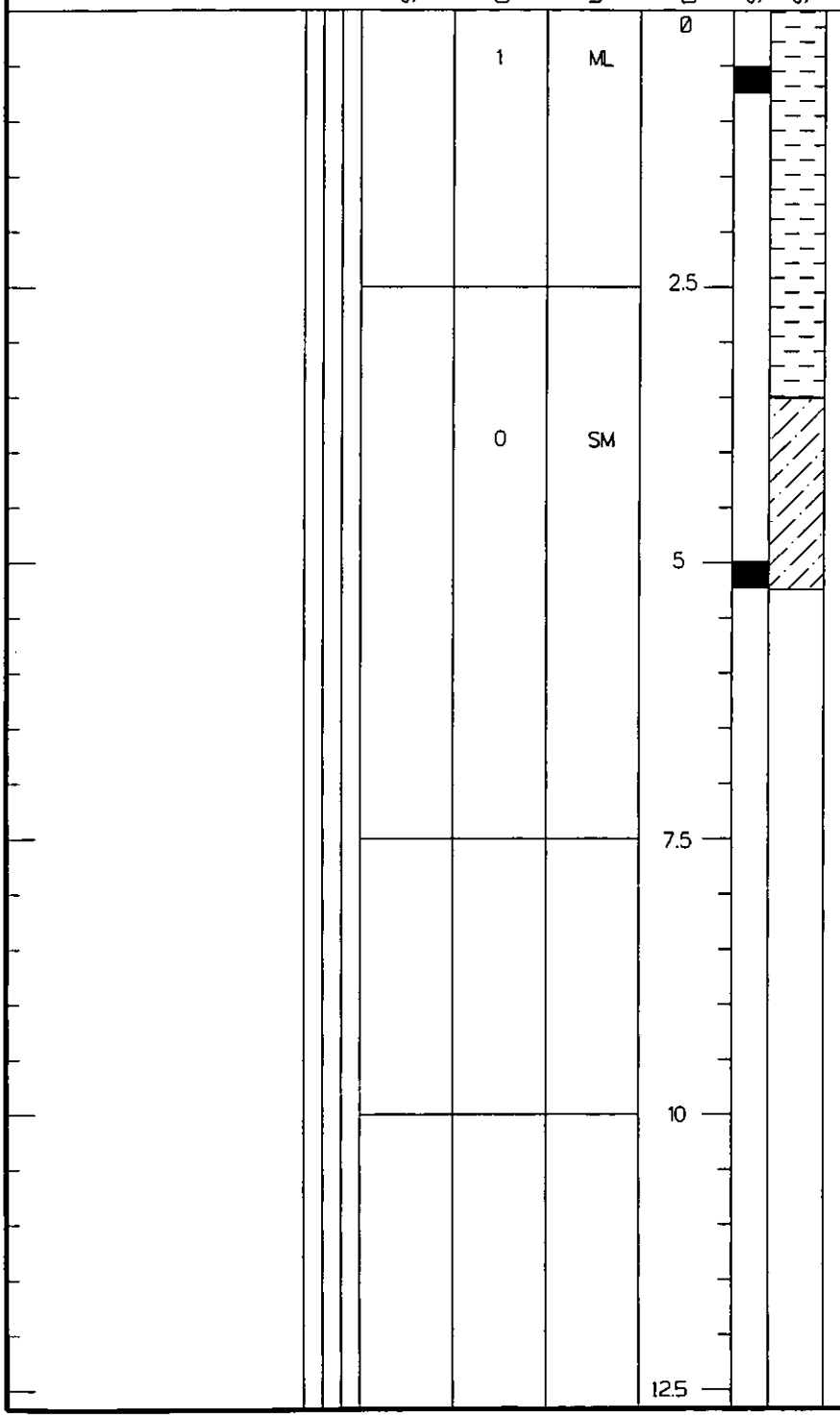
APPENDIX D

SOIL BOREHOLE LOGS

TRAK Environmental Group

4125 Market Street, # 19, Ventura, CA 93003

LOG OF BORING RL-1



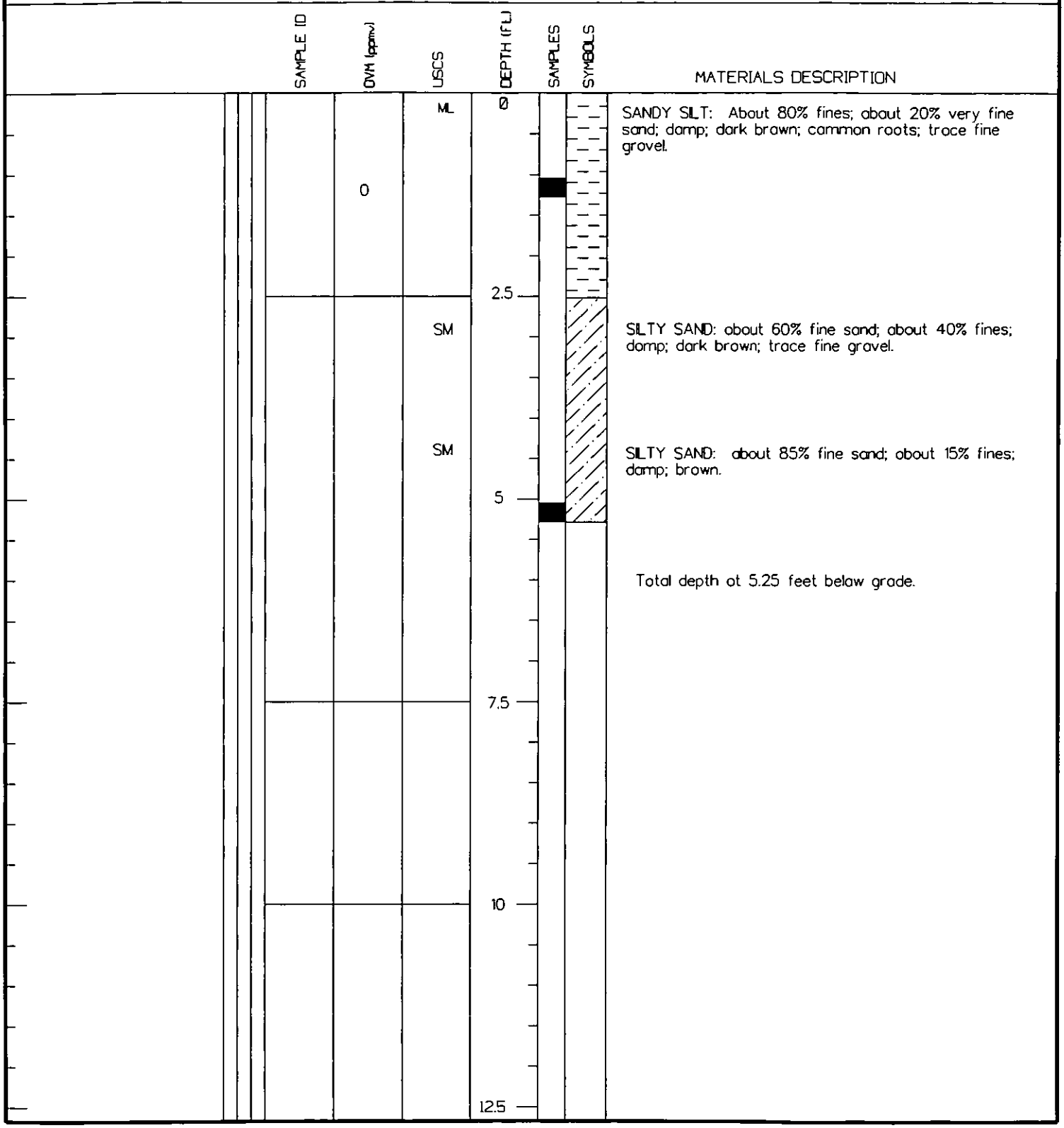
OVM (ppmv)	USCS	MATERIALS DESCRIPTION
1	ML	SANDY SILT: about 80% fines; about 20% very fine sand; damp; brown; roots common; trace fine gravel.
0	SM	SANDY SILT: about 60% fine sond; about 40% fines; Damp; brown; roots common; trace fine gravel.
		Total depth ot 5.25 feet below grode.

PROJECT Rincon Del Mar Ranch	DRILLING COMPANY TRAK
LOCATION Ventura County	DATE DRILLED 05-01-97
JOB NUMBER 366	SURFACE ELEVATION
GEOLOGIST Jeff Johnson	TOTAL DEPTH OF HOLE 5.25 Feet
DRILL RIG Hond Auger	WATER LEVEL Not Encountered

TRAK Environmental Group

4125 Market Street, # 19, Ventura, CA 93003

LOG OF BORING RL-2

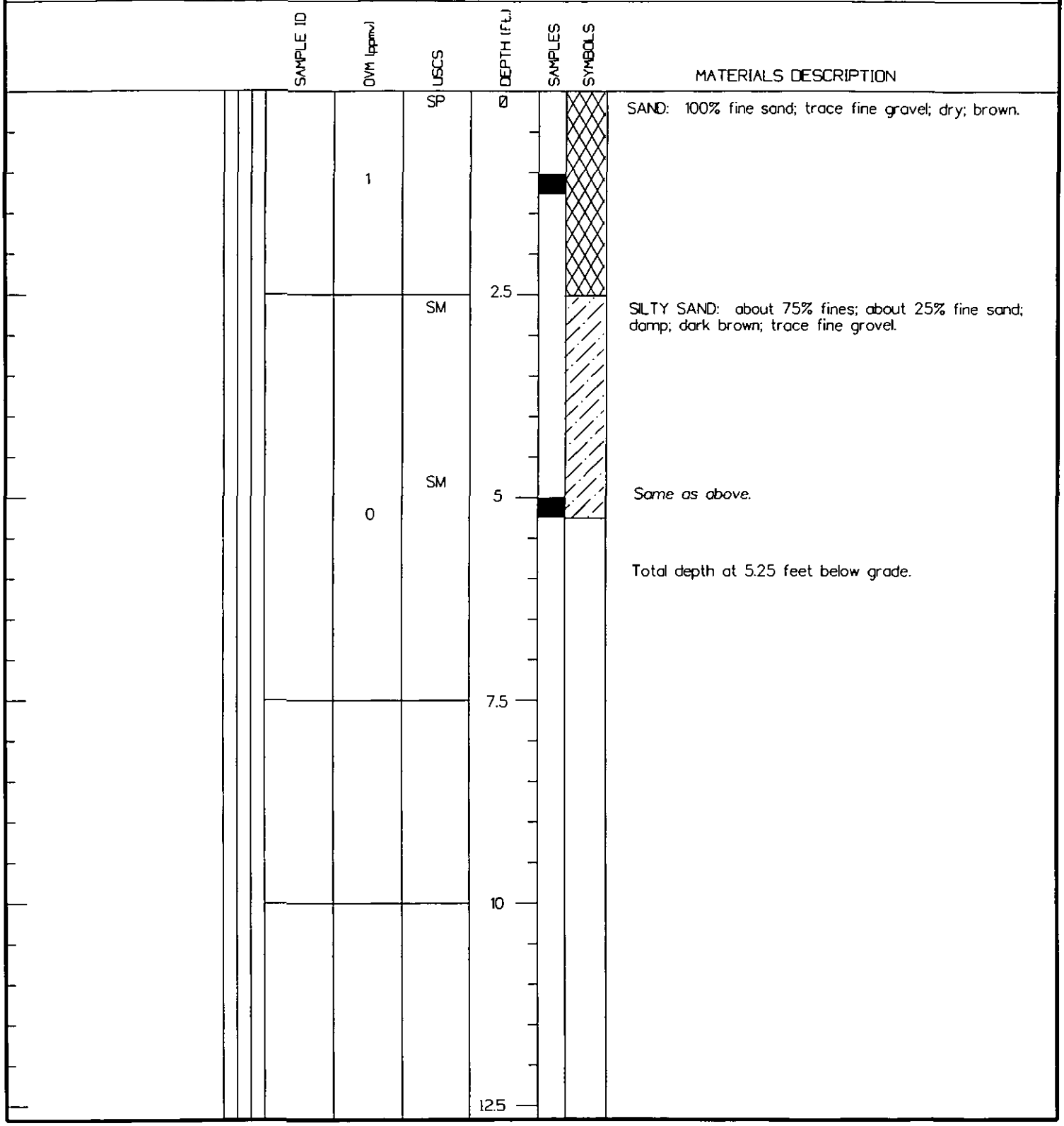


PROJECT Rincon Del Mar Ranch	DRILLING COMPANY TRAK
LOCATION Ventura County	DATE DRILLED 05-01-97
JOB NUMBER 366	SURFACE ELEVATION
GEOLOGIST Jeff Johnson	TOTAL DEPTH OF HOLE 5.25 Feet
DRILL RIG Hand Auger	WATER LEVEL Not Encountered

TRAK Environmental Group

4125 Market Street, # 19, Ventura, CA 93003

LOG OF BORING RL-3

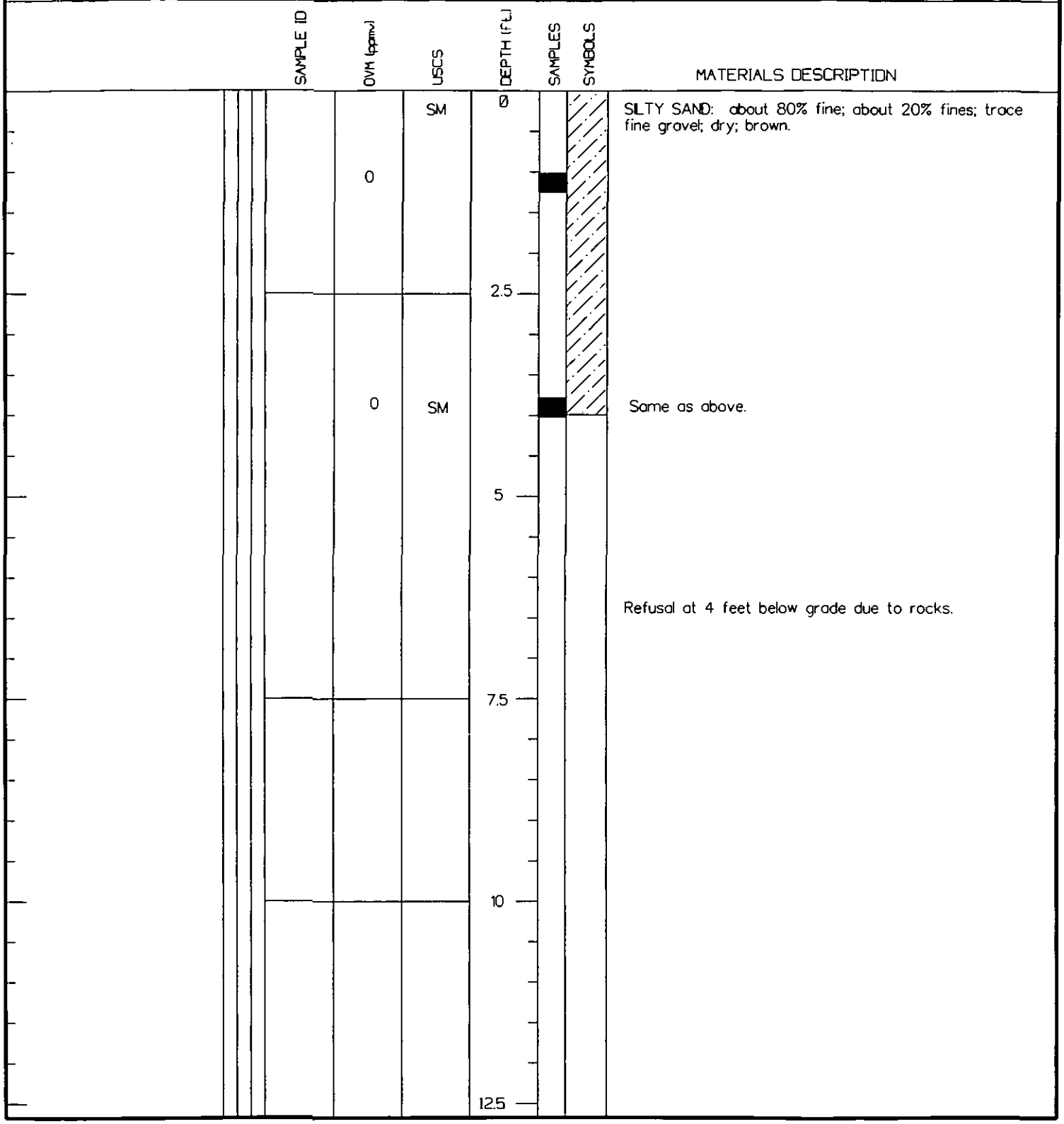


PROJECT Rincon Del Mar Ranch	DRILLING COMPANY TRAK
LOCATION Ventura County	DATE DRILLED 05-01-97
JOB NUMBER 366	SURFACE ELEVATION
GEOLOGIST Jeff Johnson	TOTAL DEPTH OF HOLE 5.25 Feet
DRILL RIG Hand Auger	WATER LEVEL Not Encountered

TRAK Environmental Group

4125 Market Street, # 19, Ventura, CA 93003

LOG OF BORING RL-4

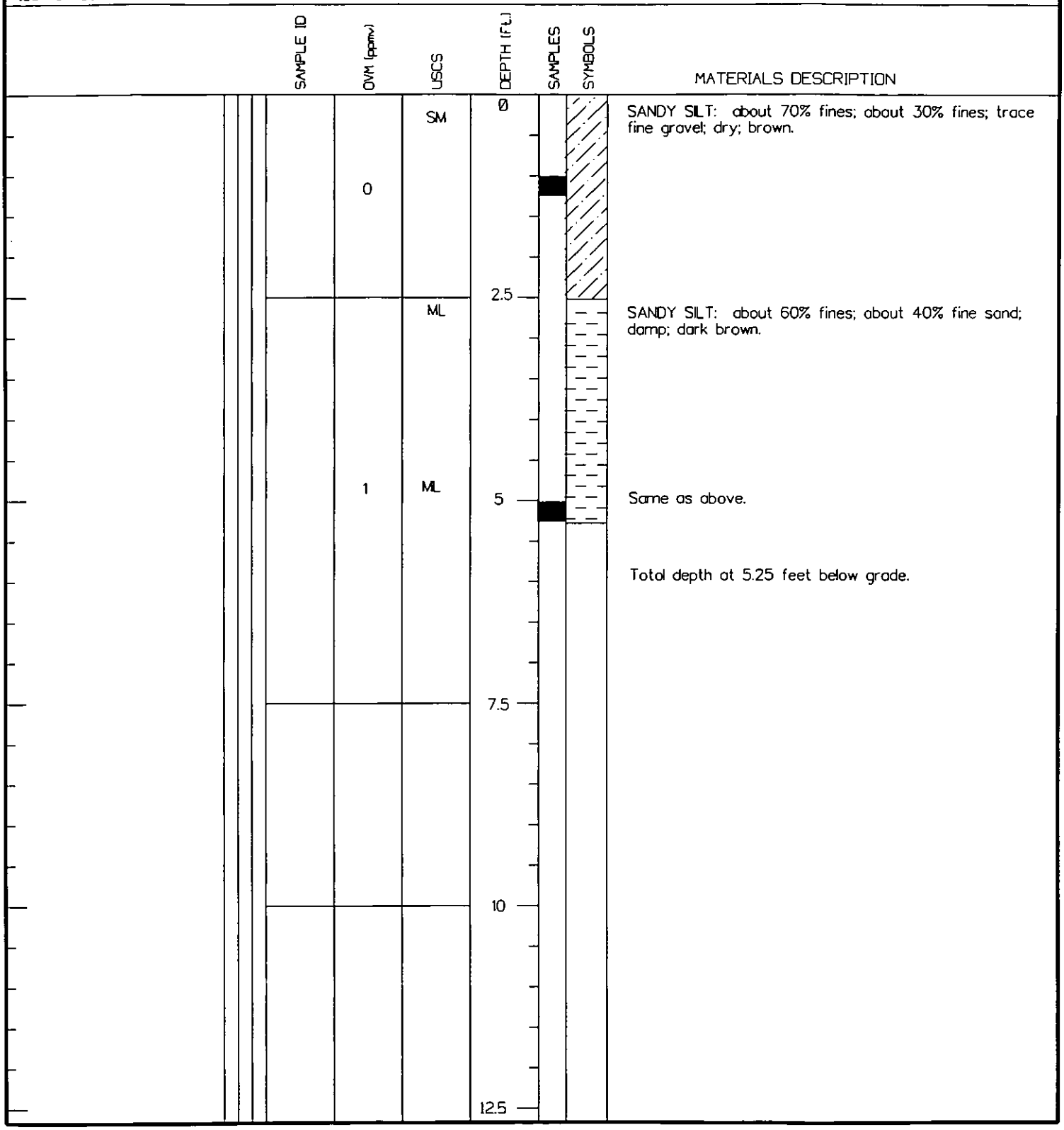


PROJECT Rincon Del Mar Ranch	DRILLING COMPANY TRAK
LOCATION Ventura County	DATE DRILLED 05-01-97
JOB NUMBER 366	SURFACE ELEVATION
GEOLOGIST Jeff Johnson	TOTAL DEPTH OF HOLE 4 Feet
DRILL RIG Hand Auger	WATER LEVEL Not Encountered

TRAK Environmental Group

4125 Market Street, # 19, Ventura, CA 93003

LOG OF BORING RL-5



PROJECT Rincon Del Mar Ranch	DRILLING COMPANY TRAK
LOCATION Ventura County	DATE DRILLED 05-01-97
JOB NUMBER 366	SURFACE ELEVATION
GEOLOGIST Jeff Johnson	TOTAL DEPTH OF HOLE 5.25 Feet
DRILL RIG Hand Auger	WATER LEVEL Not Encountered

APPENDIX E

MANIFEST

allwaste

No. 001292

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR

NAME RINCON DEL MAR RANCH

ADDRESS EAST BATES ROAD

EPA I.D NO | | | | N/A | | | |

CITY, STATE, ZIP VENTURA, CA 93002

PHONE NO (805) 963-0669

CONTAINERS No _____ VOLUME _____ WEIGHT _____

TYPE ☐ TANK TRUCK ☐ DUMP TRUCK ☒ DRUMS ☐ CARTONS ☐ OTHER _____

WASTE DESCRIPTION NON HAZARDOUS SOIL GENERATING PROCESS _____

COMPONENTS OF WASTE	PPM	%	COMPONENTS OF WASTE	PPM	%
1 SOIL		99-100 %	5		
2 T.P.H.		0-1 %	6		
3			7		
4			8		

PROPERTIES pH 4-9 ☒ SOLID ☐ LIQUID ☐ SLUDGE ☐ SLURRY ☐ OTHER _____

HANDLING INSTRUCTIONS WEAR APPROPRIATE SAFETY GEAR WHEN HANDLING MATERIAL

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS

Gregory Canova-Parker, Court-Appointed Referee, Santa Barbara County Superior Court Case No. 162707

TYPED OR PRINTED FULL NAME & SIGNATURE

5/28/97
DATE

TRANSPORTER

NAME ALLWASTE OF SOUTHERN CALIFORNIA

EPA I.D NO C|A|D|9|8|1|6|8|5|8|8|6

ADDRESS 2222 E. SEPULVEDA BLVD.

SERVICE ORDER NO _____

CITY, STATE, ZIP CARSON, CA. 90810

PICK UP DATE _____

PHONE NO 310 595-1000

TRUCK, UNIT, I D NO _____

TYPED OR PRINTED FULL NAME & SIGNATURE

DATE

TSD FACILITY

NAME CROSBY & OVERTON

EPA I.D NO. C|A|D|0|2|8|4|0|9|0|1|9

DISPOSAL METHOD

ADDRESS 1630 WEST 17TH STREET

☐ LANDFILL ☐ OTHER _____

CITY, STATE, ZIP LONG BEACH, CA 90813

PROFILE # 17936

PHONE NO 310 432-5445

TYPED OR PRINTED FULL NAME & SIGNATURE

DATE

GEN	OLD/NEW	L	A	TONS	
TRANS		S	B		
C/O		RT/CD		HW/DF NONE	DISCREPANCY

ORIGINAL - TSD F

COUNTY OF VENTURA

ENVIRONMENTAL HEALTH DIVISION

M E M O R A N D U M

TO: Voluntary Cleanup Program File No. 3146549 **DATE:** July 22 1997

SUBJECT: Rincon Del Mar Ranch, Ventura County, California
RECOMMENDATION FOR CLOSURE

This recommendation is accompanied by 20 figures and 2 tables. Table 1, all of the analytical data obtained before this site became a Voluntary Cleanup Program (VCP) project, is in chronological sequence and samples are grouped by area. To force WordPerfect™ to sort correctly, dates on the table are entered as YY/MM/DD. Date changes are indicated by a heavy horizontal line and the first entry of the more recent date being in bold type. The table also provides the number of the figure on which the sample location is shown. Table 2 provides the results of all confirmation sampling done under the VCP program. Since all of the confirmation samples were collected in one day, Table 2 is organized by figure number.

Historical Summary

04/04/94 Phase I Environmental Assessment, done by PHR Consultants, identified the following areas/items of concern:

- 9 above ground storage tanks at various locations on the ranch (5 weed oil, 2 diesel, 1 gasoline, and 1 water).
- 1 former UST at a former service station near the ranch entrance.
- Storage areas for herbicides, pesticides and insecticides.
- 2 former trash dumps.
- Small former crude oil tank farm.
- Cellars for abandoned oil wells.

See Figure 1 for a general layout of the ranch.

06/16/94 PHR took 12 surface samples (S-n) and 12 samples from depths of 1 to 2 feet (SS-n) at the ranch HQ area and took 3 surface samples and 3 samples from 1 to 2 feet in the vicinity of remote weed oil tanks 3 and 4 and in a former refuse dump area. Maximum contaminant concentrations (mg/kg) detected were 52,000 TPH in diesel range, 0.009 benzene, 540 total lead, and 230, 290 and 290 4,4-DDD, 4,4-DDE and 4,4-DDT, respectively. See Figures 3 and 4 for locations and Table 1 for the analytical results.

09/14/94 PHR took a surface sample (SB-1) and drilled boring B-1 in the vicinity of the former UST at the former service station (see Figure 1) and boring B-2 near the weed oil tanks at ranch HQ (see Figure 3). Sample SB-1 contained 41,000 mg/kg TPHd and 57,000 mg/kg TRPH. Sample B-2-5 contained 15,000 mg/kg TPHd and sample B-2-15 contained 20 mg/kg TPHd. All other samples were ND. See Table 1 for complete analytical results.

12/01/94 TRAK Environmental excavated a total of approximately 106 yd^3 of soil from 8 locations in the HQ area and near remote weed oil tanks 3 and 4. Contaminated soil was also removed from the concrete floor in the storage area west of the breezeway and the ranch office. The floor was clean and no additional sampling was necessary. All excavations were backfilled with clean native soil. The maximum contamination detected in the confirmation samples was 40 mg/kg in the TPHd range and 220 mg/kg in $>C_{22}$ range. No BTEX, lead or pesticides were detected. See Figures 5 through 10 and Table 1.

05/02/96 to 05/13/96 TRAK excavated the contaminated soil associated with the above ground diesel storage tanks and the area surrounding sample S-4, north of the diesel tanks. The excavated soil was disposed of and the excavations filled with clean native soil. A total of 30 samples were taken from various places around the ranch, including the excavations, the chlordane storage area, near an abandoned car, a former refuse dump, the former tank farm area, and in the vicinity of 3 former oil wells sites. Maximum contaminant concentrations (mg/kg) detected were 1,400 TPH $>C_{22}$ and 40 total lead. No BTEX or pesticides were detected in the samples analyzed for those compounds. See Figures 3, 5, 11, 12, and 13 for sample locations and Table 1 for analytical results.

06/27/96 and 06/28/96 TRAK drilled 10 hand auger borings (HA-1 - HA-10) and took 21 samples from the dirt floor of the steel shed north of the ranch HQ building. Sample depths ranged from 0.5 to 3.5 feet. The maximum contaminant concentrations (mg/kg) detected were: 570 TPH C_{12}-C_{22}, 28,000 TPH $>C_{22}$, 26.0 4,4-DDD, 1.8 4,4-DDE, and 100 4,4-DDT. See Figure 2 for shed location, Figure 14 for sample locations and Table 1 for analytical results.

07/17/96 TRAK drilled borings PT-5 and PT-6 in the former tank farm area and borings OW-14 and OW-36 near former oil wells #1 and #3. The only contamination detected was 810 mg/kg TPH $>C_{22}$ at 5 feet in OW-14.

09/05/96 TRAK removed approximately 4 yd^3 of contaminated soil from the floor of the steel shed, northeast corner, and took 5 confirmation samples. No hydrocarbons or pesticides were detected in those samples. See Figure 14 for sample locations and Table 1 for analytical results.

Upon completion of this work, only 2 confirmed areas of concern remained; 540 mg/kg total lead in sample S-2 near the former above ground gasoline tank and 130 mg/kg 4,4-DDT in sample S-16 from the refuse dump area. However, Though the sampling had been quite thorough, all normally required analyses were not run and the laboratory used dilution factors greater than 1 for a high percentage of samples due to matrix interference, primarily waste oil. The dilution factors used for EPA Method 8080, used to analyze for pesticides, ranged from 3 to 1,000, possibly masking significant contamination.

12/12/96 Application for the VCP and $1,000 deposit received.

04/03/97 The final Remedial Action Agreement was signed by Mr. D. W. Koepp and the site became a VCP project. All available information regarding work previously done (summarized above) was reviewed and discussed with the consultants to develop a mutually acceptable scope of work.

04/09/97 TRAK submitted a *Sampling and Analysis Workplan*, a site specific *Health and Safety Plan*, and a *QA/QC Plan*.

04/28/97 The VCEHD approved the workplan with several additions and conditions.

05/01/97 To comply with the *Sampling and Analysis Workplan* and conditions imposed by the VCEHD, TRAK drilled and sampled 17 hand auger borings at 8 locations on the ranch, excavated the contaminated soil at the former service station and took confirmation samples from the excavation.

A total of 36 samples were analyzed for the compounds of concern. Appropriate analyses were run on the samples and, in all cases but one, dilution factors were 1. Dilution factors used for DDD, DDE and DDT on sample RL-3 at 1 foot were 10, 10 and 30. All of those analyses yielded positive results so the concentrations noted in Table 2 are correct.

Figures 15 and 16 are index maps showing the general locations of the areas sampled with respect to the ranch. The following paragraphs discuss the results of the work done at each location sampled.

Figure 17 Borings HA-4A, HA-5A and HA-6A, in the floor of the steel shed, to check for pesticides because high dilution factors were used for samples taken during previous investigations. The maximum detected was 0.016 mg/kg 4,4-DDT from HA-4A at 0.5 feet.

Figure 18 Borings BWHA-1 and BWHA-2, in the breezeway, to verify that the elevated levels of total lead identified in previous investigations (410 mg/kg maximum) had been removed and that no pesticides were present (not previously analyzed for). The maximum total lead detected was 5.1 mg/kg. No pesticides were detected.

Borings SSHA-1 and SSHA-2, west of the storage shed near the entrance, to verify that lead and pesticides (not analyzed for in earlier samples) were not present in concentrations of concern. No pesticides were detected and maximum total lead was 4.8 mg/kg.

Borings TCHA-1 and TCHA-2, adjacent to the location of the former above ground fuel tank, to verify that the elevated lead concentration identified by sample S-2 (540 mg/kg) had been removed. Lead concentrations detected in boring samples ranged from 5.1 to 33 mg/kg. Boring TCHA-3, ±30 feet north-northeast of the former fuel tank, to verify that a lead plume was not present. Lead in samples from TCHA-3 was 5.4 and 5.6 mg/kg at 0.5 and 1.5 feet, respectively. Note that the MCL for total lead is 50 mg/kg and the TTLC is 1,000 mg/kg. According to the LARWQCB, 33 mg/kg total lead in an isolated sample is not a cause for concern. Though the sample was not analyzed for soluble lead (VCEHD instructions were to run that analysis only if total lead exceeded 50 mg/kg, or 10X STLC), the LARWQCB contact stated that it was doubtful that 33 mg/kg total lead would contain significant soluble lead and the fact that all other samples were within normal background range made it unlikely that lead posed an unacceptable risk.

Figure 19 Borings RWOL-1, RWOL-2, RWOH-1, and RWOH-2, adjacent to former remote weed oil tanks, to evaluate remaining lead and pesticide concentrations. Total lead concentrations ranged from 5.5 to 9.0 mg/kg, within normal background range. Maximum pesticides detected were 0.018 mg/kg 4,4-DDE and 0.016 mg/kg 4,4-DDT from RWOL-1 at 1.5 feet. These concentrations do not pose an unacceptable health risk.

Excavated ±1 yd^3 of contaminated soil identified by previous sample SB-1 taken from the ground surface at the former service station. In confirmation samples FST-EX-SW1.5 and FST-EX-B3.0, TPH and BTEX were below detection limits and total lead concentrations were 3.8 and 3.7, respectively.

Figure 20 Borings RL-1 through RL-5, in the former trash dump area, to verify that high concentrations of TPH and pesticides were not present (sample S-16 contained 130 mg/kg 4,4-DDT). The maximum TPH detected was 22 mg/kg in the C_{13-22} range and 230 mg/kg in the $=>C_{23}$ range. Maximum pesticides detected were 0.47, 0.38 and 1.2 mg/kg 4,4-DDD, 4,4-DDE and 4,4-DDT, respectively. Those concentrations do not pose an unacceptable health risk.

Summary Depth to groundwater is over 100 feet at this site and is not likely to have been impacted. A conventional RBCA evaluation for soil contamination at this site could not be run because the software does not have the chemicals of concern in its library and we do not have access to the on-line ISIS data base. Consequently, potential threat to health for both residential and industrial scenarios were evaluated using the Preliminary Remediation Goals (PRGs) published by the U.S. EPA Region 9. The results of those evaluations are presented in the following tables.

Residential Scenario Exposure = 16 hrs/day, 350 days/yr, 30 yrs	Total Lead	4,4-DDD	4,4-DDE	4,4-DDT	Cumulative Risk
Maximum in confirmation sample (mg/kg)	33	0.47	0.38	1.2	
PRGs for carcinogens (mg/kg)	NA	1.9	1.3	1.3	
PRGs for non-carcinogens (mg/kg)	400	NA	NA	NA	
Risk [(concentration / PRG) x 10^{-6}]	NA	2.5E-7	2.9E-7	9.2E-7	1.5E-6
Hazard Index (concentration / PRG)	0.083	NA	NA	NA	NA

Industrial Scenario Exposure = 8 hrs/day, 250 days/yr, 25 yrs	Total Lead	4,4-DDD	4,4-DDE	4,4-DDT	Cumulative Risk
Maximum in confirmation sample (mg/kg)	33	0.47	0.38	1.2	
PRGs for carcinogens (mg/kg)	NA	7.9	5.6	5.6	
PRGs for non-carcinogens (mg/kg)	1,000	NA	NA	NA	
Risk [(concentration / PRG) x 10^{-6}]	NA	5.9E-8	6.8E-8	2.1E-7	3.4E-7
Hazard Index (concentration / PRG)	0.033	NA	NA	NA	NA

For the Residential Scenario, the Hazard Index (HI) for lead, a non-carcinogenic element, is well below the acceptable HI of 1.0 so lead is not a problem at this site. For the carcinogens, the risk posed by individual chemicals are all well below the normally acceptable health protective risk of 1.0E-6. The cumulative risk is slightly higher than 1.0E-6. Though the cumulative risk for the residential scenario exceeds the 1.0E-6 target, it is unlikely that any particular individual would be exposed to all of the contaminants for 16 hours per day, 350 days per year, over a period of 30 years, the exposure assumptions used to develop the PRGs.

For the Industrial Scenario, the risk posed by individual chemicals and the cumulative risk are all well below the normally acceptable health protective risk of 1.0E-6.

In view of the rural nature of the site, the wide areal distribution of the low levels of contamination remaining, the low risk, even for a residential site, and the fact that sampling at this site has been unusually thorough, I conclude that no further assessment or remediation is justified and recommend that this case be closed.

Submitted By

Approved By

TABLE 1

Rincon del Mar Ranch - Voluntary Cleanup Project 25-3146549
Results of Assessment Soil Sampling

Sample ID	Date Sampled	Sample Depth	TPH Fuel Fingerprint[1]			Volatile Organic Compounds[2]				Total Lead[3]	Organochlorine Pesticides[4]			
			C_4-C_{12}	C_{13}-C_{22}	$=>C_{23}$	B	T	E	X		4,4'-DDD	4,4'-DDE	4,4'-DDT	Other[5]
See Figure 3 for Sample Locations														
S-1	06/16/94	surface	ND	150	--	ND	ND	ND	ND	16	--	--	--	--
SS-1	06/16/94	2	74	4,300	--	ND	ND	ND	ND	14	--	--	--	--
S-2	06/16/94	surface	ND	40	--	ND	ND	ND	ND	540	--	--	--	--
SS-2	06/16/94	1	ND	ND	--	ND	ND	ND	ND	--	--	--	--	--
SS-3	06/16/94	2	ND	ND	--	ND	ND	ND	ND	--	--	--	--	--
SS-4	06/16/94	1	31	28,000	--	ND	ND	ND	ND	--	--	--	--	--
S-5	06/16/94	surface	ND	230	--	ND	ND	ND	ND	55	--	--	--	--
SS-5	06/16/94	1.5	ND	14	--	ND	ND	ND	ND	39	--	--	--	--
S-6	06/16/94	surface	ND	18	--	ND	ND	ND	ND	13	--	--	--	--
SS-6	06/16/94	2	ND	93	--	ND	ND	ND	ND	--	--	--	--	--
S-7	06/16/94	surface	8.9	52,000	--	ND	0.0061	0.0073	ND	410	--	--	--	--
SS-7	06/16/94	2	ND	360	--	ND	ND	ND	ND	--	--	--	--	--
S-8	06/16/94	surface	ND	310	--	ND	ND	ND	ND	44	--	--	--	--
SS-9	06/16/94	1	ND	14	--	ND	ND	ND	ND	--	--	--	--	--
S-10	06/16/94	surface	ND	450	--	ND	ND	ND	ND	--	--	--	--	--
S-11	06/16/94	surface	ND	--	--	ND	ND	ND	ND	--	--	--	--	--
S-12	06/16/94	surface	ND	9,200	--	ND	ND	ND	ND	--	--	--	--	--
SS-12	06/16/94	1	ND	510	--	0.009	0.011	ND	ND	--	--	--	--	--
S-13	06/16/94	surface	ND	10,000	--	ND	ND	ND	ND	--	--	--	--	--
SS-13	06/16/94	1	ND	330	--	ND	ND	ND	ND	--	--	--	--	--
S-17	06/16/94	surface	ND	9,400	--	0.005	0.0084	ND	ND	--	--	--	--	--
SS-18	06/16/94	1	ND	250	--	ND	ND	ND	ND	--	230	290	290	ND
S-19	06/16/94	surface	ND	210	--	ND	ND	ND	ND	--	--	--	--	--

Superscripts: 1, EPA 8015M; 2, EPA 8020M; 3, EPA 7421; 4, EPA 8080; 5, all other EPA 8080 analytes; 6, Endrin.
ND, not detected. --, not analyzed for. All concentrations are in mg/kg.

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Sample ID	Date Sampled	Sample Depth	TPH Fuel Fingerprint[1]			Volatile Organic Compounds[2]				Total Lead[3]	Organochlorine Pesticides[4]			
			C_4-C_{12}	C_{13}-C_{22}	$=>C_{23}$	B	T	E	X		4,4'-DDD	4,4'-DDE	4,4'-DDT	Other[5]
SS-19	06/16/94	1	ND	ND	--	ND	ND	ND	ND	--	--	--	--	--
D1-2	05/02/96	1.0	--	--	55	--	--	--	--	--	--	--	--	--
D2-2.5	05/02/96	2.5	--	--	83	--	--	--	--	--	--	--	--	--
D3-2.5	05/02/96	2.5	--	--	22	--	--	--	--	--	--	--	--	--
See Figure 4 for Sample Locations														
S-14	06/16/94	surface	ND	290	--	ND	ND	ND	ND	--	--	--	--	--
SS-14	06/16/94	1	ND	460	--	ND	ND	ND	ND	--	--	--	--	--
S-15	06/16/94	surface	6.3	27,000	--	ND	ND	ND	ND	--	--	--	--	--
SS-15	06/16/94	2	ND	300	--	ND	ND	ND	ND	--	--	--	--	--
S-16	06/16/94	surface	ND	32	--	ND	ND	ND	ND	--	20	11	130	15[6]
SS-16	06/16/94	1	ND	18	--	ND	ND	ND	ND	--	11	17	24	20[6]
See Figure 5 for Sample Locations														
FW06-B1.5	12/01/94	1.5	ND	--	--	--	--	--	--	--	--	--	--	--
FW07-B1	12/01/94	1	ND	--	--	--	--	--	--	--	--	--	--	--
CP1-1	05/02/96	1	--	--	--	--	--	--	--	--	ND	ND	ND	ND
CP1-3	05/02/96	3	--	--	--	--	--	--	--	--	ND	ND	ND	ND
See Figure 7 for Sample Locations														
WOS-S1	12/01/94	1	--	--	ND	--	--	--	--	--	--	--	--	--
WOS-S5	12/01/94	5	--	ND	ND	--	--	--	--	ND	--	--	--	--
WOS-S10	12/01/94	10	--	--	ND	--	--	--	--	--	--	--	--	--
WOE-B7	12/01/94	7	--	10	14	--	--	--	--	--	--	--	--	--
WOE-S8	12/01/94	8	--	ND	ND	--	--	--	--	ND	--	--	--	--

Superscripts: 1, EPA 8015M; 2, EPA 8020M; 3, EPA 7421; 4, EPA 8080; 5, all other EPA 8080 analytes; 6, Endrin.
ND, not detected. --, not analyzed for. All concentrations are in mg/kg.

TABLE 1

Rincon del Mar Ranch - Voluntary Cleanup Project 25-3146549
Results of Assessment Soil Sampling

Sample ID	Date Sampled	Sample Depth	TPH Fuel Fingerprint[1]			Volatile Organic Compounds[2]				Total Lead[3]	Organochlorine Pesticides[4]			
			C_6-C_{12}	C_{13}-C_{22}	$=>C_{23}$	B	T	E	X		4,4'-DDD	4,4'-DDE	4,4'-DDT	Other[5]
WOE-S12	12/01/94	12	--	--	11	--	--	--	--	--	--	--	--	--
WON-S5	12/01/94	5	--	--	210	--	--	--	--	--	--	--	--	--
WON-S6	12/01/94	6	--	--	220	--	--	--	--	--	--	--	--	--
WON-S7	12/01/94	7	--	--	ND	--	--	--	--	--	--	--	--	--
WON-S9	12/01/94	9	--	ND	ND	--	--	--	--	ND	--	--	--	--
WOW-S4	12/01/94	4	--	--	ND	--	--	--	--	--	--	--	--	--
WOW-S6	12/01/94	6	--	ND	ND	--	--	--	--	ND	--	--	--	--
WOW-S8	12/01/94	8	--	540	400	--	--	--	--	--	--	--	--	--
WOC-B7	12/01/94	7	--	78	630	--	--	--	--	--	--	--	--	--
WOC-B8	12/01/94	8	--	--	23,000	--	--	--	--	--	--	--	--	--
WOC-B10	12/01/94	10	--	--	78	--	--	--	--	--	--	--	--	--
WOC-B16	12/01/94	16	--	--	28	--	--	--	--	--	--	--	--	--
WOC-B18	12/01/94	18	--	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
See Figure 8 for Sample Locations														
BC-S1.5	12/01/94	1.5	--	ND	--	--	--	--	--	ND	--	--	--	--
BC-B2	12/01/94	2	--	ND	--	--	--	--	--	ND	--	--	--	--
BB-S2	12/01/94	2	--	39	--	--	--	--	--	ND	--	--	--	--
BB-B2	12/01/94	2	--	15	--	--	--	--	--	ND	--	--	--	--
BA-S2	12/01/94	2	--	32	--	--	--	--	--	ND	--	--	--	--
BA-S3	12/01/94	3	--	ND	--	--	--	--	--	--	--	--	--	--
BA-B4	12/01/94	4	--	14	--	--	--	--	--	ND	--	--	--	--
See Figure 9 for Sample Locations														
SSD-B1.5	12/01/94	1.5	--	78	--	--	--	--	--	--	--	--	--	--

Superscripts: 1, EPA 8015M; 2, EPA 8020M; 3, EPA 7421; 4, EPA 8080; 5, all other EPA 8080 analytes; 6, Endrin.
ND, not detected. --, not analyzed for. All concentrations are in mg/kg.

TABLE 1

Rincon del Mar Ranch - Voluntary Cleanup Project 25-3146549
Results of Assessment Soil Sampling

Sample ID	Date Sampled	Sample Depth	TPH Fuel Fingerprint[1]			Volatile Organic Compounds[2]				Total Lead[3]	Organochlorine Pesticides[4]			
			C_4-C_{12}	C_{13}-C_{22}	=> C_{23}	B	T	E	X		Lead[3]	4,4'-DDD	4,4'-DDE	4,4'
SSD-B2.5	12/01/94	2.5	--	ND	--	--	--	--	--	--	--	--	--	--
SSD2-B1.5	12/01/94	1.5	--	ND	--	--	--	--	--	--	--	--	--	--
DS-B1.5	12/01/94	1.5	--	27	--	--	--	--	--	--	--	--	--	--
DS-B2.5	12/01/94	2.5	--	ND	--	--	--	--	--	--	--	--	--	--
See Figure 10 for Sample Locations														
DTW-B1	12/01/94	1	--	100	--	--	--	--	--	ND	--	--	--	--
DTW-B2	12/01/94	2	--	ND	--	--	--	--	--	--	--	--	--	--
DTE-B1	12/01/94	1	--	14	--	--	--	--	--	ND	--	--	--	--
CST-B1	12/01/94	1	--	40	--	--	--	--	--	--	--	--	--	--
SS-B1	12/01/94	1	--	35	--	--	--	--	--	--	--	--	--	--
See Figure 11 for Sample Locations														
R1-5	05/02/96	5	--	--	ND	--	--	--	--	--	--	--	--	--
R2-2	05/02/96	2	--	--	ND	--	--	--	--	12	ND	ND	ND	ND
R3-3	05/02/96	3	--	--	ND	--	--	--	--	4.1	--	--	--	--
R4-3	05/02/96	3	--	--	ND	--	--	--	--	4.9	ND	ND	ND	ND
R5-4	05/02/96	4	--	--	ND	--	--	--	--	3.7	ND	ND	ND	ND
R6-1	05/02/96	1	--	--	48	--	--	--	--	12	ND	ND	ND	ND
C1-1	05/02/96	1	ND	--	ND	ND	ND	ND	ND	13	--	--	--	--
C2-1	05/02/96	1	ND	--	11	ND	ND	ND	ND	40	--	--	--	--
C3-1	05/02/96	1	ND	--	19	ND	ND	ND	ND	--	--	--	--	--
C4-1	05/02/96	1	ND	--	ND	ND	ND	ND	ND	22	--	--	--	--

Superscripts: 1, EPA 8015M; 2, EPA 8020M; 3, EPA 7421; 4, EPA 8080; 5, all other EPA 8080 analytes; 6, Endrin.
ND, not detected. --, not analyzed for. All concentrations are in mg/kg.

TABLE 1

Rincon del Mar Ranch - Voluntary Cleanup Project 25-3146549
Results of Assessment Soil Sampling

Sample ID	Date Sampled	Sample Depth	TPH Fuel Fingerprint[1]			Volatile Organic Compounds[2]				Total Lead[3]	Organochlorine Pesticides[4]			
			C_6-C_{12}	C_{13}-C_{22}	$=>C_{23}$	B	T	E	X		4,4'-DDD	4,4'-DDE	4,4'-DDT	Other[5]
See Figure 12 for Sample Locations														
OW11-3	05/02/96	3	--	--	670	--	--	--	--	--	--	--	--	--
OW12-3	05/02/96	3	--	--	1,400	ND	ND	ND	ND	--	--	--	--	--
OW-13-3	05/02/96	3	--	--	800	--	--	--	--	--	--	--	--	--
OW14-5	05/02/96	5	--	--	810	--	--	--	--	--	--	--	--	--
OW14-10	05/02/96	10	--	--	ND	--	--	--	--	--	--	--	--	--
OW14-20	05/02/96	20	--	--	ND	--	--	--	--	--	--	--	--	--
OW14-40	05/02/96	40	--	--	ND	--	--	--	--	--	--	--	--	--
PT1-3	05/02/96	3	--	--	ND	--	--	--	--	--	--	--	--	--
PT2-3	05/02/96	3	--	--	150	ND	ND	ND	ND	--	--	--	--	--
PT3-3	05/02/96	3	--	--	300	--	--	--	--	--	--	--	--	--
PT4-3	05/02/96	3	--	--	240	--	--	--	--	--	--	--	--	--
PT5-5	05/02/96	5	--	--	ND	--	--	--	--	--	--	--	--	--
PT5-10	05/02/96	10	--	--	ND	--	--	--	--	--	--	--	--	--
PT5-15	05/02/96	15	--	--	ND	--	--	--	--	--	--	--	--	--
PT5-20	05/02/96	20	--	--	ND	--	--	--	--	--	--	--	--	--
PT5-30	05/02/96	30	--	--	ND	--	--	--	--	--	--	--	--	--
PT5-40	05/02/96	40	--	--	ND	--	--	--	--	--	--	--	--	--
PT5-50	05/02/96	50	--	--	ND	--	--	--	--	--	--	--	--	--
PT5-60	05/02/96	60	--	--	ND	--	--	--	--	--	--	--	--	--
PT6-5	05/02/96	5	--	--	ND	--	--	--	--	--	--	--	--	--
PT6-10	05/02/96	10	--	--	ND	--	--	--	--	--	--	--	--	--
PT6-20	05/02/96	20	--	--	ND	--	--	--	--	--	--	--	--	--
PT6-40	05/02/96	40	--	--	ND	--	--	--	--	--	--	--	--	--

Superscripts: 1, EPA 8015M; 2, EPA 8020M; 3, EPA 7421; 4, EPA 8080; 5, all other EPA 8080 analytes; 6, Endrin.
ND, not detected. --, not analyzed for. All concentrations are in mg/kg.

TABLE 1

Rincon del Mar Ranch - Voluntary Cleanup Project 25-3146549
Results of Assessment Soil Sampling

Sample	Date	Sample	TPH Fuel Fingerprint[1]			Volatile Organic Compounds[2]				Total	Organochlorine Pesticides[4]			
ID	Sampled	Depth	C_4-C_{12}	C_{13}-C_{22}	$=>C_{23}$	B	T	E	X	Lead[3]	4,4'-DDD	4,4'-DDE	4,4'-DDT	Other[5]
See Figure 13 for Sample Locations														
OW21-3	05/02/96	3	--	--	110	--	--	--	--	--	--	--	--	--
OW22-3	05/02/96	3	--	--	190	--	--	--	--	--	--	--	--	--
OW23-3	05/02/96	3	--	--	37	--	--	--	--	--	--	--	--	--
OW31-3	05/02/96	3	--	--	840	--	--	--	--	--	--	--	--	--
OW32-2	05/02/96	2	--	--	500	--	--	--	--	--	--	--	--	--
OW33-2	05/02/96	2	--	--	ND	--	--	--	--	--	--	--	--	--
OW34-2	05/02/96	2	--	--	ND	--	--	--	--	--	--	--	--	--
OW35-3	05/02/96	3	--	--	930	ND	ND	ND	ND	--	--	--	--	--
OW36-5	07/17/96	5	--	--	ND	--	--	--	--	--	--	--	--	--
OW36-10	07/17/96	10	--	--	ND	--	--	--	--	--	--	--	--	--
OW36-20	07/17/96	20	--	--	ND	--	--	--	--	--	--	--	--	--
OW36-40	07/17/96	40	--	--	ND	--	--	--	--	--	--	--	--	--
See Figure 14 for Sample Locations														
HA1-0.5	06/27/96	0.5	--	--	650	--	--	--	--	--	ND	ND	ND	ND
HA1-1.5	06/27/96	1.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA2-0.5	06/27/96	0.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA2-1.5	06/27/96	1.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA3-0.5	06/27/96	0.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA3-1.5	06/27/96	1.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA4-0.5	06/27/96	0.5	--	--	130	--	--	--	--	--	ND	ND	ND	ND
HA4-1.5	06/27/96	1.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA5-0.5	06/27/96	0.5	--	550	--	--	--	--	--	--	ND	ND	ND	ND
HA5-1.5	06/27/96	1.5	--	570	--	--	--	--	--	--	ND	ND	ND	ND

Superscripts: 1, EPA 8015M; 2, EPA 8020M; 3, EPA 7421; 4, EPA 8080; 5, all other EPA 8080 analytes; 6, Endrin.
ND, not detected. --, not analyzed for. All concentrations are in mg/kg.

TABLE 1

Rincon del Mar Ranch - Voluntary Cleanup Project 25-3146549
Results of Assessment Soil Sampling

Sample	Date	Sample	TPH Fuel Fingerprint[1]			Volatile Organic Compounds[2]				Total	Organochlorine Pesticides[4]			
ID	Sampled	Depth	C_4-C_{12}	C_{13}-C_{22}	$=>C_{23}$	B	T	E	X	Lead[3]	4,4'-DDD	4,4'-DDE	4,4'-DDT	Other[5]
HA5-3.5	06/27/96	3.5	--	--	120	--	--	--	--	--	--	--	--	--
HA6-0.5	06/27/96	0.5	--	--	360	--	--	--	--	--	ND	ND	ND	ND
HA6-1.5	06/27/96	1.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA7-0.5	06/27/96	0.5	--	--	28,000	--	--	--	--	--	26	1.8	100	ND
HA7-1.5	06/27/96	1.5	--	--	1,800	--	--	--	--	--	ND	ND	ND	ND
HA7-3.5	06/27/96	3.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA8-0.5	06/27/96	0.5	--	--	42	--	--	--	--	--	ND	ND	ND	ND
HA8-1.5	06/27/96	1.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA9-0.5	06/27/96	0.5	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
HA10-0.5	06/27/96	0.5	--	--	38	--	--	--	--	--	ND	ND	ND	ND
HA10-1.0	06/27/96	1.0	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
EWB-3	06/27/96	3	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
EEB-3	06/27/96	3	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
EWS-2	06/27/96	2	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
ENS-2	06/27/96	2	--	ND	--	--	--	--	--	--	ND	ND	ND	ND
EDT-1	06/27/96	1	--	ND	--	--	--	--	--	--	ND	ND	ND	ND

Superscripts: 1, EPA 8015M; 2, EPA 8020M; 3, EPA 7421; 4, EPA 8080; 5, all other EPA 8080 analytes; 6, Endrin.
ND, not detected. --, not analyzed for. All concentrations are in mg/kg.

TABLE 2

Rincon del Mar Ranch - Voluntary Cleanup Project 25-3146549
Results of Confirmation Soil Sampling

Sample ID	Date Sampled	Sample Depth	TPH Fuel Fingerprint[1]			Volatile Organic Compounds[2]				Total Lead[3]	Organochlorine Pesticides[4]			
			C_4-C_{12}	C_{13}-C_{22}	=>C_{23}	B	T	E	X		4,4'-DDD	4,4'-DDE	4,4'-DDT	Other[5]
See Figure 17 for Sample Locations (steel shed at ranch headquarters)														
HA-4A	05/01/97	0.5	--	--	--	--	--	--	--	--	<0.005	<0.004	**0.016**	ND
HA-4A	05/01/97	1.5	--	--	--	--	--	--	--	--	<0.005	<0.004	<0.007	ND
HA-5A	05/01/97	0.5	--	--	--	--	--	--	--	--	<0.005	<0.004	<0.007	ND
HA-5A	05/01/97	1.5	--	--	--	--	--	--	--	--	<0.005	<0.004	<0.007	ND
HA-6A	05/01/97	0.5	--	--	--	--	--	--	--	--	<0.005	<0.004	<0.007	ND
HA-6A	05/01/97	1.5	--	--	--	--	--	--	--	--	<0.005	<0.004	<0.007	ND
See Figure 18 for Sample Locations (various locations at ranch headquarters)														
BWHA-1	05/01/97	5.0	--	--	--	--	--	--	--	5.1	<0.005	<0.004	<0.007	ND
BWHA-2	05/01/97	3.5	--	--	--	--	--	--	--	2.8	<0.005	<0.004	<0.007	ND
SSHA-1	05/01/97	3.5	--	--	--	--	--	--	--	4.8	<0.005	<0.004	<0.007	ND
SSHA-2	05/01/97	2.5	--	--	--	--	--	--	--	4.6	<0.005	<0.004	<0.007	ND
TCHA-1	05/01/97	0.5	--	--	--	--	--	--	--	6.4	--	--	--	--
TCHA-1	05/01/97	1.5	--	--	--	--	--	--	--	5.1	--	--	--	--
TCHA-2	05/01/97	0.5	--	--	--	--	--	--	--	33	--	--	--	--
TCHA-2	05/01/97	1.5	--	--	--	--	--	--	--	7.4	--	--	--	--
TCHA-3	05/01/97	0.5	--	--	--	--	--	--	--	5.4	--	--	--	--
TCHA-3	05/01/97	1.5	--	--	--	--	--	--	--	5.6	--	--	--	--
See Figure 19 for Sample Locations (former remote weed oil tanks and former service station)														
RWOH-1	05/01/97	0.5	--	--	--	--	--	--	--	7.4	<0.005	<0.004	<0.007	ND
RWOH-1	05/01/97	1.5	--	--	--	--	--	--	--	9.0	<0.005	<0.004	<0.007	ND
RWOH-2	05/01/97	0.5	--	--	--	--	--	--	--	9.0	<0.005	<0.004	<0.007	ND
RWOH-2	05/01/97	1.5	--	--	--	--	--	--	--	8.7	<0.005	<0.004	<0.007	ND

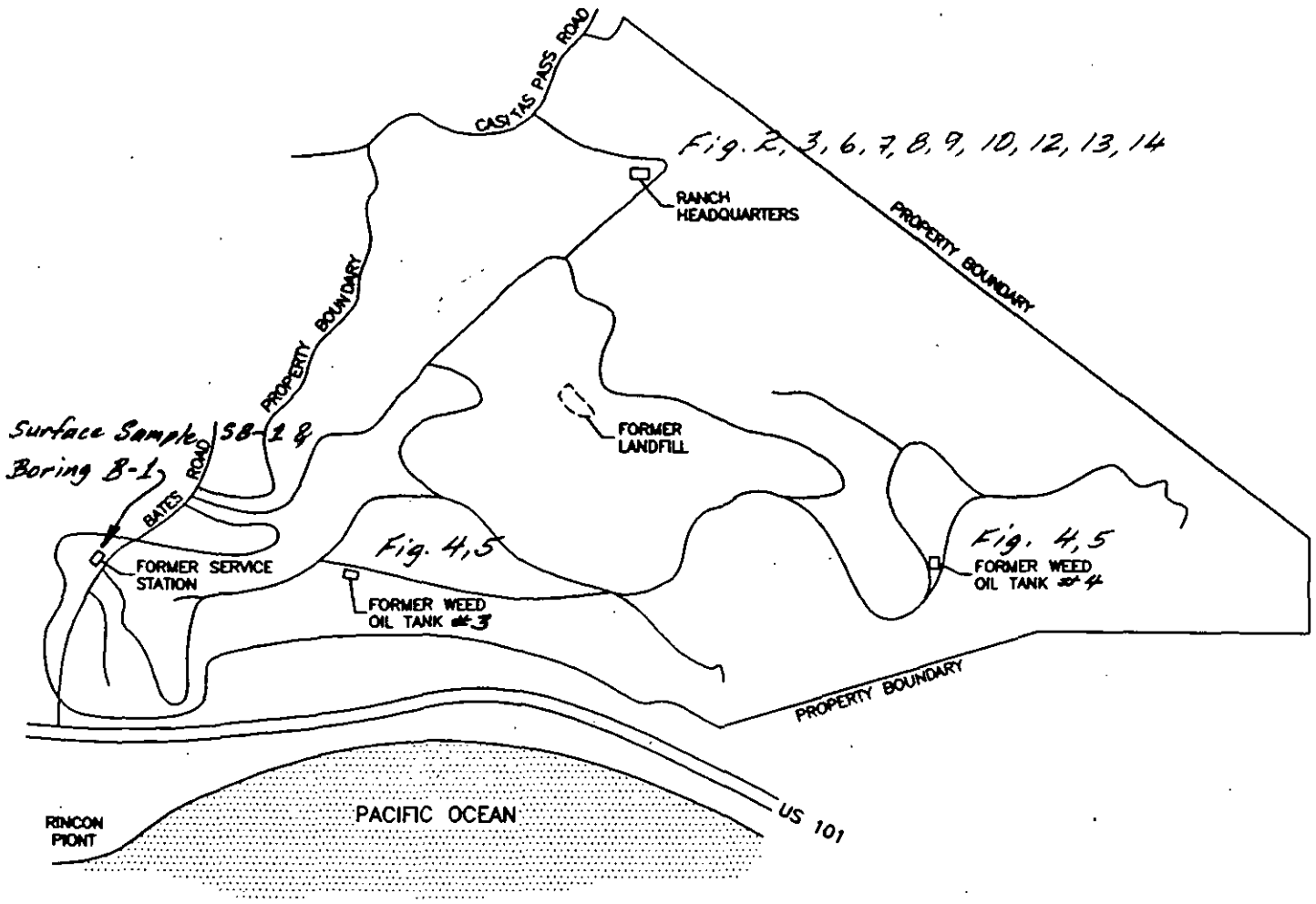
Superscripts: 1, EPA 8015M; 2, EPA 8020M; 3, EPA 7421; 4, EPA 8080; 5, all other EPA 8080 analytes.
ND, not detected. NA, not applicable. --, not analyzed for. All concentrations are in mg/kg.

TABLE 2

Rincon del Mar Ranch - Voluntary Cleanup Project 25-3146549
Results of Confirmation Soil Sampling

Sample ID	Date Sampled	Sample Depth	TPH Fuel Fingerprint[1]			Volatile Organic Compounds[2]				Total Lead[3]	Organochlorine Pesticides[4]			
			C_4-C_{12}	C_{13}-C_{22}	$=>C_{23}$	B	T	E	X		4,4'-DDD	4,4'-DDE	4,4'-DDT	Other[5]
RWOL-1	05/01/97	0.5	--	--	--	--	--	--	--	7.6	<0.005	0.013	0.0097	ND
RWOL-1	05/01/97	1.5	--	--	--	--	--	--	--	5.7	<0.005	0.018	0.016	ND
RWOL-2	05/01/97	0.5	--	--	--	--	--	--	--	6.4	<0.005	<0.004	<0.007	ND
RWOL-2	05/01/97	1.5	--	--	--	--	--	--	--	5.7	<0.005	0.0049	<0.007	ND
FST-EX-SW1.5	05/01/97	1.5	<0.05	<10	<10	ND	ND	ND	ND	3.8	--	--	--	--
FST-EX-B3.0	05/01/97	3.0	<0.05	<10	<10	ND	ND	ND	ND	3.7	--	--	--	--
See Figure 20 for Sample Locations (former trash dump area)														
RL-1	05/01/97	1.0	<0.05	<10	<10	--	--	--	--	--	<0.005	0.0072	<0.007	ND
RL-1	05/01/97	5.0	<0.05	<10	<10	--	--	--	--	--	0.0054	0.0049	0.013	ND
RL-2	05/01/97	1.0	<0.05	<10	<10	--	--	--	--	--	<0.005	<0.004	<0.007	ND
RL-2	05/01/97	5.0	<0.05	<10	<10	--	--	--	--	--	<0.005	0.004	<0.007	ND
RL-3	05/01/97	1.0	<0.05	<10	<10	--	--	--	--	--	0.47	0.38	1.2	ND
RL-3	05/01/97	5.0	<0.05	<10	<10	--	--	--	--	--	<0.005	<0.004	<0.007	ND
RL-4	05/01/97	1.0	<0.05	<10	<10	--	--	--	--	--	<0.005	0.0048	0.016	ND
RL-4	05/01/97	4.0	<0.05	<10	<10	--	--	--	--	--	0.0091	0.011	0.007	ND
RL-5	05/01/97	1.0	<0.05	<10	<10	--	--	--	--	--	<0.005	<0.004	<0.007	ND
RL-5	05/01/97	5.0	<0.05	<10	<10	--	--	--	--	--	<0.005	<0.004	<0.007	ND

Superscripts: 1, EPA 8015M; 2, EPA 8020M; 3, EPA 7421; 4, EPA 8080; 5, all other EPA 8080 analytes.
ND, not detected. NA, not applicable. --, not analyzed for. All concentrations are in mg/kg.

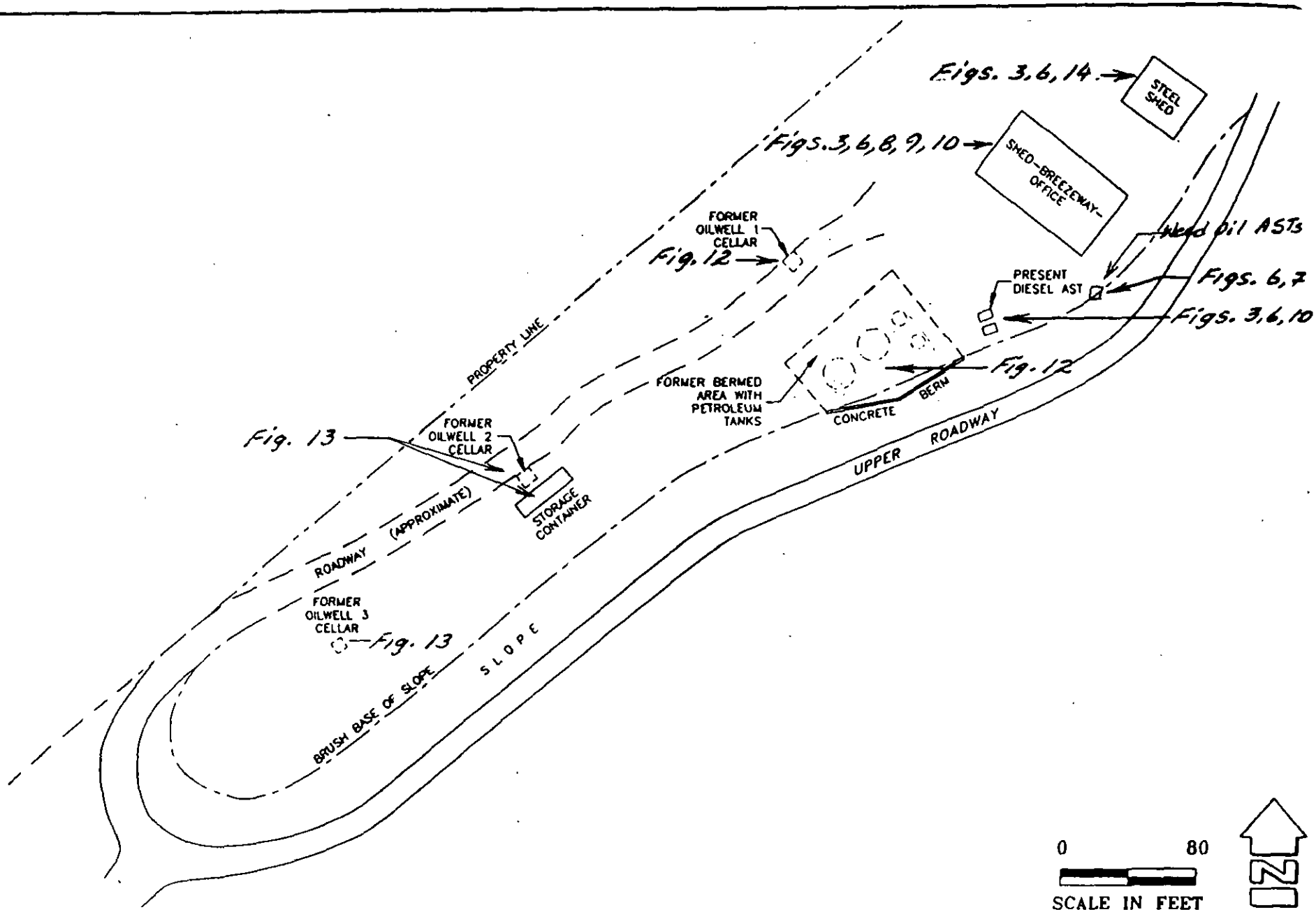


LEGEND	Sample	TPH_d	TRPH
	SB-1	41,000	57,000
	B1-5	<10	--
	B1-10	<10	--
	B1-15	<10	--

NOT DRAWN TO SCALE

N

TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCONS2 DATE: 12/23/94 SOURCE:	LOCATION OF RANCH HEADQUARTERS AND REMOTE LOCATIONS RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 1



TRAK Environmental Group

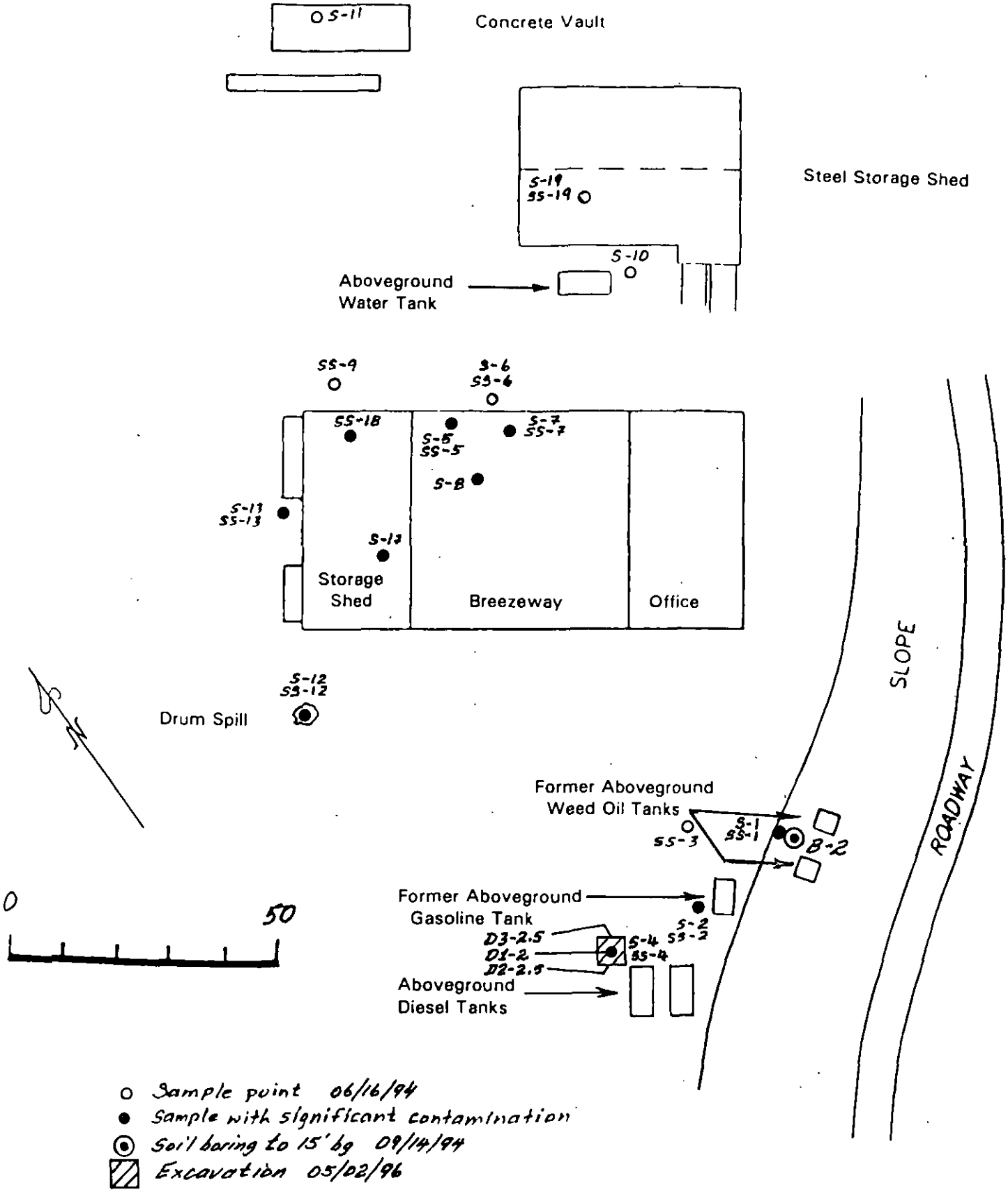
4125 Market Street, # 19

FILE NAME:	DATE:
RINCON3A	6/4/96
SOURCE:	

RANCH HEADQUATERS AREA, WITH LOCATION OF FORMER OILWELL FACILITIES AND FORMER PETROLEUM TANK AREA

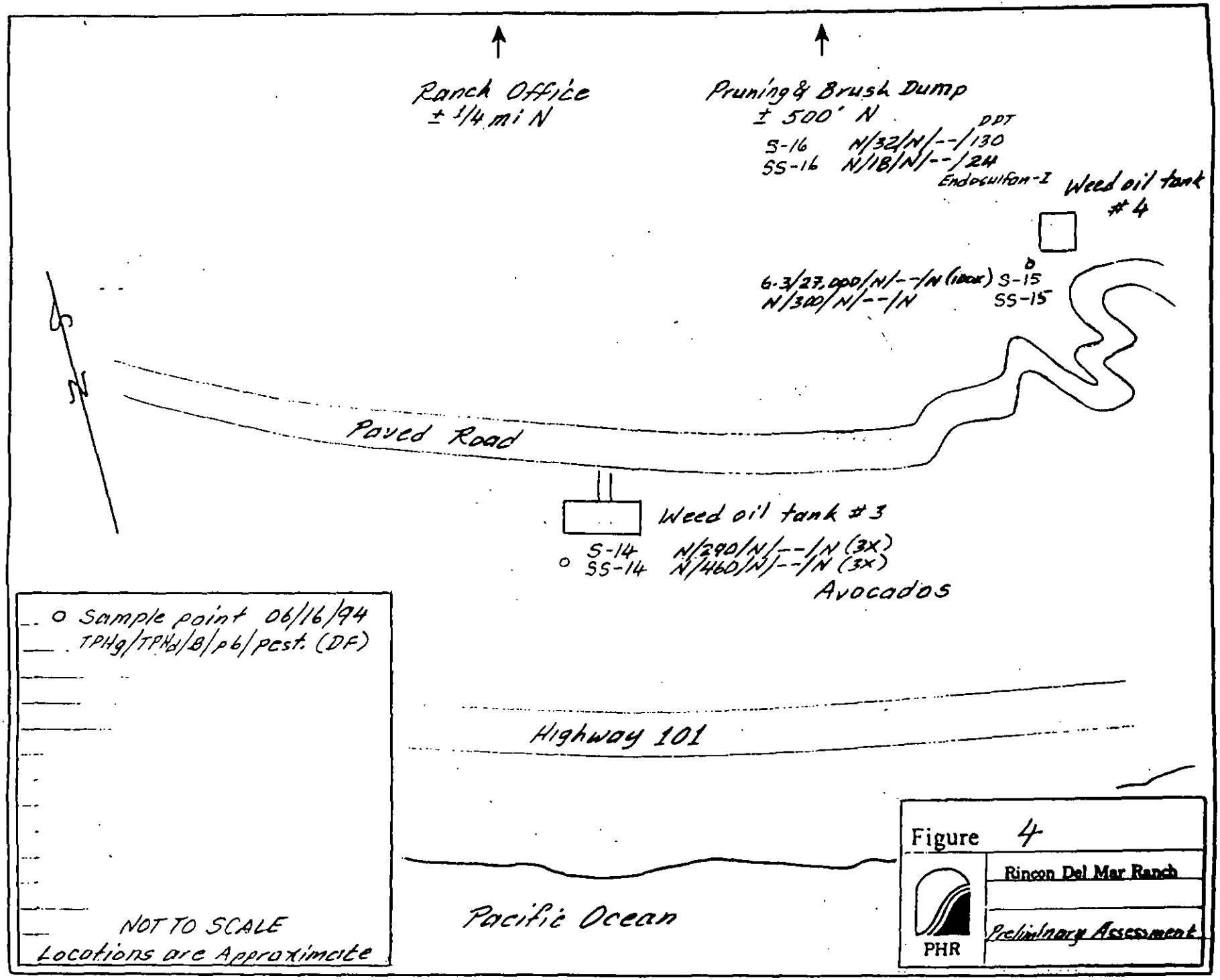
RINCON DEL MAR RANCH

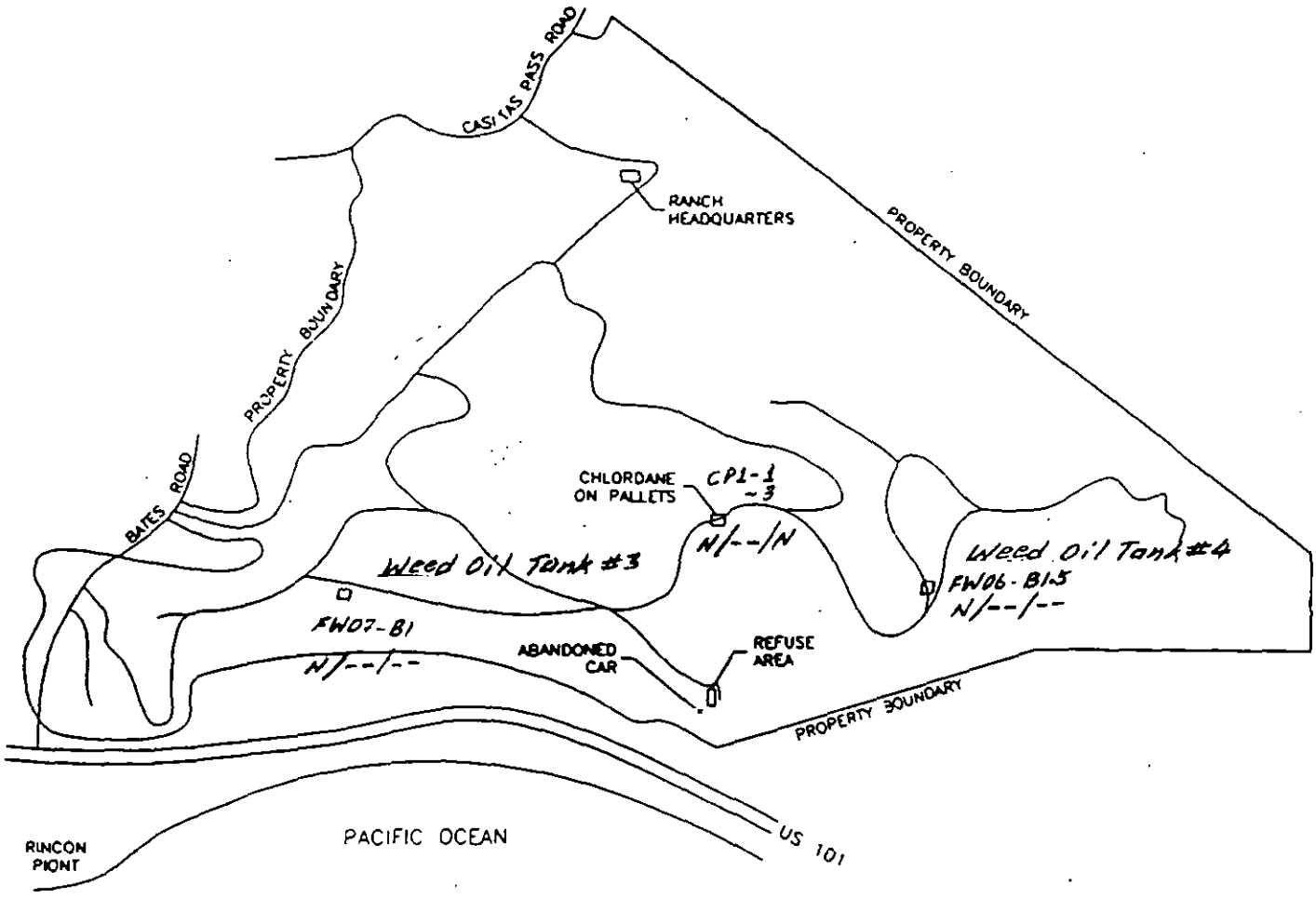
FIGURE 2



Rincon Del Mar Ranch
Headquarters Area

Figure 3


Ranch Office
± 1/4 mi N
Pruning & Brush Dump
± 500' N
DDT
S-16 N/32/N/--/130
SS-16 N/18/N/--/24
Endosulfan-I
Weed oil tank #4
6-3/27,000/N/--/N (1 each)
N/300/N/--/N
S-15
SS-15
N
Paved Road
Weed oil tank #3
S-14 N/290/N/--/N (3X)
SS-14 N/460/N/--/N (3X)
Avocados
o Sample point 06/16/94
TPHg/TPHd/B/pb/pest. (DF)
NOT TO SCALE
Locations are Approximate
Highway 101
Pacific Ocean
Figure 4
PHR
Rincon Del Mar Ranch
Preliminary Assessment



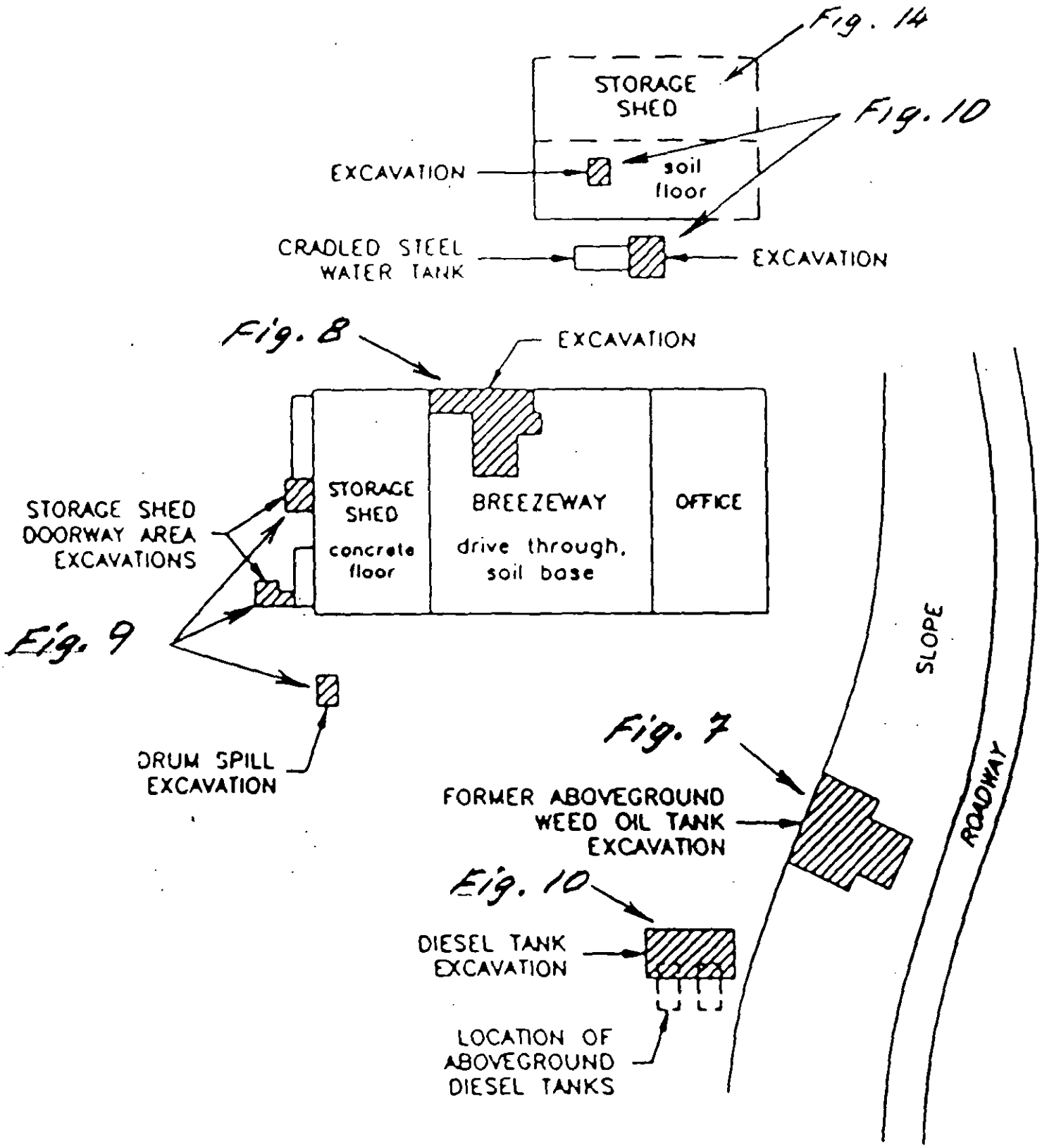
LEGEND

Dec. 1, 1994 Assessment TPH$_d$/pb/pesticides

NOT DRAWN TO SCALE

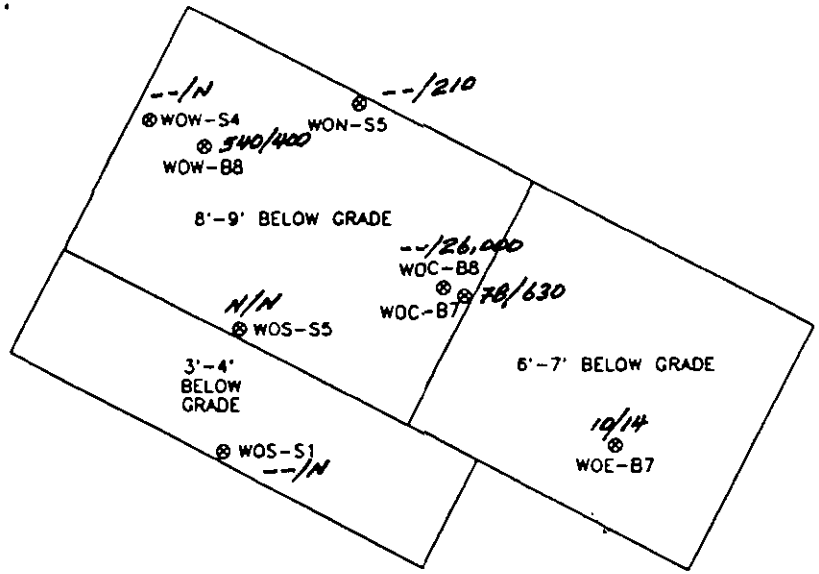
N

TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCONS2 DATE: 12/23/94 SOURCE	LOCATION OF RANCH HEADQUARTERS AND REMOTE SAMPLING LOCATIONS RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 5

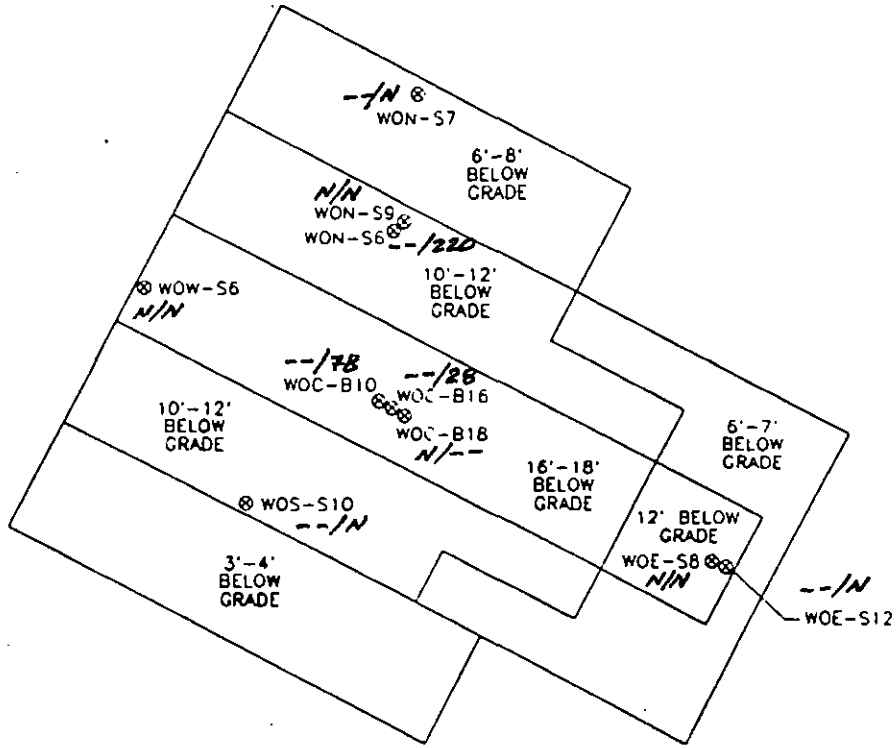


Rincon Del Mar Ranch
Headquarters Area

Figure 6



INTERMEDIATE PHASE OF EXCAVATION



FINAL PHASE OF EXCAVATION

LEGEND

⊗ WOW-B8 — SAMPLE LOCATIONS FROM INTERMEDIATE PHASE

⊗ WOW-S6 — SAMPLE LOCATIONS FROM FINAL PHASE

Analyses TPH$_d$/TRPH (mg/kg)

SAMPLE NUMBERING SYSTEM

WO WEED OIL – W (WEST), C (CENTER), E (EAST), N (NORTH), S (SOUTH) – B (BASE), S (SIDEWALL) – 8 (DEPTH IN FEET)

Total Excavated ≈ 75 yd^3

0 5

SCALE IN FEET

N

TRAK Environmental Group

4125 Market Street, # 19
Ventura, California 93003

FILE NAME: RINCON54

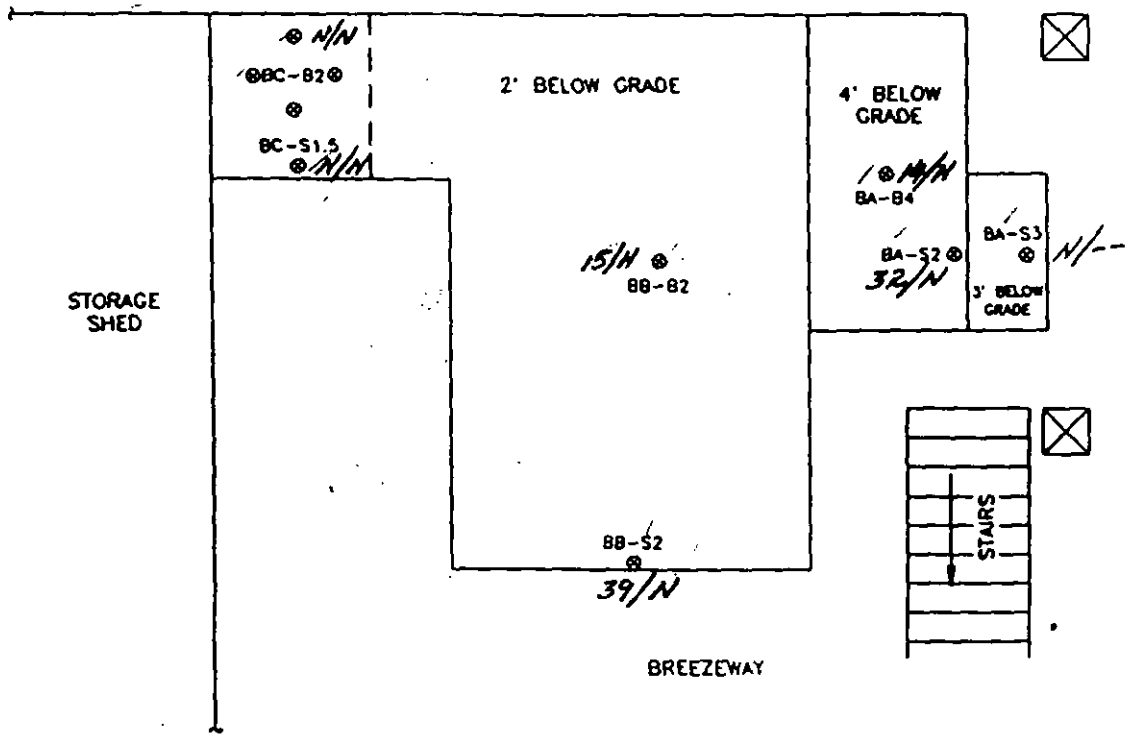
DATE: 12/23/94

SOURCE:

RANCH HEADQUARTERS - WEED OIL TANK, INTERMEDIATE AND FINAL EXCAVATION CONFIGURATIONS WITH SAMPLE LOCATIONS

RINCON DEL MAR RANCH
VENTURA COUNTY, CALIFORNIA

FIGURE 7



LEGEND

BB-S2 SAMPLE LOCATIONS

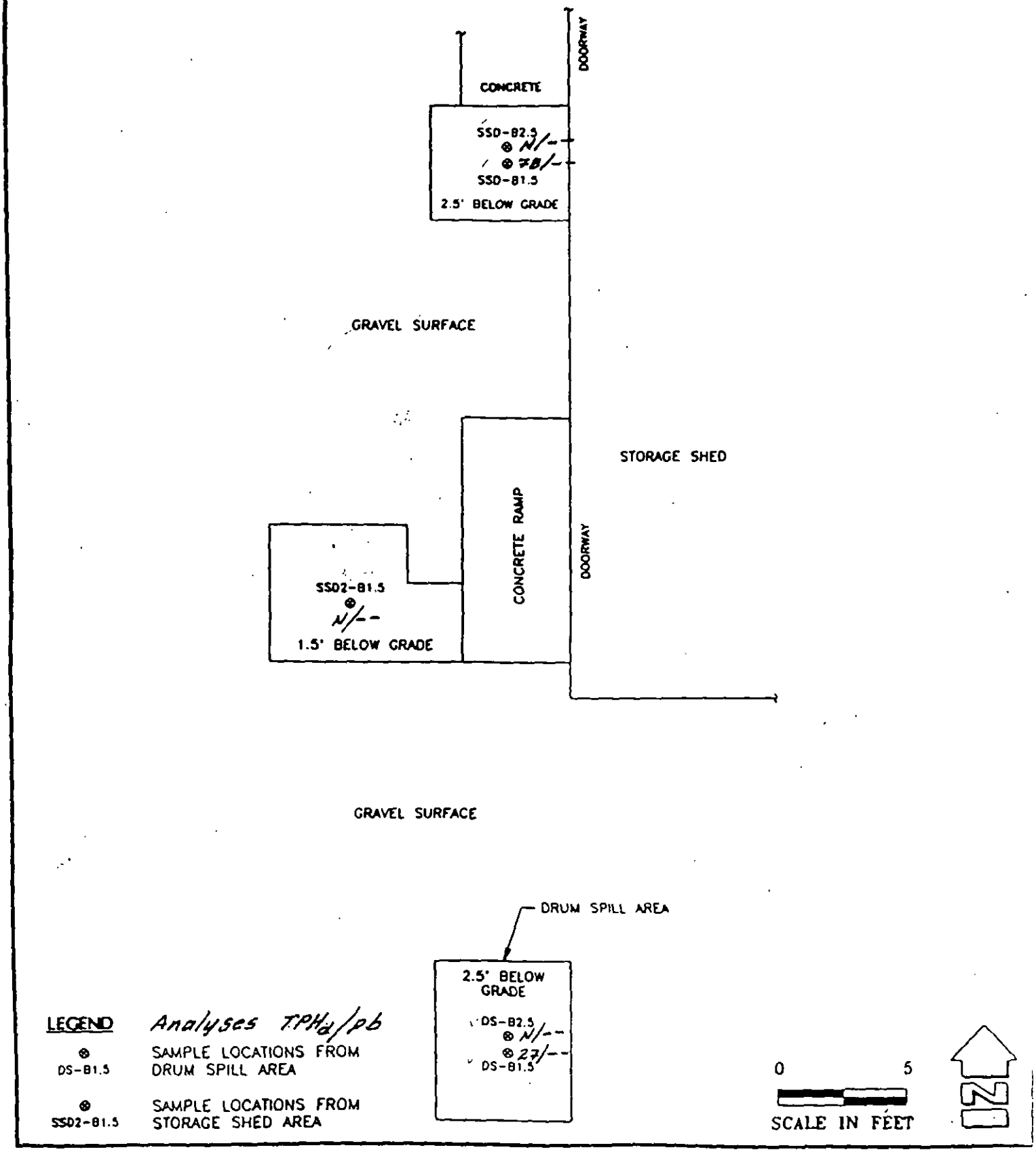
Analyses TPHd/pb

0 5

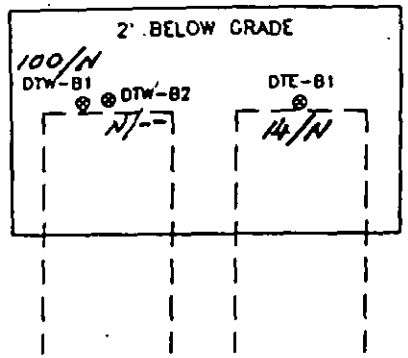
SCALE IN FEET

N

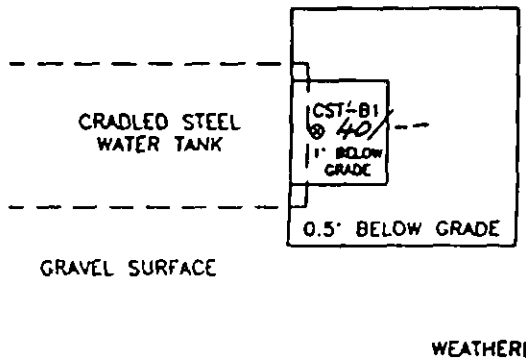
TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCONS5 DATE: 12/23/94 SOURCE:	RANCH HEADQUARTERS - BREEZEWAY RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 8



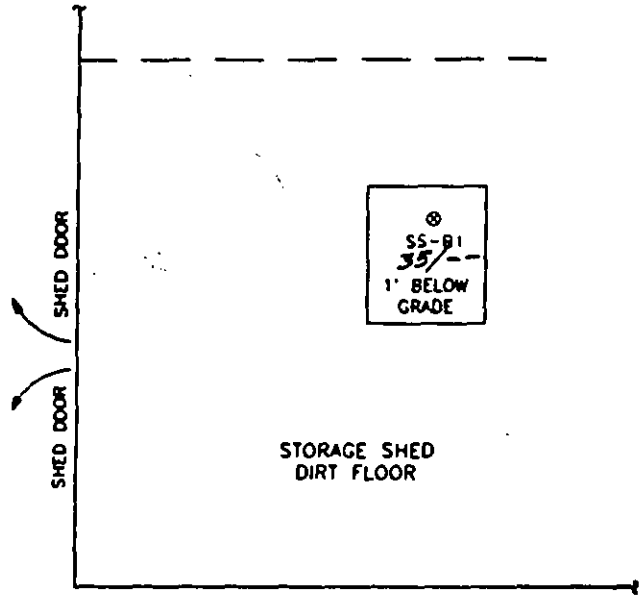
TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCONS6 DATE: 12/23/94 SOURCE:	RANCH HEADQUARTERS - STORAGE SHED DOORWAYS AND DRUM SPILL AREA RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 9



A. ABOVEGROUND DIESEL TANKS - AREA OF EXCAVATIONS & SAMPLES



B. CRADLED STEEL WATER TANK - AREA OF EXCAVATION & SAMPLES



C. STORAGE SHED - AREA OF EXCAVATION & SAMPLES

LEGEND Analyses TPHd/pb

- DTE-B1 — SAMPLE LOCATIONS FROM DIESEL TANK AREA
- CST-B1 — SAMPLE LOCATIONS FROM CRADLED STEEL TANK AREA
- SS-B1 — SAMPLE LOCATIONS FROM STORAGE SHED AREA

0 6

SCALE IN FEET

N

TRAK Environmental Group

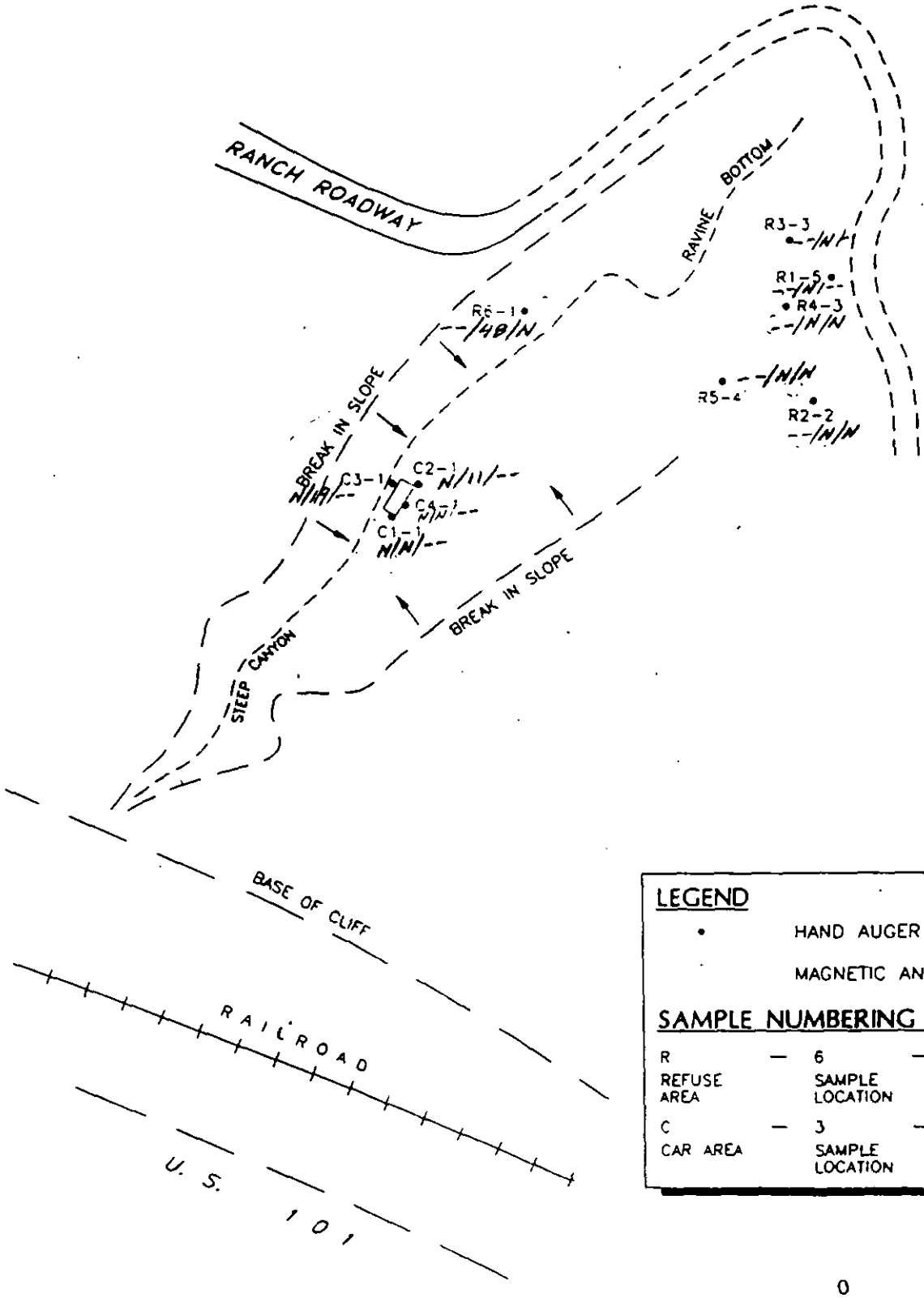
4125 Market Street, # 19
Ventura, California 93003

FILE NAME:	DATE:
RINCON57	12/23/94
SOURCE:	

RANCH HEADQUARTERS - 3 AREAS OF EXCAVATION

RINCON DEL MAR RANCH

FIGURE 10



LEGEND

- • HAND AUGER BORING
- MAGNETIC ANOMOLY

SAMPLE NUMBERING SYSTEM

R	—	6	—	1
REFUSE AREA		SAMPLE LOCATION		DEPTH (FT)
C	—	3	—	1
CAR AREA		SAMPLE LOCATION		DEPTH (FT)

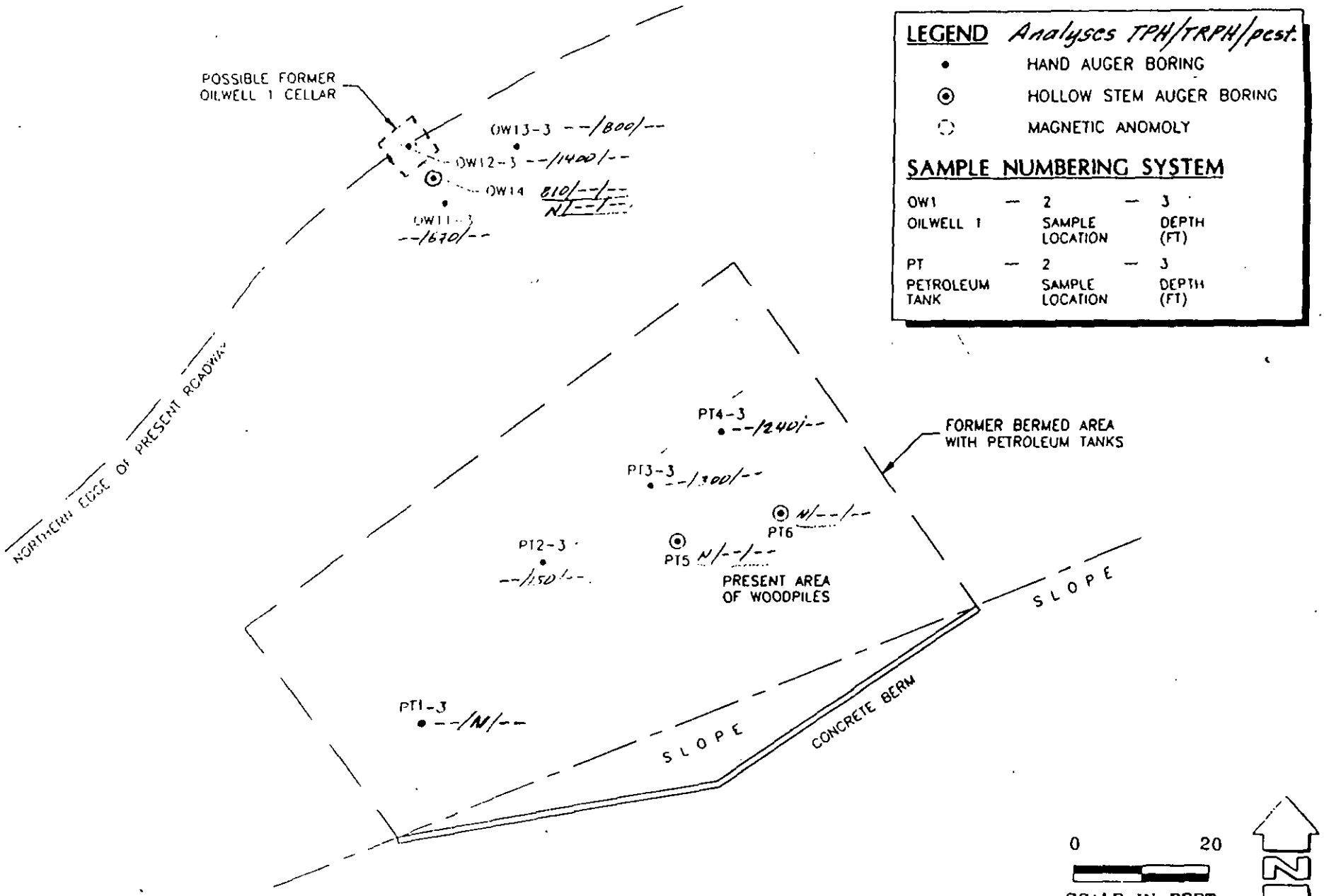
Analyses TPH/TRPH/pest.

0 80

SCALE IN FEET

N

TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON6A DATE: 6/4/96 SOURCE:	REFUSE AREA AND ABANDONED CAR AREA, WITH SAMPLE LOCATIONS RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 11



TRAK Environmental Group

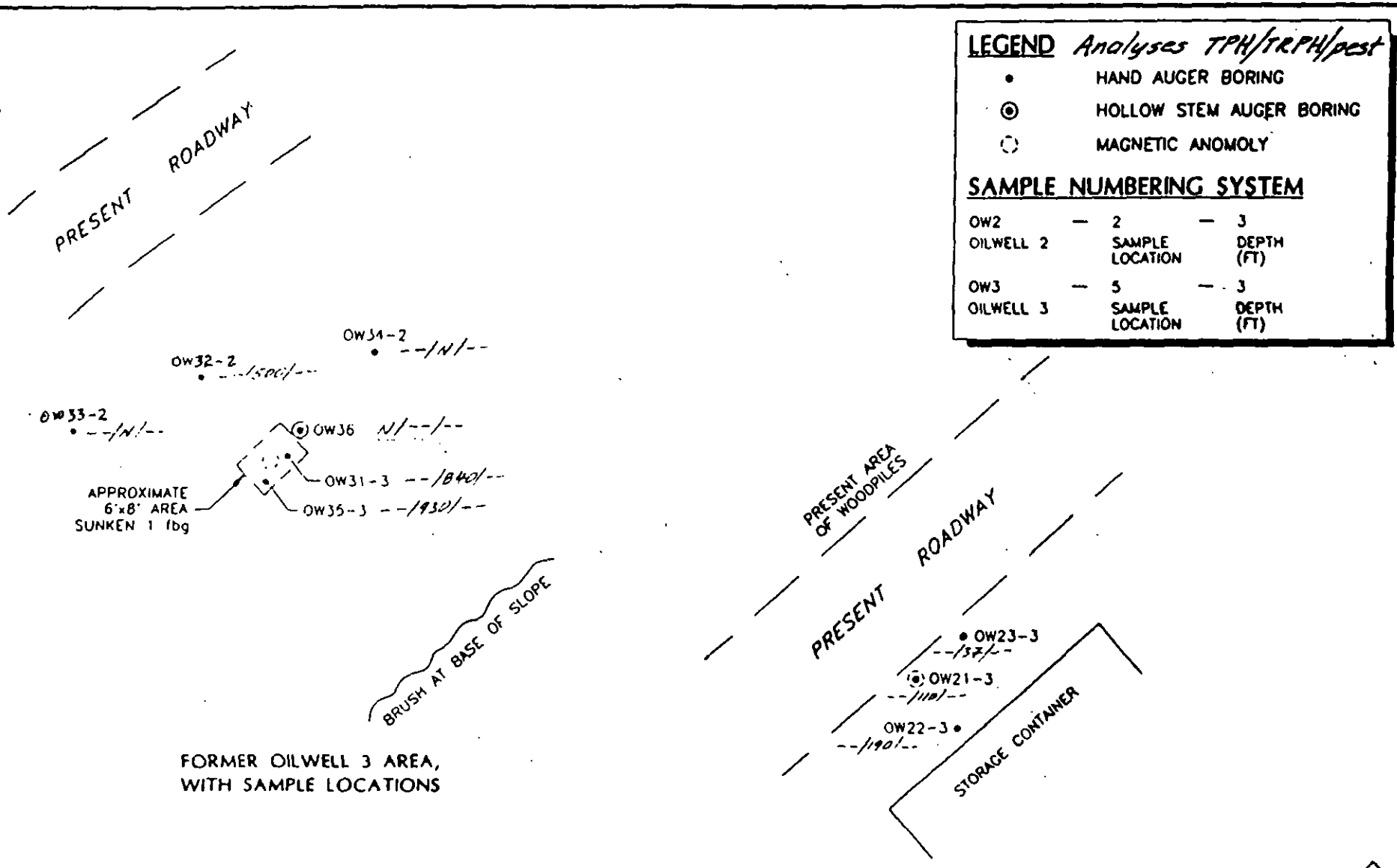
4125 Market Street, # 19

FILE NAME:	DATE:
RINCON4A	6/4/96
SOURCE:	

FORMER OILWELL 1 AREA AND FORMER PETROLEUM TANK AREA, WITH SAMPLE LOCATIONS

RINCON DEL MAR RANCH

FIGURE 12



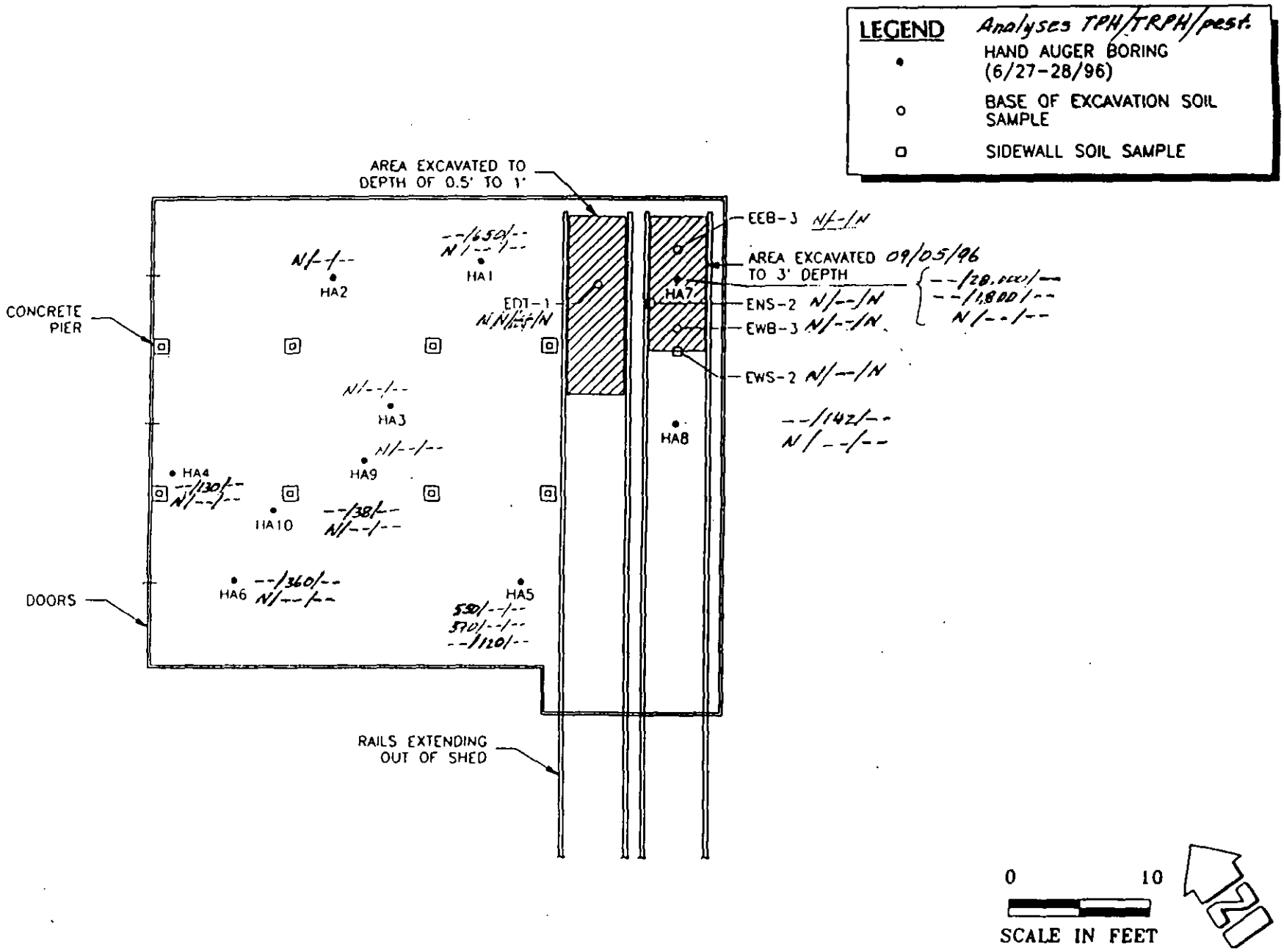
FORMER OILWELL 3 AREA, WITH SAMPLE LOCATIONS

FORMER OILWELL 2 AREA, WITH SAMPLE LOCATIONS

TRAK Environmental | FILE NAME: RINCON54 | DATE: 6/4/96

FORMER OILWELL 2 AREA, AND FORMER OILWELL 3 AREA,

FIGURE 13



TRAK Environmental Group

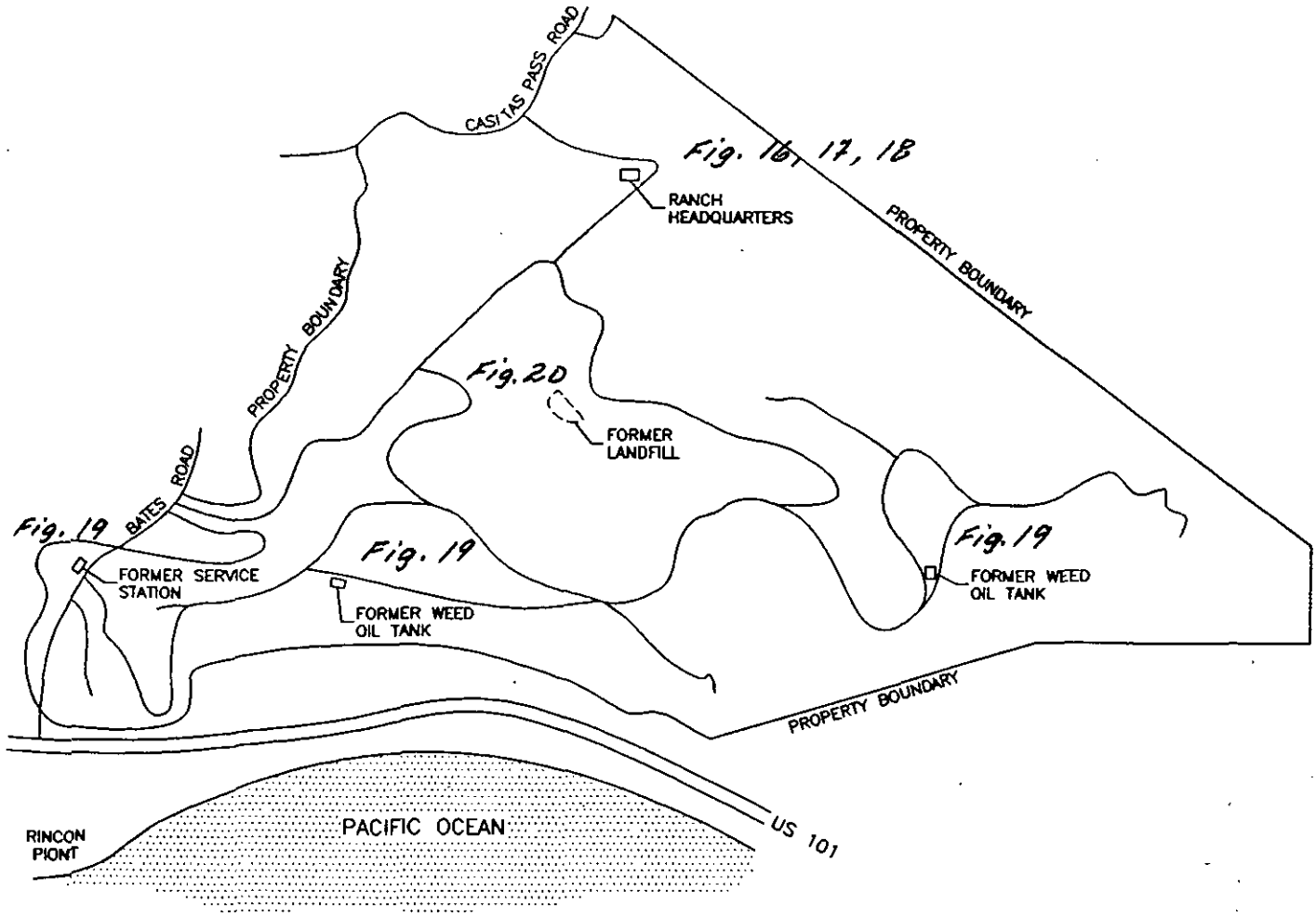
4125 Market Street, # 19
Ventura, California 93003

FILE NAME:	DATE:
RINCON6B	7/29/96
SOURCE:	

STEEL SHED, WITH AREA OF EXCAVATIONS AND CONFIRMATION SAMPLE LOCATIONS

RINCON DEL MAR RANCH

FIGURE 14

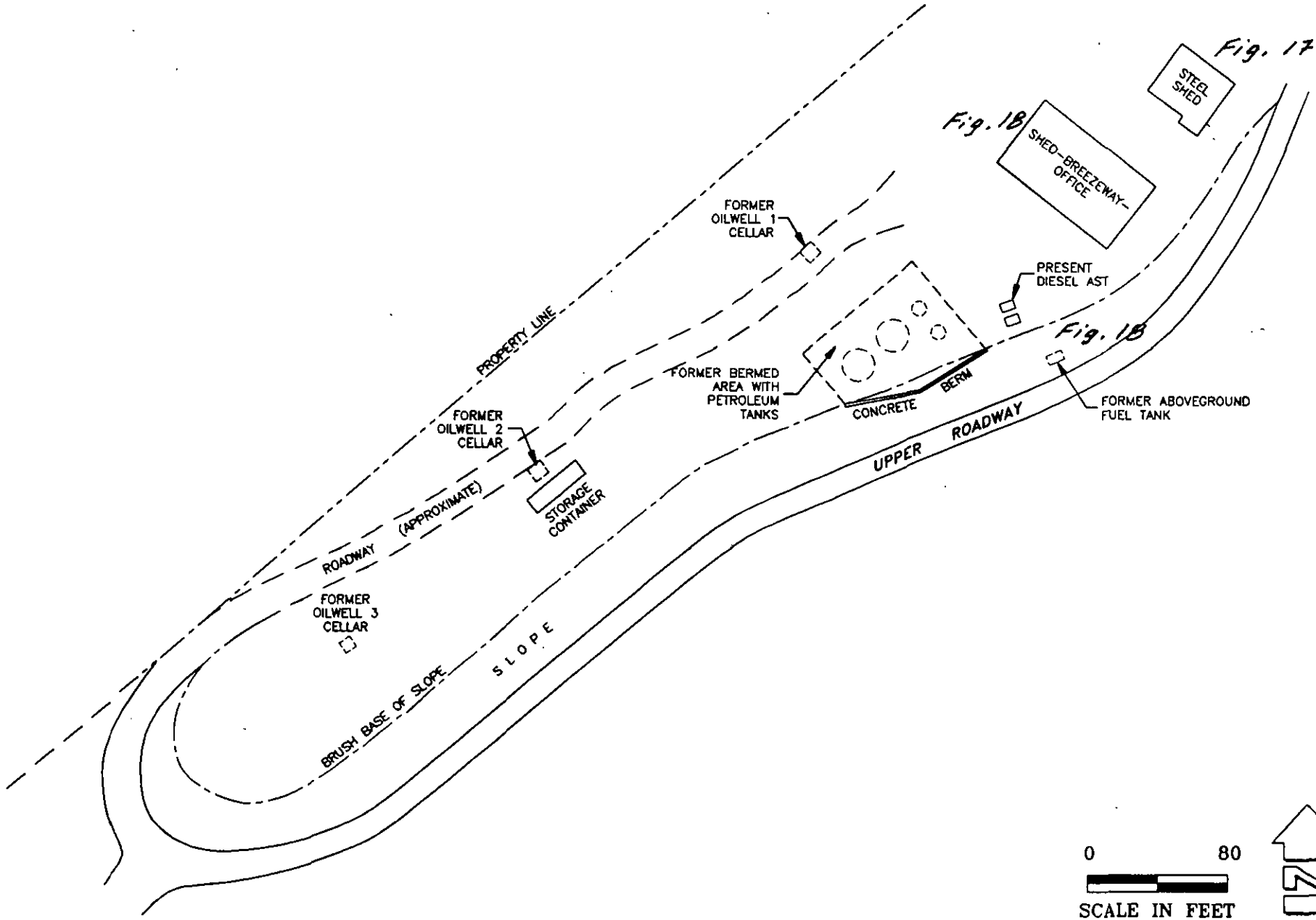


LEGEND

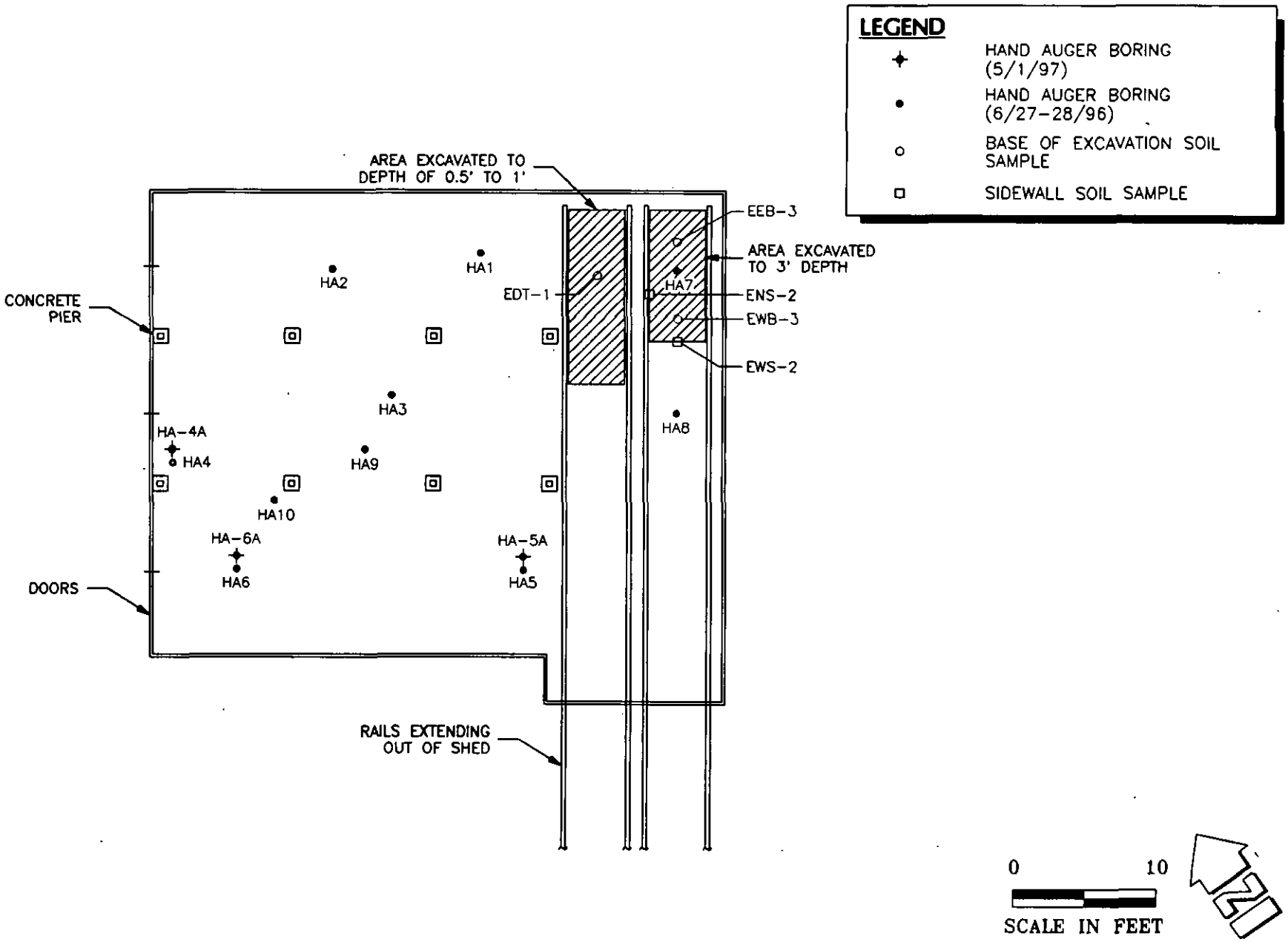
NOT DRAWN TO SCALE

N

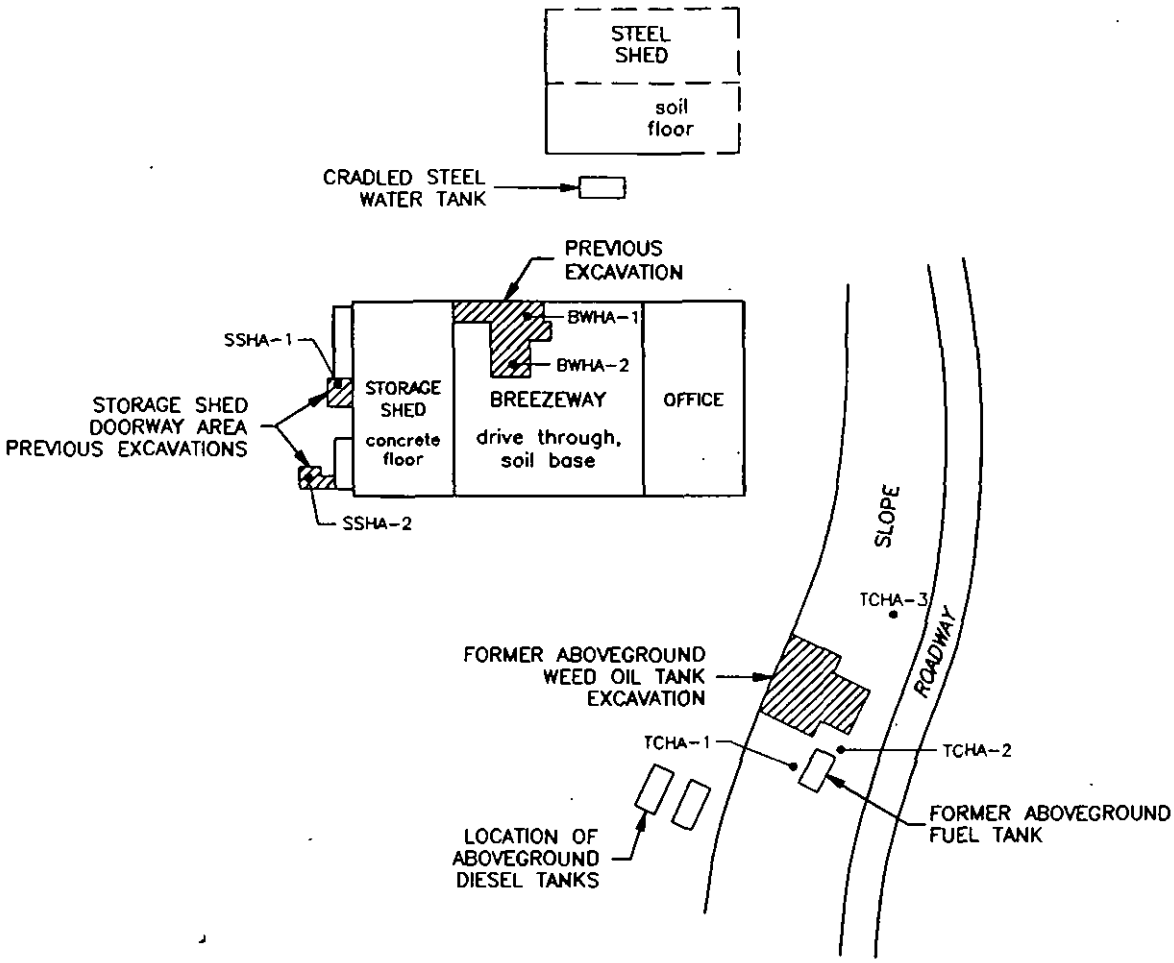
TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCONS2	DATE: 12/23/94	LOCATION OF RANCH HEADQUARTERS AND REMOTE LOCATIONS RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 15
	SOURCE:			



TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON3A DATE: 6/4/96 SOURCE:	**RANCH HEADQUATERS AREA, WITH LOCATION OF FORMER OILWELL FACILITIES AND FORMER PETROLEUM TANK AREA** RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 16.



TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON6B DATE: 7/29/96 SOURCE:	**STEEL SHED, WITH AREA OF EXCAVATIONS AND CONFIRMATION SAMPLE LOCATIONS** RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 17



LEGEND

AREA OF REMEDIATION

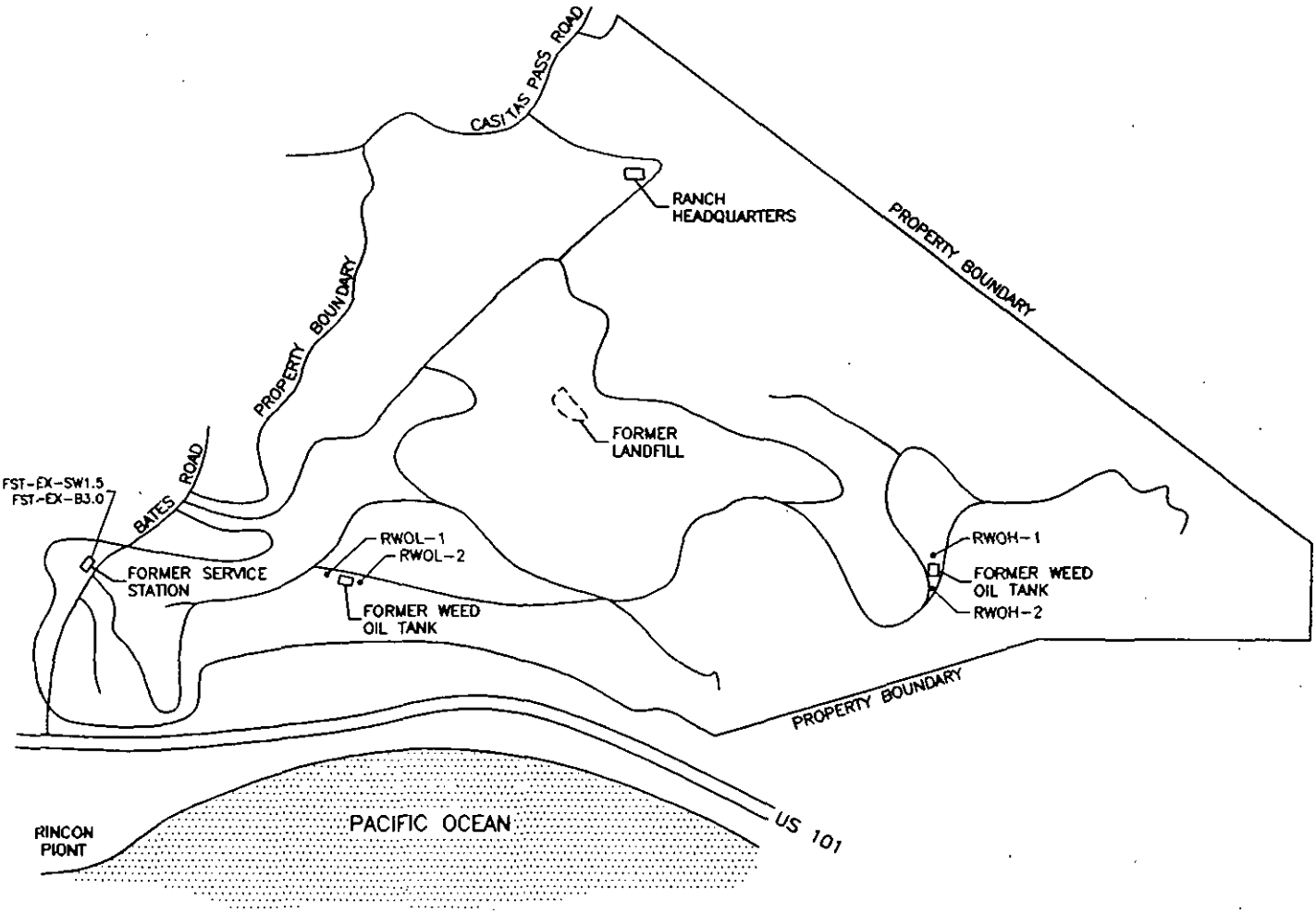
TCHA-3 HAND AUGER LOCATIONS

0 40

APPROX. SCALE IN FEET

N

TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCONS3	DATE: 12/23/94	SITE MAP OF RANCH HEADQUARTERS, WITH AREAS OF SOIL SAMPLING RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA
	SOURCE:		FIGURE 18

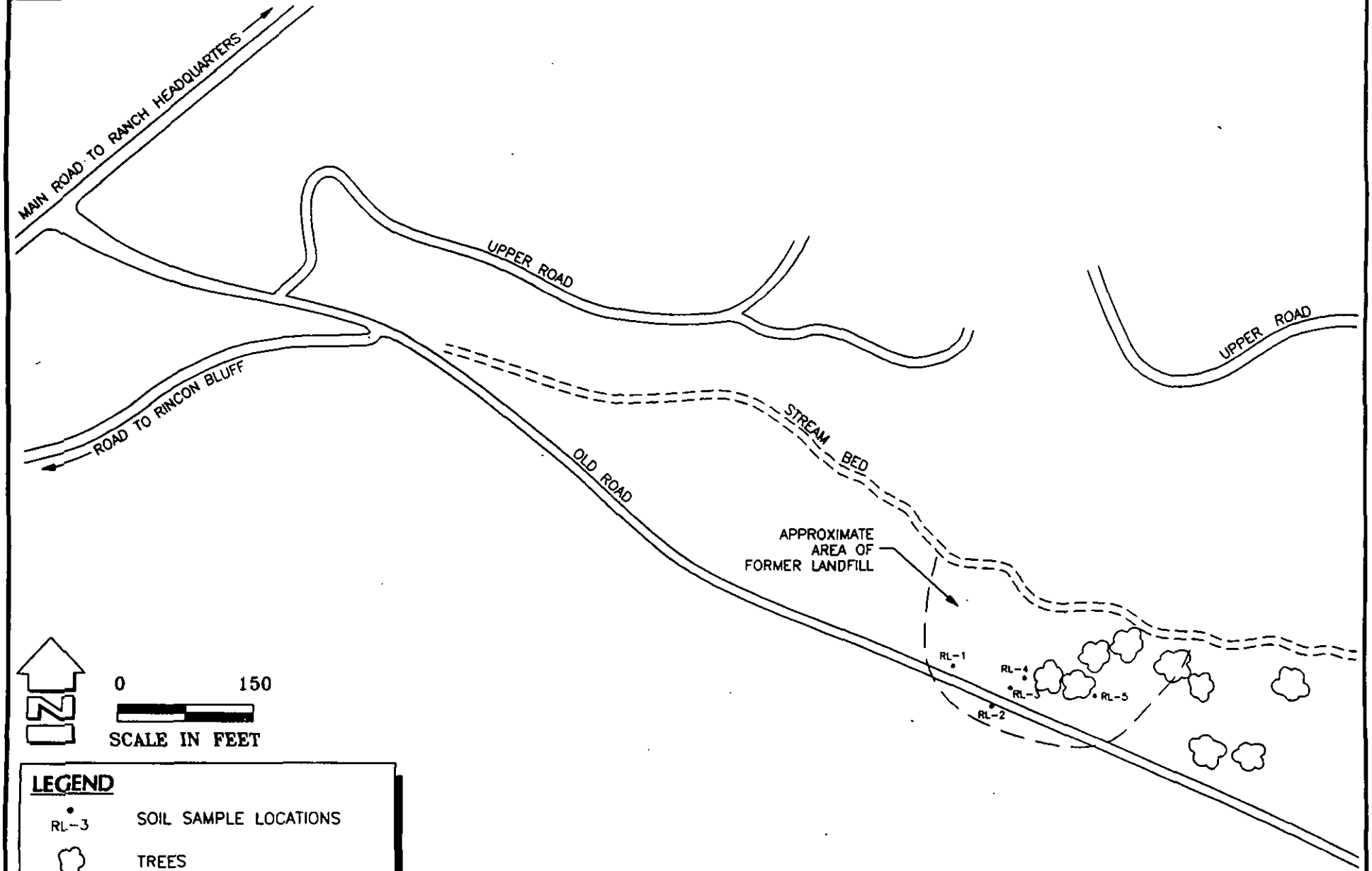


LEGEND

RWOL-1 SOIL SAMPLE LOCATIONS

NOT DRAWN TO SCALE

TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON6C DATE: 12/23/94 SOURCE:	LOCATION OF RANCH HEADQUARTERS AND REMOTE LOCATIONS OF SAMPLING AND REMEDIATION RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 19



TRAK Environmental Group 4125 Market Street, # 19 Ventura, California 93003	FILE NAME: RINCON7A DATE: 6/11/97 SOURCE:	**FORMER LANDFILL AREA WITH SAMPLING LOCATIONS** RINCON DEL MAR RANCH VENTURA COUNTY, CALIFORNIA	FIGURE 20

RESOURCE MANAGEMENT AGENCY

county of ventura

Environmental Health Division
Donald W. Koepp
Director

July 30, 1997

RAA #3146549

Mr. Gregory Canova-Parker
Seed, Mackall & Cole LLP
1332 Anacapa Street, Suite 200
Santa Barbara, CA 93101

COMPLETION OF VOLUNTARY CLEANUP PROGRAM REQUIREMENTS, RINCON DEL MAR RANCH, VENTURA COUNTY, CALIFORNIA

This letter confirms completion of the site investigation and remedial action described in Remedial Action Agreement #3146549.

Based on the information provided and with the provision that this information is accurate and representative of site conditions, the Ventura County Environmental Health Division concludes that no further action is warranted at this site. The documentation reviewed indicates that there is no substantial evidence of residual hazardous material and that the site in its present condition does not pose a threat to human health or the environment.

If you have any questions regarding this matter, please contact D.C. Salter at 805/662-6512.

DONALD W. KOEPP, DIRECTOR
ENVIRONMENTAL HEALTH DIVISION

DWK/jm>koepp/rincondmr

c: Mr. Robert Cashier, PHR Environmental

RESOURCE MANAGEMENT AGENCY

county of ventura

Environmental Health Division
Donald W. Koepp
Director

Date _____

~~Case File Number~~
3146549

~~Name of Responsible Party~~ Mr. Gregory Canova-Parker
~~Street Address~~ Seed, Mackall & Cole LLP
~~City, ST Zip Code~~ 1332 Anacapa Street, Suite 200
Santa Barbara, CA 93101

COMPLETION OF VOLUNTARY CLEANUP PROGRAM REQUIREMENTS,
~~address of site~~ RINCON DEL MAR RANCH, VENTURA COUNTY, CALIFORNIA

This letter confirms completion of the site investigation and remedial action described in Remedial Action Agreement No. 3146549.

Based on the information provided and with the provision that this information is accurate and representative of site conditions, the Ventura County Environmental Health Division concludes that no further action is warranted at this site. The documentation reviewed indicates that there is no substantial evidence of residual hazardous materal and that the site in its present condition does not pose a threat to human health or the environment.

If you have any questions regarding this matter, please contact D. C. Salter at (805) 662-6512.

Sincerely,

DONALD W. KOEPP, DIRECTOR
ENVIRONMENTAL HEALTH DIVISION

C: Mr. Robert Cashier, PHR Environmental

800 South Victoria Avenue, Ventura, CA 93009-1730 (805) 654-3518 FAX (805) 654-2480

PHR Environmental
Westlake Corporate Center
4195 Thousand Oaks Blvd., Suite 155
Westlake Village, CA 93132-3812

Drilled in 2/85 to T.D. @ 7051'. - Minor shows - Cmt Plug 7004' - 6740'

Redrilled in 3/85 to T.D @ 7200'.

Casing Record: 14" cem 36'
9 5/8" cem 915'

Cement Plugs: 7100 - 6826'
2703' - 2354'
980 - 777'
30' - 0'

Plugged & Abandoned in 1985 - Complete

↳ No additional Pr A required - Meets current standards.

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, California

July 2, 1987

Mr. Floyd W. Clawson, Agent
May Petroleum Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Your report of abandonment of well "Rincon Del Mar Ranch" 1
(Name and number)
A.P.I. No. 111-21336, Section 35, T. 4N, R. 25W, SB B. & M.,
Rincon Creek field, Ventura County,
dated 5-23-85, received 5-23-85, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

MAP	MAP BOOK	CARDS	BOND	FORMS	
W2-1		—		—	✓

bb

M. G. MEFFERD
State Oil and Gas Supervisor

By Michael Stettner
Acting Deputy Supervisor

Michael Stettner

OG159 (11/82/GSR1/8M)

CLAWSON PETROLEUM CONSULTANTS INC.
2977 SEXTON CANYON ROAD
VENTURA, CALIFORNIA 93003
805 644-9575

December 16, 1985

Mr. Mike Stetner
State Of California
Department Of Conservation
Division Of Oil & Gas
146 South Ojai Street
P.O. Box 67
Santa Paula, California 93060

Re: May Petroleum, Inc. - Rincon Del Mar Ranch #1
Sec. 35, T4N, R25W, SBBM
API 11121336

Dear Mike:

Rincon Oil Company and the Rincon Del Mar Ranch requested May Petroleum leave the cellar intact and pay the ranch, in lieu of site restoration.

Therefore, the attached letter agreement was signed by Rincon Oil Company and May Petroleum transferring responsibility to Rincon for the unabandoned cellar.

A letter agreement is also attached, whereby Rincon Del Mar Ranch was paid, by May Petroleum, in lieu of site restoration.

The assumption of cellar responsibility was requested by Rincon Oil Company, so they could use the cellar and casing for possible re-entry after revising their geology.

Leaving the site unrestored was requested by the Rincon Del Mar Ranch for the possible re-entry and because they were paid $10,700, which restoration would have cost.

We would appreciate your acknowledging the relieving of May from responsibility, on this well and site, with a letter.

Yours sincerely,

Floyd L. Clawson

Floyd L. Clawson
Agent

FLC/rmb

Attachments

CLAWSON PETROLEUM CONSULTANTS INC.
2977 SEXTON CANYON ROAD
VENTURA, CALIFORNIA 93003
805 644-9575

ASSUMPTION OF RESPONSIBILITY

RIG SITE - DEL MAR RANCH #1
SEC. 35, R3N, R25W, SBBM
VENTURA COUNTY, CALIFORNIA

This agreement between May Petroleum Company and Rincon Oil Company certifies Rincon has requested that May leave the cellar and casing in it's present form for Rincon's possible future use. Rincon will, therefore, assume responsibility for any required abandonment and restoration of the well casing and cellar to satisfy any state or local agency. Furthermore, Rincon henceforth indemnifies May Petroleum from any further liability and holds May harmless against any claim which might be lodged because of the open cellar or casing stub therein.

Date: 11-25-85 W. K. Barker

W. K. Barker, President
Rincon Oil Company

Date: 12-11-85

May Petroleum Inc.

RIG SITE - DEL MAR RANCH #1
Sec. 35, T3N, R25W, SBBM
Ventura County, California

CLAIMS RELEASE

Rincon Del Mar Ranch - Property Owner
May Petroleum, Inc. - Lessee

Rincon Del Mar Ranch hereby accepts the amount of ten thousand seven hundred dollars ($10,700), from May Petroleum, Inc., in lieu of rig site restoration. Rincon Del Mar Ranch prefers the site in it's current state and Rincon Del Mar Ranch hereby indemnifies May Petroleum from any further liability and holds May Petroleum harmless against any claim which might be lodged because of the non-restored condition of the drill site.

18/1/85
Date

David N. Grey M.D.
David N. Grey, M.D. Manager
RINCON DEL MAR RANCH

FILE COPY

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

API No. 111-21336

WELL SUMMARY REPORT

Operator	Well				
MAY PETROLEUM	RINCON DEL MAR RANCH # 1				
Field	**County**	**Sec.**	**T.**	**R.**	**B.&M.**
RINCON CREEK	VENTURA	35	4N	25W	S.B.

Location (Give surface location from property or section corner, street center line and/or California coordinates)

1958.86' South & 1176.97 West from NE Corner of Section 35

Elevation of ground above sea level: 175'

Commenced drilling (date)	Total depth			Depth measurements taken from top of:
February 7, 1985	(1st hole)	(2nd)	(3rd)	☐ Derrick Floor ☐ Rotary Table ☒ Kelly Bushing
Completed drilling (date)	7051'	7200'		Which is 22 feet above ground
March 12, 1985	Present effective depth: Surface			
Commenced producing (date)	Junk: NONE			
NA Dry				
☐ Flowing ☐ Pumping ☐ Gas lift				
Name of producing zone(s): NA				

GEOLOGICAL MARKERS	DEPTH
Rincon Shale	3075'
Vaqueros Sand	4250'
Sespe	4300'
Bates	6975'

Formation and age at total depth: Bates Sd. - Oligocene

	Clean Oil (bbl per day)	Gravity Clean Oil	Percent Water including emulsion	Gas (Mcf per day)	Tubing Pressure	Casing Pressure
Initial Production						
Production After 30 days						

CASING RECORD (Present Hole)

Size of Casing (API)	Top of Casing	Depth of Shoe	Weight of Casing	Grade and Type of Casing	New or Second Hand	Size of Hole Drilled	Number of Sacks or Cubic Feet of Cement	Depth of Cementing (if through perforations)
9 5/8"	O'	915'	36#	K-55, ERW	NEW	12 1/4"	427 cf	--

PERFORATED CASING (Size, top, bottom, perforated intervals, size and spacing of perforation and method.)
NA

DIVISION OF OIL AND GAS
RECEIVED
MAY 28
SANTA PAULA, CALIFORNIA

Was the well directionally drilled? ☒ Yes ☐ No If yes, show coordinates at total depth 2nd. hole: 50.22'South&1307.33 East of sfc. location.
1st hole: 257.6' South &1124.33' East of sfc location

Electrical log depths
1st. hole: DIL/SFL/GR,FDC/CNL/GR/Caliper f/7051' to 915', Dipmeter f/ 7051' to 3000'

Other surveys
2nd. hole: DIL/SFL/GR,FDC/CNL/GR/Caliper f/7198' to 5650'.

In compliance with Sec. 3215, Division 3 of the Public Resources Code, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Name	Title	
May Petroleum	Agent	
Address	**City**	**Zip Code**
2977 Sexton Canyon Road	Ventura	93003
Telephone Number	**Signature**	**Date**
805-644-9575		May 23, 1985

OG100 (4/83/DWRR/5M)

SUBMIT IN DUPLICATE

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator MAY PETROLEUM Field Rincon Creek County Ventura
Well Rincon Del Mar Ranch #1, Sec. 35, T 4N, R 25W S.B. B. & M.
A.P.I. No. 111-21336 Name L. E. Anderson (Person submitting report) Title Agent (President, Secretary or Agent)
Date May 23, 1985

Signature L E Anderson

2977 Sexton Canyon Road Ventura, California 93003 (805) 644-9575
(Address) (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date 1985

2-07 Move in and rig up Cal Pac Rig #6. Spud 12 1/4" hole below 14" casing preset @ 40'. Drill 12 1/4" hole to 850'. MW 9.0, PV 7, YP 10, vis 45, fl 18.0, pH 10.2, gels 4/20, Cl 300, solids 4. Surveys: ¼° N55°W @ 200', 3/4° N65°W @ 351', 1° S85°W @ 502', 1° S65°W @ 655', 1° N40°W @ 805'.

2-08 Drill & survey to 915'. Made wiper trip. POH. RU & run 9 5/8", 36#, K55, STC casing with shoe @ 915'. Preflush w/26 Bbl mudflush, then 255 cf 1:1 Perlite + 2% gel + 2% $CaCl_2$ + ¼#/sk flocele, tailed w/172 cf Class "G" + 2% $CaCl_2$. CIP @ 1420 hours 2/8/85. Perform 1" top job @ 130 ft with 60 sx Class "G" + 3% $CaCl_2$. CIP @ 2030 hours 2-8-85. Cut 14" & 9 5/8" casing. Install & test 9 5/8" casinghead. NU BOPE. MW 9, PV 8, YP 11, vis 45, fl 17, pH 10.2, gels 4/20, Cl 300, solids 4%. Surveys: 3/4° N70°W @ 915'.

2-09 Fin NU BOPE. Test casing to 1000 psi. LD 8" DC. MU BHA. Test BOP per D.O.G. requirements. Drill baffle @ 882' & shoe @ 915'. Drill 8 3/4" hole to 1425'. MW 9, PV 10, YP 7, vis 48, fl 12.6, pH 11, gels 5/20, Cl 350, solids 5%. Surveys: 2 3/4° N70°W @1142'.

2-10 Drill to 1646'. POH. MU Eastman 6½" Posidrill. RIH. Orient & drill f/1646' to 1873'. POH. MU BHA. RIH. Ream f/1646' to 1873'. Drill to 1965'. MW 9.1, PV 7, YP 10, vis 45, fl 14.5, pH 10.2, gels 2/16, Cl 250, solids 6. Surveys: 3½° N69°W @1460', 4° N71°W @ 1584', 4° N75°W @1646', 1° West @1705', 1½° S75E @1767', 4 3/4° S72°E @1828'.

2-11 Drill to 2704'. TFNB. Drill to 3072'. MW 8.9, PV 7, YP 13, fl 14.2, pH 9.5, gels 3/14, Cl 275, solids 5%. Surveys: 6° S80°E @1941', 5½° S80°E @ 2063', 6° S82°E @2186', 6½° S80°E @2340'. 6 3/4° S80°E @2485', 6½° S80°E @ 2648', 8½° S78°E @2808', 10° S70°E @2927'.

2-12 Drill to 3315'. POH. MU 6½" Posidrill. RIH. Orient & drill f/3315' to 3428'. POH. MU BHA. MW 9.2, PV 11, YP 6, vis 42, fl 8.4, pH 9, gels 1/3, Cl 300, solids 6. Surveys: 10½° S66°E @3047', 12° S63°E @3168', 14° S63°E @3290', 14° S65°E @3332', 13 3/4° S72°E @3363'.

2-13 RIH. Drill to 3797'. TFNB. Drill to 3885'. MW 9.2, PV 13, YP 6, vis 44, fl 7.8, pH 8.7, gels ¼, Cl 400, solids 6. Surveys: 13½° S83°E @3480', 14° S81°E @3634', 14¼° S82°E @ 3746'.

2-14 Drill to 4339'. TFNB. Drill to 4415'. MW 9.4, PV 17, YP 8, vis 48, fl 7.4, pH 8.6, gels 2/16, Cl 450, solids 6, Surveys: 14½° S84°E @3940', 15° S84°E @4125', 15¼° S84°E @4309'.

2-15 Drill to 4825'. MW 9.3, PV 11, YP 6, vis 45, fl 14.2, pH 8.3, gels 2/26, Cl 450, solids 6. Surveys: 15 3/4° S86°E @4495', 15 3/4° S85°E @4680'.

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator MAY PETROLEUM Field Rincon Creek County Ventura
Well Rincon Del Mar Ranch #1, Sec. 35, T 4N, R 25W, S.B. B. & M.
A.P.I. No. 111-21336 Name L. E. Anderson (Person submitting report) Title Agent (President, Secretary or Agent)

Date 1985	
2-16	Drill to 4863'. TFNB. Drill to 5090'. MW 9.5, PV 16, YP 10, vis 48, fl 5.8, pH 9.5, gels 2/25, Cl 600, solids 8. Surveys: 16° S85°E @4833', 16¼° S83°E @5016'.
2-17	Drill to 5304'. TFNB. Drill to 5330'. MW 9.4, PV 12, YP 7, vis 45, fl 6.6, pH 9.5, gel 2/20, Cl 500, solids 8. Surveys: 16½° S80°E @5200'.
2-18	Drill to 5661'. MW 9.5, PV 22, YP 12, vis 58, fl 7.4, pH 10, gels 5/35, Cl 600, solids 9. Surveys: 16½° S81°E @5387', 16 3/4° S82°E @5569'.
2-19	Drill to 5995'. Short trip to 5720'. MW 9.5, PV 12, YP 8, vis 48, fl 5.7, pH 9.6, gels 3/25, Cl 570, solids 8. Surveys: 16 3/4° S85°E @5783'.
2-20	Drill to 6022'. POH. PU 6½" Posidrill. RIH for course correction run. Orient and drill to 6156'. MW 9.5, PV 11, YP 8, vis 43, fl 6.2, pH 9, gels 2/20, Cl 570, solids 8. Surveys: 16° S89°E @5970', 17° S86°E @ 6066', 17½° S83°E @ 6097'.
2-21	Drill to 6173'. TFNB. Orient and drill to 6231'. Circulate POH. MU BHA. MW 9.5, PV 12, YP 7, vis 43, fl 5.8, pH 9, gels 3/18, Cl 600, solids 8. Surveys: 17½° S79°E @6128', 17 3/4° S75°E @6159', 17½° S70°E @6186'.
2-22	RIH. Ream Posidrill run f/6022' to 6231'. Drill to 6463'. MW 9.6, PV 14, YP 11, vis 48, fl 6., pH 8.8, gels 3/20, Cl 550, solids 10. Surveys: 17° S65°E @6253'.
2-23	Drill to 6720'. Wiper trip to 6587'. MW 9.5, PV 14, YP 11, vis 48, fl 6.0, pH 9, gels 3/26, Cl 550, solids 10. Surveys: 17 3/4° S60°E @6438', 18° S58°E 6624'.
2-24	Drill to 7000'. Wiper trip to 6922'. Circulate samples. MW 9.6, PV 14, YP 11, vis 46, fl 6, pH 8.8, gels 3/18, Cl 550, solids 9. Surveys: 18° S58°E @6806', 17½° S54°E @6959'.
2-25	Drill to 7051'. Circulate bottoms up. Wiper trip to shoe. Circulate. Measure out of hole. RU Schlumberger. Ran DIL/SFL/GR & FDC/CNL/GR/Cal from 7051' to 915'. MW 9.5, PV 14, YP 10, vis 43, fl 5.6, pH 8.8, gels 2/21, Cl 600, solids 8.
2-26	Ran Dipmeter from 7051' to 3000'. RD Schlumberger. RIH with 4½" DP and 120' - 2 7/8" stinger to 7004'. Mix and pump 150 cf of Class "G" Neat cement. Displace w/534 cf mud. C.I.P. @ 2100 hours 2-26-85. POH. RIH. TOC witnessed by D.O.G. @ 6740'. POH. MW 9.5, PV 14, YP 11, vis 45, fl 5.8, pH 8.8, gels 2/22, Cl 600, solids 8.
2-27	RIH with DP and stinger. With stinger @6054', mix and displace 250 cf Class "G" + 20% sand + 0.5% CFR-2. Displace with 454 cf mud. CIP @1100 hours 2-27-85. POH. PU bit. RIH. TOC @5450'. CO Cement f/5450' to 5915'. POH. MW 9.2, PV 11, YP 13, vis 50, fl 8.8, pH 11.5, gels 4/30, Cl 600, solids 5.
2-28	FPOH. RIH with 6½" Dyna-Drill. Orient and drill from 5915' to 6079'. Did not get kicked off plug. POH with DD. MW 9.1, PV 7, YP 2, vis 38, fl 13.8, pH 12, gels 1/3, Cl 500, solids 5.

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator MAY PETROLEUM Field Rincon Creek County Ventura
Well Rincon Del Mar Ranch #1, Sec. 35, T 4N, R 25W, S.B. B. & M.
A.P.I. No. 111-21336 Name L. E. Anderson (Person submitting report) Title Agent (President, Secretary or Agent)

Date 1985	
3-01	FPOH. RIH with DP & stinger. Trip to unplug pipe. RIH. Stopped @1188'. POH. RIH with bit. CO bridge from 1180' to 1250'. RIH to 6079'. Circulate and condition mud. POH. RIH with stinger to 6050'. Circulate bottoms up. RU Halliburton. Unplug pipe. Circulate. MW 9.2, PV 16, YP 10, vis 49, fl 9.4, pH 12.5, gels 2/18, Cl 500, solids 6.
3-02	With stinger @5965', mix and displace 160 cf Class "G" + 20% sand + 0.5% CFR-2. Displace with 425 cf mud. CIP @0630 hours 3-2-85. POH. RIH and tag TOC @5641'. CO to 5745'. Circulate hole clean. POH. RIH with 6½" Dyna-Drill to 5700'. Trip for plugged bit. MW 9.2, PV 16, YP 10, vis 48, fl 6.6, pH 12.5, gels 2/4, Cl 450, solids 6.
3-03	RIH. Orient and drill to 5855'. POH. MU BHA. RIH. Ream from 5745' to 5855'. Drill to 5885'. MW 9.3, PV 17, YP 10, vis 50, fl 5.8, pH 12, gels 2/10, Cl 500, solids 7. Surveys: 16° S89°E @ 5757', 15½° N76°E @5820'.
3-04	Drill to 6111'. TFNB. Drill to 6165'. MW 9.5, PV 18, YP 10, vis 57, fl 6., pH 11, gels 2/8, Cl 550, solids 8. Surveys: 16 3/4° N77°E @5891', 17° N77°E @6045'.
3-05	Drill to 6165'. Wiper trip to 5267'. Drill to 6288'. Wiper trip to 5500'. MW 9.5, PV 18, YP 10, vis 48, fl 5.4, pH 11.5, gels 2/12, Cl 550, solids 9. Surveys: 18¼° N74°E @6165', 20° N73°E @6320'.
3-06	Drill to 6442'. Wiper trip to 5482'. Drill to 6548'. Wiper trip to 5750'. Drill to 6591'. MW 9.4, PV 16, YP 7, vis 47, fl 60, pH 10, gels 2/22, Cl 550, solids 8. Surveys: 20° N73°E @6320', 21° N71°E @6471'.
3-07	Drill to 6600'. Wiper trip to 5900'. Drill to 6844'. Wiper trip to 6000'. Drill to 6847'. MW 9.3, PV 18, YP 10, vis 50, fl 6.8, pH 10, gels 2/20, Cl 500, solids 9. Surveys: 23½° N70°E @6635', 26° N69°E @6813'.
3-08	Drill to 6730'. Wiper trip to 5970'. Drill to 7004'. MW 9.3, PV 16, YP 7, vis 47, fl 7.8, pH 9.8, gels 2/14, Cl 500, solids 8.
3-09	Drill to 7200'. Circulate gel sweep. Circulate for logs. Wiper trip to shoe. MW 9.4, PV 19, YP 12, vis 51, fl 7.2, pH 9.5, gels 2/16, Cl 500, solids 9. Surveys: 28° N66°E @6997', 29° N65°E @7100' est, 30° N64°E @7200' est. BHL @7200': 50.23' North & 1307.33' East from surface location.
3-10	Finish wiper trip. RIH. Circulate hole clean. POH. RU Schlumberger. Ran DIL/SFL/GR & FDC/CNL/GR/Cal from 7198' - 5650'. RD Schlumberger. RIH with DP and tubing stinger. With stinger @7102' mix & pump 150 cf Class "G" cement + 2% $CaCl_2$. Displace with 525 cf mud. CIP @0330 hours 3-10-85. POH 10 stands. Circulate & work pipe. WOC. MW 9.4, PV 18, YP 10, vis 48, fl 7.4, pH 9.5, gels 2/16, Cl 450, solids 8.

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator MAY PETROLEUM Field Rincon Creek County Ventura
Well Rincon Del Mar Ranch #1, Sec. 35, T 4N, R 25W, S.B.B. & M.
A.P.I. No. 111-21336 Name L. E. Anderson (Person submitting report) Title Agent (President, Secretary or Agent)

Date 1985	
3-11	WOC. RIH tag TOC @6826'. D.O.G. witnessed & approved plug. LDDP. With stinger @2705' mix and pump 150 cf Class "G" + 3% $CaCl_2$. Displace with 194 cf mud. CIP @1730 hours 3-11-85. POH 10 stands. Circulate clean. Fin POH. LD excess DP. RIH and tag TOC @ 2354'. D.O.G. witnessed & approved plug. POH. LDDP to 965'. Mix & pump 100 cf Class "G" + 3% $CaCl_2$. Displace with 49 cf mud. CIP @0530 hours 3-12-85. D.O.G. witnessed cement job and accept TOC calculated at 777'. POH. LDDP.
3-12	Finish POH LDDP. Remove BOPE. Clean pits. Mix 11 sx Class "G" surface plug and place @30'. CIP @1400 hours 3-12-85. Release rig @1500 hours 3-12-85. Remove casinghead flange.

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T 285-80

DIVISION OF OIL AND GAS

Report on Operations

Floyd L. Clawson, Agent
May Petroleum Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, Calif.
March 28, 1985

Your operations at well "Rincon Del Mar Ranch" 1, API No. 111-21336
Sec. 35, T. 4N, R. 25W SB B.& M. Rincon Creek Field, in Ventura County,
were witnessed on 3/11/85. S. Mulqueen, representative of
the supervisor, was present from 1400 to 1500. There were also present Micky McLean

Present condition of well: 14" cem 36'; 9 5/8" cem 915'; sidetracked at 5745'. TD 7200'.
Plugged w/cem 7100-6826', 2703-2354', 980-777'+ and 30' to 0'.

The operations were performed for the purpose of abandonment

DECISION:

THE PLUGGING OPERATIONS AS WITNESSED AND REPORTED ARE APPROVED.

b

M. G. MEFFERD

Murray W. Dosch

OG109 (9/83/GSR1/15M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 285-77

PERMIT TO CONDUCT WELL OPERATIONS

601 (field code)
00 (area code)
-- (new pool code)
10 (old pool code)

Floyd L. Clawson, Agent
May Petroleum Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, California
April 16, 1985

Your ____ proposal to abandon well "Rincon Del Mar Ranch" 1, A.P.I. No. 111-21336, Section 35, T. 4N, R. 25W, S.B. B. & M., Rincon Creek field, any area, no breakdown pool, Ventura County, dated 3/28/85, received 4/4/85 has been examined in conjunction with records filed in this office.

THE PROPOSAL, COVERING ABANDONMENT OPERATIONS, IS APPROVED ACCORDING TO PRIOR AGREEMENT PROVIDED THAT:

1. THIS DIVISION SHALL BE NOTIFIED:
   a. TO INSPECT the well site after cleanup and restoration operations are completed.

MS:ljg

Engineer Michael Stettner

Phone (805) 525-2105

M. G. MEFFERD, State Oil and Gas Supervisor

By _____
Deputy Supervisor

A copy of this permit and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

OG111 (3/85/DWRR/5M)

STATE OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

Notice of Intention to Abandon Well

FOR DIVISION USE ONLY			
CARDS	BOND	FORMS	
		OGD114	OGD121
	—	✓	✓

DIVISION OF OIL AND GAS

In compliance with Section 3229, Division 3, Public Resources Code, notice is hereby given that it is our intention to abandon well "Rincon Del Mar Ranch" 1, API No. 111-21336, Sec. 35, T. 4N, R. 25W, SB B. & M., Rincon Creek Field, Ventura County, commencing work on March 10, 1985.

The present condition of the well is:

1. Total depth: Rd #1 7200'
2. Complete casing record, including plugs and perforations (present hole)

   9 5/8" 36# K-55 ST&C CSG @ 915'

3. Last produced — (Date) (Oil, B/D) (Gas, Mcf/D) (Water, B/D)

   or

4. Last injected — (Date) (Water, B/D) (Gas, Mcf/D) (Surface pressure)

Additional data for dry hole (show depths):

5. Oil or gas shows

   7035' - 7075'

6. Stratigraphic markers

   TOP BATES ZONE 7040'

7. Formation and age at total depth
   SESPE - OLIGOCENE
8. Base of fresh water sands 2600'

9. Is this a critical well according to the definition on the reverse side of this form? ☐ Yes ☒ No

The proposed work is as follows:

1. Lay a cement plug from 7100' to 6935'. Top of plug must be at 6935' or higher. Use 150 ft^3 cmt. DOG to wit. loc & hardness.
2. Lay a cement plug from 2700' - 2500' across base of fresh water. Use 150 ft^3. DOG to witness loc and hardness of plug.
3. Plug shoe of surface casing from 965' to 865'. Use 100 ft^3 cmt. DOG to witness location and hardness of plug.
4. Set surface plug from 30' to 5'. Use 12± ft^3 ($\frac{1}{2}$ yard)

It is understood that if changes in this plan become necessary, we are to notify you immediately.

Address 2977 Sexton Canyon Road (Street)
VENTURA, (City) CALIFORNIA (State) 93003 (Zip)
Telephone Number (805) 644-9575 (Area Code) (Number)

MAY PETROLEUM, INC. (Name of Operator)
By GLEN M. WEBSTER (Print Name) AGENT
Glen M Webster (Signature) 3/28/85 (Date)

OG108 (2/84/DWRR/5M)

CRITICAL WELL

As defined in the California Administrative Code, Title 14, Section 1720(a), "Critical well" means a well within:

(1) 300 feet of the following:
  (A) Any building intended for human occupancy that is not necessary to the operation of the well; or
  (B) Any airport runway.
(2) 100 feet of the following:
  (A) Any dedicated public street, highway, or nearest rail of an operating railway that is in general use;
  (B) Any navigable body of water or watercourse perennially covered by water;
  (C) Any public recreational facility such as a golf course, amusement park, picnic ground, campground, or any other area of periodic high-density population; or
  (D) Any officially recognized wildlife preserve.

Exceptions or additions to this definition may be established by the supervisor upon his own judgment or upon written request of an operator. This written request shall contain justification for such an exception.

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T. 285-79

DIVISION OF OIL AND GAS

Report on Operations

Floyd L. Clawson, Agent
May Petroleum Inc.
2977 Sexton Canyon Rd.
Ventura, CA93003

Santa Paula, Calif.
March 28, 1985

Your operations at well "Rincon Del Mar Ranch" 1, API No. 111-21336, Sec. 35, T4N, R.25W, SB B.& M. Rincon Creek Field, in Ventura County, were witnessed on 2/27/85. M. Kratovil, representative of the supervisor, was present from 0430 to 0500. There were also present Bob March, Drilling Supervisor

Present condition of well: 14" cem 36'; 9 5/8" cem 915'. TD 7051'. Plugged with cement 7004-6740'.

The operations were performed for the purpose of abandonment of zone prior to redrill

DECISION:

THE PLUGGING/CEMENTING OPERATIONS AS WITNESSED AND REPORTED ARE APPROVED.

b

M. G.MEFFERD

Murray W. Dosch

Murray W. Dosch

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T. 285-60

DIVISION OF OIL AND GAS

Report on Operations

Floyd L. Clawson, Agent
May Petroleum Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, Calif.
Feb. 26, 1985

Your operations at well "Rincon Del Mar Ranch" 1, API No. 111-21336
Sec. 35, T. 4N, R. 25W SB B.& M. Rincon Creek Field, in Ventura County,
were witnessed on 2/9/85. M. Kratovil, representative of
the supervisor, was present from 1300 to 1530. There were also present Bob Marks,
Drilling Supervisor
Present condition of well: 14" cem 36'; 9 5/8" cem 915'. TD 915'.

The operations were performed for the purpose of testing the blowout prevention equipment and installation.

DECISION:

THE BLOWOUT PREVENTION EQUIPMENT and its INSTALLATION ON THE 9 5/8" CASING ARE APPROVED.

b

M. G. MEFFERD

Murray W. Dosch

OG108 (9/83/GSR1/15M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 285-3

PERMIT TO CONDUCT WELL OPERATIONS

601 (field code)
00 (area code)
10 (new pool code)
-- (old pool code)

Floyd L. Clawson, Agent
May Petroleum Inc.
2977 SextonCanyon Rd.
Ventura, CA 93003

Santa Paula, California
January 11, 1985

Your ____ proposal to drill well "Rincon Del Mar Ranch" 1,
A.P.I. No. 111-21336, Section 35, T. 4N, R. 25W, S.B. B. & M.,
Rincon Creek field, any area, no breakdown pool,
Ventura County, dated 1/2/85, received 1/4/85 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Sufficient cement shall be used to fill the annular space to at least 500 feet above oil and gas zones and anomalous pressure intervals, and to at least 100 feet above the base of the freshwater zone.
2. Hole fluid of sufficient quality and quantity shall be maintained in the hole to control any subsurface condition, and a reserve supply shall be on hand for emergencies.
3. Unlined sumps, if they contain harmful waters, shall not be located over fresh water bearing aquifers.
4. Any sump used during these operations shall be thoroughly cleaned and filled with earth as soon as operations are completed.
5. Blowout prevention equipment of at least DOG Class III IM B shall be installed and maintained in operating condition at all times.
6. This office shall be consulted before placing any plugs or sidetracking any hole.
7. This office shall be consulted before initiating any changes or additions to this proposed operation, or if operations are to be suspended.
8. THIS DIVISION SHALL BE NOTIFIED:
   a. TO WITNESS a pressure test of the blowout prevention equipment before drilling below 900'.
   b. TO WITNESS a test of the 5 1/2" shut-off above the zone to be produced.

Ms/Floyd Clawson, 2 Copies
Will plug [illegible]
Zone shows from [illegible] 6816'
Put [illegible] 6816-6850' Dem. [illegible]
[illegible]

Blanket Bond
MS:ljg

SM / GLEN WEBSTER 3 - [illegible]
WILL ABANDON WELL W/TD @ 7200', GAS ZONE 7040± - 7080±.
PLUGGED W/ CEM TO 6836' + TAGGED BFW PLUG TO BE FR.
2700' - 2500' BASED ON "E" LOG + MUD LOG. SHOE PLUG 965' -
865' PROPOSED & SURF PLUG 30' - 5'.

Engineer Michael Stettner

Phone (805) 525-2105

M. G. MEFFERD, State Oil and Gas Supervisor

By [signature]
Deputy Supervisor

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

OG111 (9/83/GSR1/5M)

CLAWSON PETROLEUM CONSULTANTS INC.
2977 SEXTON CANYON ROAD
VENTURA, CALIFORNIA 93003
805 644-9575

DIVISION OF OIL AND GAS
RECEIVED
SANTA PAULA, CALIFORNIA

Murray Dosch
DIVISION OF OIL & GAS
P.O. Box 67
Santa Paula, California 93060

SUBJECT: Notice of Intention to Drill New Well
Rincon Del Mar Ranch #1
Sec 35, T4N, R25W, S.B. B.M.
Ventura County, California

Dear Mr. Dosch,

Please note a revision to our referenced Notice to reflect the actual surface location as staked.

Location of well is now 1958.86 feet South along section line and 1176.97 feet West at right angles to said line from the Northeast corner of section 35.

Proposed coordinates (from surface location) at total depth will be 371 feet South and 1127 feet East.

All other submitted data should be considered correct as filed.

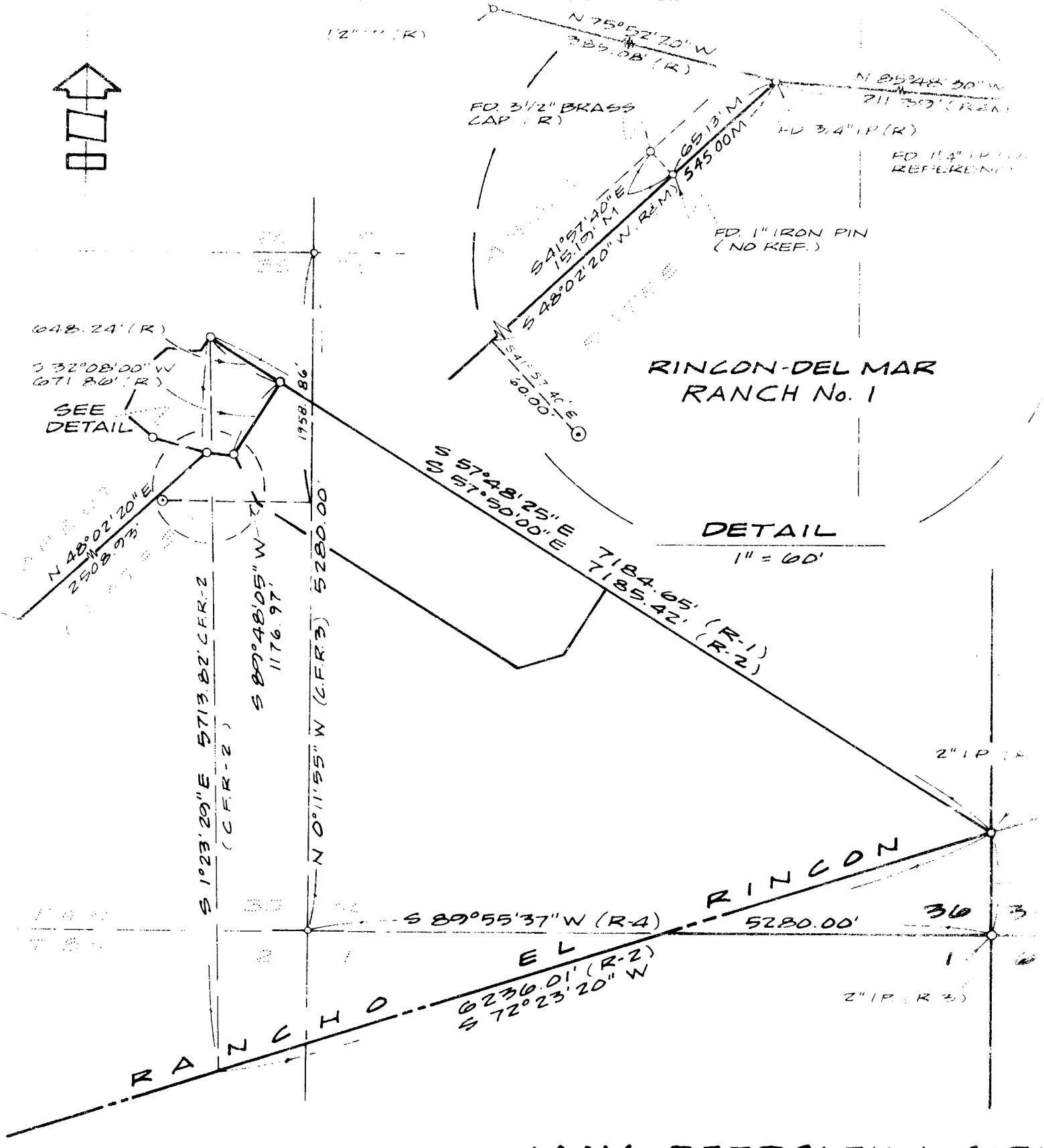
Please make these changes to the referenced Notice of Intent.

Sincerely,

L. E. Anderson

cc: Joe Clark
Well File

LEA/rmb



R = 8 P.M. 44
R-1 = 15 P.M. 57
R-2 = ASSESSOR'S
R-3 = 25 P.M. 74
R-4 = RECORDS ON FILE AT LEWIS & LEWIS, INC.

PROJECTED SECTIONS PER R-1 & R-2

LSSI
LAND & SEA SURVEYS INC
LAND SURVEYORS - OFFSHORE SURVEYORS
CIVIL ENGINEERS
2259 PORTOLA ROAD
VENTURA, CALIFORNIA 93003

MAY PETROLEUM CORP

SKETCH SHOWING

RINCON-DEL MAR RANCH No. 1

PROJECTED SECTION 35
T 4 N R 25 W
RANCHO EL RINCON
(1 A M.R. 12)

VENTURA COUNTY CALIFORNIA

JANUARY 1985 SCALE: 1" = 1000'

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

CONFIDENTIAL

DIVISION OF OIL AND GAS
Notice of Intention to Drill New Well

DIVISION OF OIL AND GAS
RECEIVED
JAN 4 1985
SANTA [illegible], CALIFORNIA

C.E.Q.A. INFORMATION			
EXEMPT ☐ CLASS ___	NEG. DEC. ☐ S.C.H. NO. ___	E.I.R. ☒ S.C.H. NO. CUP 4075	DOCUMENT NOT REQUIRED BY LOCAL JURISDICTION ☐
See Reverse Side			

FOR DIVISION USE ONLY					
MAP	MAP BOOK	CARDS	BOND	FORMS 114	FORMS 121
W2-1	1-4-85 mpk		2/3	✓	✓

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to commence drilling well Rincon Del Mar Ranch "1", API No. 111-21336 (Assigned by Division),

Sec. 35, T. 4N, R. 25W, S.B. B. & M., Rincon Creek Wildcat Field, Ventura County.

Legal description of mineral-right lease, consisting of ± 640 acres, is as follows: (Attach map or plat to scale)

See Attached Assessors Map.

Do mineral and surface leases coincide? Yes X No ___. If answer is no, attach legal description of both surface and mineral leases, and map or plat to scale.

Location of well ~~1969~~ 1957 feet South (Direction) along section / property line (Cross out one) and ~~1165~~ 1177 feet West (Direction)

at right angles to said line from the NE corner of section / property (Cross out one) 35 or

Is this a critical well according to the definition on the reverse side of this form? Yes ☐ No ☒

If well is to be directionally drilled, show proposed coordinates (from surface location) at total depth:
361 feet South (Direction) and 1115 feet East (Direction)

Elevation of ground above sea level 175 feet.

All depth measurements taken from top of Kelly Bushing (Derrick Floor, Rotary Table, or Kelly Bushing) that is 22 feet above ground.

PROPOSED CASING PROGRAM

SIZE OF CASING INCHES API	WEIGHT	GRADE AND TYPE	TOP	BOTTOM	CEMENTING DEPTHS	CALCULATED FILL BEHIND CASING (Linear Feet)
9 5/8"	36#	K-55 - ERW	0'	900'	Surface	900'
5 1/2"	15.5#	K-55 - SMLS	0'	8000'	900'	7100'

(A complete drilling program is preferred and may be submitted in lieu of the above program.)

Intended zone(s) of completion Bates Zone (Sespe) ± 5850', 9.3 ppg (Name, depth, and expected pressure) Estimated total depth 8000'

It is understood that if changes in this plan become necessary we are to notify you immediately.

Name of Operator	Type of Organization (Corporation, Partnership, Individual, etc.)	
MAY PETROLEUM INC.	CORPORATION	
Address	**City**	**Zip Code**
800 One Linclon Centre, LB-8, 5400 LBJ Freeway	Dallas, Texas	75240-6263
Telephone Number / **Name of Person Filing Notice**	**Signature**	**Date**
214-934-9600 LE Anderson	F. Lloyd L. Clanton	1-2-85

This notice and indemnity or cash bond shall be filed, and approval given, before drilling begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

OG105 (3/82/GSR1/10M)

CONFIDENTIAL

Information for compliance with the California Environmental Quality Act of 1970 (C.E.Q.A.).

If an environmental document has been prepared by the lead agency, please submit a copy of the document with this notice *or* supply the following information:

Lead Agency: _____

Lead Agency Contact Person: _____

Address: _____

_____

Phone: ( ) _____

FOR DIVISION USE ONLY
District review of environmental document (if applicable)? Yes ☐ No ☐
Remarks: _____

CRITICAL WELL

As defined in the California Administrative Code, Title 14, Section 1720(a), "Critical well" means a well within:

(1) 300 feet of the following:
  (A) Any building intended for human occupancy that is not necessary to the operation of the well; or
  (B) Any airport runway.
(2) 100 feet of the following:
  (A) Any dedicated public street, highway, or nearest rail of an operating railway that is in general use;
  (B) Any navigable body of water or watercourse perennially covered by water;
  (C) Any public recreational facility such as a golf course, amusement park, picnic ground, campground, or any other area of periodic high-density population; or
  (D) Any officially recognized wildlife preserve.

Exceptions or additions to this definition may be established by the supervisor upon his own judgment or upon written request of an operator. This written request shall contain justification for such an exception.

POR. SECS. 1,2, & 3, T3N., R.25W.
P R. SECS. 34,35 & 36 T4N,R.25W, S.B.B.& M.
Por. RO. RINCON

Tax Area Code 91006

8-16

JUL 15 1982

1" = 800'

R.s wn both solid and dotted per greement Bates and Sheldon per 508/180

DETAIL I
1" = 300'
SBV 3, (Map 95 1/2)

SCHEDULE		
	BEARING	DIST.
a	N45°33'E	106.88'
b	N30°15'E	133.37'
c	N51°07'E	140 03'
d	N57°48'E	260.82'
e	N86°47'E	336.43'
f	N32°13'E	200.32'
g	S70°24'10"E	340.00'
h	N40°51'30"E	256.58'
j	N28°50'17"E	904 12

S 56°04'W 160.45
S 09°33'30"E 87.55
S 22°54'E 502.52
S 41°W 177.87
S 0°46'E 252.52
S 45°55'W 241.82
S 35°38'W 160.45
S 41°38'W 165.59
S59°06'W 349.88'
S 07°49'40"E 151.6
N 37°45'40"E 63.85
S 04°32'20"E 118
N 44°12'E 102.7
N 06°36'E 147.3
N 25°35'20"E 207.1
N 68°59'20"E 100.4
N 21°54'E 97
N 38°29'W 99.83
N 02°21'W 283.7
S 71°56'20"E 271.2
S 55°54'40"E 265.8
S 69°01'40"E 248.2
N 46°52'20"E 136
N 26°46'E 97.75
N 23°33'W 326.15
N 19°20'20"E 415
N 03°25'20"W 422
N 24°13'40"W 104.2
N 57°22'40"W 119.2
N 15°06'40"E 106.15
N 25°05'20"W 49.5
N 77°45'40"W 215.9
N 61°09'20"W 372.8

N 33°22'E 129.95
N 84°37'E 66.35
S 81°06'E 212.45
N 58°01'E 164.06
N 37°24'E 218.3
N 57°02'40"E 49.75
N 14°04'E 97.7
N 29°06'40"E 161.6
N 61°19'W 226.71
N 80°16'W 593.74

S 73°38'40"E 366.58
N 48°02'20"E 839.72
N 42°19'E 108.85'
N 83°54'W 750.35
S 72°04'20"W 395.14
N 45°45'E 296.76
N 75°36'20"W 1521.96
N 76°00'40"W 730.01
S 72°23'30"W 6236.01
N 60°48'W 148
N 16°48'W 102.6
N 84°59'W. 3398.8'
S. 72°20'E. 190'
S.41°54'E. 69.6'
N.17°40'E. 180.2'
S.17°40'W. 145'
N.72°20'W. 249.6'

A	N44°03'W 144.4
B	N36°02'W 18.4
C	N56°39'E 135.3
D	
E	N69°50'E 107.6
F	S86°21'E 153.6
G	S77°19'E 144.9
H	N69°56'E 26.5
I	S10°83'30"W 294
J	S09°12'W 95
K	S79°42'W 211.8
L	S88°12'W 605.6
M	N83°18'W 753.8
N	N74°38'W 521
O	N65°28'W 231
P	N86°58'W 115.8
Q	N76°28'W 141
R	N86°13'W 132
S	N69°13'W 197
T	N78°43'W 387.3
U	N 51°50'20"W 407.78'
V	N75°52'20"W 408.95

DETAIL III
1" = 400'

8PM44
3722/173
(22) 16.42 Ac.
(21)
(13)
(20)
R.25W.
R.24W.
T4N
T3N
(36) 25.24 Ac.
(31) ~~55.21Ac.~~ 49.46Ac.Pl.
(30) ~~60.00Ac.~~
15RM57
(35) 34.75Ac.
28PM9
(14) 55.82Ac.
(28) 111.15Ac. P.
(29) 346.61 Ac.
(27) 124.18Ac. P.
(18) ~~236.45Ac.~~ Plan.
(26) ~~236.36Ac.~~ P.
(25) ~~236.33Ac.~~ 1961.37'
(12) ~~423.27Ac.~~
(26) ~~406.61Ac.~~
Lot 3
39 RS9
(17) ~~190.70Ac.~~
(32) ~~135.40Ac.~~ ~~137.76Ac.~~ R.S.
4513 O77
(7) 22Ac.
17.59Ac.
4.05Ac.
(94.485 CH)
TERM. 54th COURSE
NORTH 3960
(18)
(8) 1.01 Ac.
(1) 13.05Ac.
(33)
(34) 11.35Ac.
(19) (23) To state Ac(P) per 3208/402 4730-883 4309/431
(10) 39.64 A. S.B.E. 872-56-182
DEEDS (20/423) SPRW
10PM71
SEE DETAIL II
SEE DETAIL III 8PM44
SEE DETAIL II (1700/236)
TUBBS
ROAD
300' R
BRUSH
Barbara
Santa
Pacific
Ocean
STATE HWY.
101
RANCHO EL RINCON
BOUNDARY
1500'
387.1
N 84°59'W 3398.8'
TERM. 54th COURSE

DETAIL II
1" = 200'

DETAIL IV
1" = 200'
N37°38'37"E 24.62
S88°01'46"E 205.05'
193.11
N88°01'46"W
WLY TERMINUS 6th case 3208/407
S54°43'15"W 33.04'
(24) 3908/038

Bk.60

Assessor's Map Bk.8 -Pg.16
County of Ventura, Calif.

Rancho El Rincon. R.M. Bk.1A, Pg.12.

NOTE - Assessor's Block Numbers Shown in Ellipses.
Assessor's Parcel Numbers Shown in Circles

OPERATOR: May Petroleum Inc
WELL NO.: "Rincon Del Mar Ranch"
MAP:

ENTION	DRILL	RD#1	ABD			
ICE DATED	1-2-85		3-28-85			
EPORT NUMBER	285-3		285-77			
CKED BY/DATE						
LETTER DATED						

	REC'D	NEED	REC'D	NEED	REC'd	NEED	REC'D	NEED	REC'D	NEED	REC'D	NEED
ICE	1-4-85				4-4-85							
TORY	5-23-85				5-23-85							
MARY	5-23-85				5-23-85							
-LOG 5"	7-1-85		7-1-85 1-15-86									
D LOG 2 runs	4-8-85		4-8-85									
PMETER (Borehole) 5"	3-7-85											
RECTIONAL	5-23-85											
RE/SWS	4-8-85											
DIAMETER (CLUSTER)	3-7-85											
(2")	7-1-85		1-15-86									
E-LOG 2	1-15-86		7-1-85 1-15-86									
DENSITY (5")	7-1-85											

ENGINEERING CHECK

REPORTS						
ERATOR'S NAME						
LL NO.						
& ELEV						
GNATURE						
RFACE INSP.						
ILL CARD						
CORD'S COMPLETE			OMC			

FINAL LETTER OK
MAILED 1-28-87
RELEASED BOND

JECTION BOOK
LE WELL LIST
RFACE INSP. CARD

REMARKS:

MAY PETROLEUM FILE: 5257
WELL: RINCON DEL MAR RANCH NO. 1
LOCATION: VENTURA COUNTY, CA.
DATE: 2/10/85
DECL: 14.25 EAST
SEC. BEARING: S78 15E
TYPE: SINGLE SHOT SURVEYS
RIG: CAL PAC 6
SURVEYED BY: EASTMAN WHIPSTOCK
DRILLER: JIM DELANO

VERTICAL SECTION CALCULATED IN PLANE OF PROPOSAL
DIRECTION: S 78 DEG. 15 MIN. E

RECORD OF SURVEY

RADIUS OF CURVATURE METHOD

MAY PETROLEUM FILE: 5257
WELL: RINCON DEL MAR RANCH NO. 1
LOCATION: VENTURA COUNTY, CA.

COMPUTATION TIME 09:50:17 DATE 11-MAR-85

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	SUBSEA TVD FEET	RECTANGULAR COORDINATES FEET	CLOSURE DISTANCE FEET	CLOSURE DIRECTION D M	DOGLEG SEVERIT DG/100F
0.	0 0	0 0	0.	0.00	0.00	-198.00	0.00	0.00	0 0	0.00
200.	0 15	N 55 0 W	200.	200.00	-0.40	2.00	0.25 N 0.36 W	0.43	N 55 0 W	0.13
351.	0 45	N 65 0 W	151.	350.99	-1.65	152.99	0.91 N 1.50 W	1.75	N 58 46 W	0.33
502.	1 0	S 85 0 W	151.	501.98	-3.93	303.98	1.30 N 3.74 W	3.96	N 70 47 W	0.34
655.	1 0	S 65 0 W	153.	654.95	-6.30	456.95	0.62 N 6.31 W	6.34	N 84 26 W	0 3
805.	1 0	N 40 0 W	150.	804.93	-8.73	606.93	1.14 N 8.68 W	8.76	N 82 30 W	0.81
915.	0 45	N 70 0 W	110.	914.92	-10.26	716.92	2.09 N 10.04 W	10.26	N 78 13 W	0.47
1307.	3 0	N 69 0 W	392.	1306.68	-22.93	1108.68	6.59 N 22.05 W	23.02	N 73 22 W	0.57
1460.	3 30	N 60 0 W	153.	1459.43	-31.35	1261.43	10.32 N 29.88 W	31.61	N 70 57 W	0.47
1584.	4 0	N 71 0 W	124.	1583.17	-39.25	1385.17	13.67 N 37.24 W	39.68	N 69 50 W	0.70
1646.	4 0	N 75 0 W	62.	1645.02	-43.56	1447.02	14.94 N 41.38 W	43.99	N 70 9 W	0.45
1705.	1 0	N 90 0 W	59.	1703.95	-46.11	1505.95	15.27 N 43.92 W	46.50	N 70 50 W	5.16
1767.	1 30	S 75 0 E	62.	1765.94	-46.05	1567.94	14.35 N 44.05 W	46.32	N 71 57 W	4.00
1828.	4 45	S 72 0 E	61.	1826.84	-42.73	1628.84	13.41 N 40.86 W	43.00	N 71 50 W	5.33
1941.	6 0	S 80 0 E	113.	1939.34	-32.16	1741.34	10.85 N 30.60 W	32.46	N 70 29 W	1.29
2063.	5 30	S 80 0 E	122.	2060.73	-19.95	1862.73	8.72 N 18.56 W	20.51	N 64 49 W	0.41
2186.	6 0	S 82 0 E	123.	2183.11	-7.64	1985.11	6.80 N 6.39 W	9.33	N 43 13 W	0.44
2340.	6 30	S 80 0 E	154.	2336.19	9.11	2138.19	4.17 N 10.17 E	10.99	N 67 41 E	0 35
2495.	6 45	S 80 0 E	155.	2490.16	26.98	2292.16	1.07 N 27.78 E	27.81	N 87 48 E	6
2648.	6 30	S 80 0 E	153.	2642.14	44.63	2444.14	2.00 S 45.17 E	45.22	S 87 28 E	0.16
2804.	8 30	S 78 0 E	156.	2796.79	64.99	2598.79	5.88 S 65.16 E	65.42	S 84 51 E	1.29
2927.	10 0	S 70 0 E	123.	2918.19	84.69	2720.19	11.33 S 84.15 E	84.91	S 82 20 E	1.60
3047.	10 30	S 66 0 E	120.	3036.27	105.70	2838.27	19.32 S 103.94 E	105.72	S 79 28 E	0.72
3168.	12 0	S 63 0 E	121.	3154.95	128.63	2956.95	29.49 S 125.25 E	128.67	S 76 45 E	1.33
3290.	14 0	S 63 0 E	122.	3273.81	155.10	3075.81	41.94 S 149.70 E	155.46	S 74 21 E	1.64
3332.	14 0	S 65 0 E	42.	3314.57	164.95	3116.57	46.40 S 158.83 E	165.47	S 73 43 E	1.15
3363.	13 45	S 72 0 E	31.	3344.66	172.27	3146.66	49.12 S 165.74 E	172.87	S 73 29 E	5.47
3480.	13 30	S 83 0 E	117.	3458.37	199.79	3260.37	55.08 S 192.61 E	200.33	S 74 3 E	2.22
3634.	14 0	S 81 0 E	154.	3607.96	236.31	3409.96	60.17 S 228.85 E	236.63	S 75 16 E	0.45
3746.	14 15	S 82 0 E	112.	3716.57	263.60	3518.57	64.21 S 255.89 E	263.82	S 75 55 E	0.31

MAY PETROLEUM FILE: 5257
WELL: RINCON DEL MAR RANCH NO. 1
LOCATION: VENTURA COUNTY, CA.

COMPUTATION TIME 09:50:17 DATE 11-MAR-85 PAGE NO. 2

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	SUBSEA TVD FEET	RECTANGULAR COORDINATES FEET	CLOSURE DISTANCE FEET	CLOSURE DIRECTION D M	DOGLEG SEVERITY DG/100F
3940.	14 30	S 84 0 E	194.	3904.50	311.60	3706.50	70.08 S 303.69 E	311.67	S 77 0 E	0.29
4125.	15 0	S 84 0 E	185.	4083.40	358.46	3885.40	75.00 S 350.53 E	358.47	S 77 55 E	0.27
4309.	15 15	S 84 0 E	184.	4261.02	406.23	4063.02	80.02 S 398.28 E	406.24	S 78 38 E	0.14
4495.	15 45	S 86 0 E	186.	4440.26	455.59	4242.26	84.35 S 447.79 E	455.67	S 79 20 E	0.39
4680.	15 45	S 85 0 E	185.	4618.31	505.40	4420.31	88.29 S 497.86 E	505.62	S 79 57 E	0.15
4833.	16 0	S 85 0 E	153.	4765.48	546.97	4567.48	91.94 S 539.55 E	547.33	S 80 20 E	0.16
5016.	16 15	S 83 0 E	183.	4941.28	597.54	4743.28	97.25 S 590.10 E	598.06	S 80 38 E	0.33
5200.	16 30	S 80 0 E	184.	5117.81	649.32	4919.81	104.92 S 641.39 E	649.92	S 80 43 E	0.48
5387.	16 30	S 81 0 E	187.	5297.11	702.39	5099.11	113.69 S 693.77 E	703.03	S 80 42 E	0.15
5569.	16 45	S 82 0 E	182.	5471.51	754.37	5273.51	121.38 S 745.27 E	755.09	S 80 45 E	0.21
5783.	16 45	S 85 0 E	214.	5676.43	815.78	5478.43	128.36 S 806.54 E	816.69	S 80 57 E	0.40
5970.	16 0	S 89 0 E	187.	5855.84	867.88	5657.84	131.12 S 859.18 E	869.13	S 81 19 E	0.72
6066.	17 0	S 86 0 E	96.	5947.88	894.78	5749.88	132.31 S 886.41 E	896.23	S 81 31 E	1.37
6097.	17 30	S 83 0 E	31.	5977.49	903.92	5779.49	133.19 S 895.56 E	905.41	S 81 32 E	3.29
6128.	17 30	S 79 0 E	31.	6007.06	913.23	5809.06	134.65 S 904.77 E	914.73	S 81 32 E	3.88
6159.	17 45	S 75 0 E	31.	6036.60	922.61	5838.60	136.76 S 913.91 E	924.09	S 81 29 E	3.99
6186.	17 30	S 70 0 E	27.	6062.33	930.74	5864.33	139.22 S 921.71 E	932.16	S 81 25 E	5.68
6253.	17 0	S 65 0 E	67.	6126.32	950.26	5928.32	146.82 S 940.06 E	951.45	S 81 7 E	2.33
6438.	17 45	S 60 0 E	185.	6302.88	1003.41	6104.88	172.32 S 989.04 E	1003.94	S 80 7 E	0
6624.	18 0	S 58 0 E	186.	6479.90	1057.31	6281.90	201.72 S 1037.98 E	1057.40	S 79 0 E	0.36
6806.	18 0	S 58 0 E	182.	6652.99	1110.07	6454.99	231.53 S 1085.67 E	1110.08	S 77 58 E	0.00
6959.	17 30	S 54 0 E	153.	6798.71	1153.23	6600.71	257.60 S 1124.33 E	1153.47	S 77 6 E	0.86
7051.	17 30	S 54 0 E	92.	6886.45	1178.46	6688.45	273.87 S 1146.72 E	1178.97	S 76 34 E	0.00

STATION AT 7051 MD IS PROJECTED

FINAL CLOSURE - DIRECTION: S 76 DEGS 34 MINS 4 SECS E
DISTANCE: 1178.97 FEET

MAY PETROLEUM FILE: 5283
WELL: RINCON DEL MAR RANCH NO. 1 REDRILL
LOCATION: VENTURA COUNTY, CA.

COMPUTATION TIME 11:06:25 DATE 11-MAR-85

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	COURSE LENGTH FEET	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	CLOSURE DISTANCE FEET	CLOSURE DIRECTION D M	DOGLEG SEVERITY DG/100FT
5569.	16 45	S 82 0 E	0.	5471.51	740.06	121.38 S 745.27 E	755.09	S 80 45 E	0.00
REDRILL BEGINS AT 5705 MD									
5705.	16 45	S 85 0 E	136.	5601.74	778.80	125.82 S 784.21 E	794.24	S 80 53 E	0.
5757.	16 0	S 89 0 E	52.	5651.63	793.40	126.58 S 798.84 E	808.81	S 81 0 E	2.
5820.	15 30	N 76 0 E	63.	5712.26	810.40	124.65 S 815.79 E	825.26	S 81 19 E	6.49
5891.	16 45	N 77 0 E	71.	5780.47	829.74	120.05 S 834.96 E	843.55	S 81 49 E	1.80
6045.	17 0	N 77 0 E	154.	5927.84	873.65	109.99 S 878.52 E	885.38	S 82 52 E	0.16
6165.	18 15	N 74 0 E	120.	6042.20	909.15	100.90 S 913.69 E	919.25	S 83 42 E	1.29
6320.	20 0	N 73 0 E	155.	6188.64	958.35	86.47 S 962.38 E	966.26	S 84 52 E	1.15
6471.	21 0	N 71 0 E	151.	6330.08	1009.23	70.13 S 1012.67 E	1015.10	S 86 2 E	0.81
6635.	23 30	N 70 0 E	164.	6481.85	1068.52	49.41 S 1071.20 E	1072.34	S 87 22 E	1.54
6813.	26 0	N 69 0 E	178.	6643.49	1139.26	23.31 S 1141.00 E	1141.24	S 88 50 E	1.42
6997.	28 0	N 66 0 E	184.	6807.43	1217.60	8.65 N 1218.16 E	1218.19	N 89 36 E	1.31
7100.EST.	29 0	N 65 0 E	103.	6897.94	1263.07	29.03 N 1262.88 E	1263.22	N 88 41 E	1.08
7200.EST.	30 0	N 64 0 E	100.	6984.98	1308.29	50.23 N 1307.33 E	1308.29	N 87 48 E	1.11

FINAL CLOSURE - DIRECTION: N 87 DEGS 47 MINS 59 SECS E
DISTANCE: 1308.29 FEET

*****REDRILL****

DATA FILE: 85257

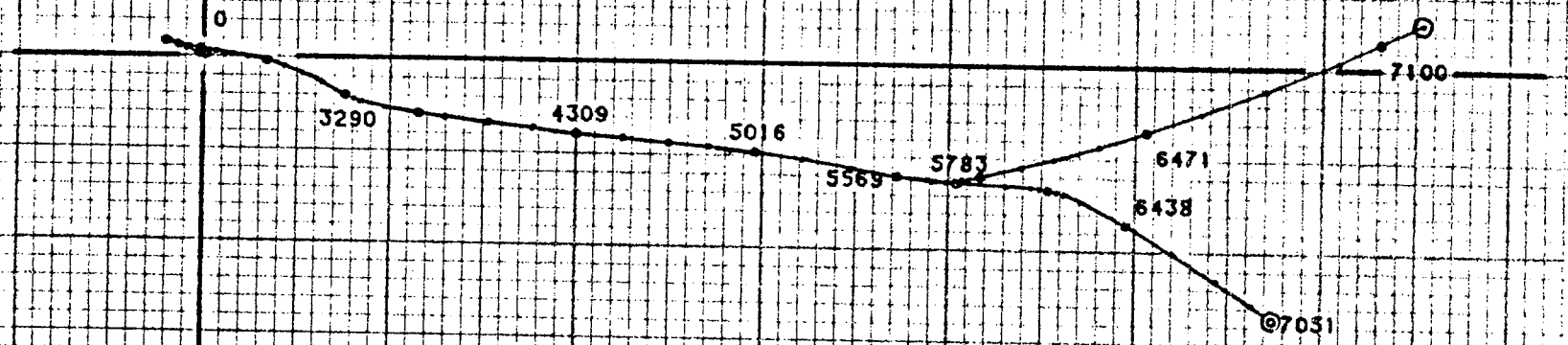
MAY PETROLEUM FILE: 5257
WELL: RINCON DEL MAR RANCH NO. 1
LOCATION: VENTURA COUNTY, CA.

EASTMAN WHIPSTOCK, INC.

HORIZONTAL PROJECTION

SCALE 1 IN. = 200 FEET
DEPTH INDICATOR: MD

REDRILL
FINAL STATION:
DEPTH 7200 MD, 6984.98 TVD
NORTH 50.23 EAST 1307.33
CLOSURE 1308.29 N 87 47 59 E

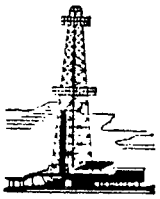


FINAL STATION:
DEPTH 7051 MD, 6886.45 TVD
SOUTH 273.87 EAST 1146.72
CLOSURE 1178.97 S 76 34 4 E

BURNS GEOLOGICAL EXPLORATION, INC.

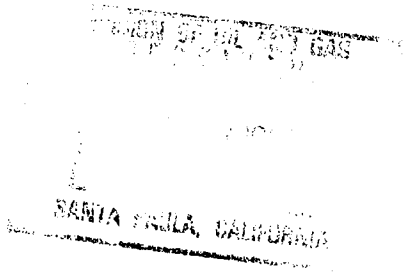
30112 SANTIAGO RD. • RANCHO CALIFORNIA, CALIF. 92390

PHONE: 714-676-5699



WELL LOGGING
CORE ANALYSIS
CHROMATOGRAPHY
MUD ANALYSIS





ENGINEERING REPORT

MAY PETROLEUM, INC.
RINCON DEL MAR RANCH #1 & REDRILL #1
SECTION 35 - T4N - R25W - SBB&M
RINCON CREEK AREA
VENTURA COUNTY, CALIFORNIA

111-21336

WELL DATA AND SPECIFICATIONS

COMPANY:	MAY PETROLEUM, INC.
WELL:	RINCON DEL MAR RANCH #1 & REDRILL #1
API #:	111-21336
LOCATION:	1969' FROM THE NORTH LINE AND 1165' FROM THE EAST LINE OF THE NORTHEAST CORNER OF SECTION 35, T4N, R25W, SBB&M
ELEVATION:	175.0' G.L./197.0' K.B.
AREA:	RINCON CREEK
COUNTY:	VENTURA
STATE:	CALIFORNIA
COMPANY GEOLOGIST:	BILL LANGENBAHN/BILL BARKER
COMPANY ENGINEER:	FLOYD CLAWSON
COMPANY PUSHER:	CHUCK MARTIN
LOGGING GEOLOGISTS:	BRUCE LEWIS/MARK MURRAY/MIGUEL GARCIA
INTERVAL LOGGED:	2900' TO 7051'/5795' TO 7200'
DATE:	2/12/85-2/26/85 - 3/3/85-3/10/85
CONTRACTOR:	CAL PACIFIC DRILLING COMPANY
PUSHER:	BOB MARCH/JESS BAXTER
MAST:	RIG #6/DRECO FULL VIEW
DRAWWORKS:	SUPERIOR 1100
MOTORS:	GENERAL ELECTRIC 752 HP
PUMP #1:	OILWELL A1100-PT/STROKE: 6" X 10"
MOTORS:	GENERAL ELECTRIC 752 HP
PUMP #2:	OILWELL A850-PT /STROKE: 6" X 9"
MOTORS:	GENERAL ELECTRIC 752 HP
MUD TYPE:	GEL-BENEX
MUD CONTRACTOR:	NL BAROID
MUD ENGINEER:	RON DICKMAN
DIRECTIONAL	EASTMAN WHIPSTOCK
DIRECTIONAL ENGINEER:	KEN WALKER
ELECTRIC LOGGING:	SCHLUMBERGER
LOGGING ENGINEER:	JEFF LITTLE

TIME PERCENTAGE BREAKDOWN*

	HOURS	PERCENT(%)
DRILLING ACTUAL	401.50	52.3
DYNADRILLING & EYETOOL	54.25	7.1
REAMING	9.50	1.2
OPEN HOLE	----	----
CIRCULATE MUD & DRY JOBS	31.25	4.1
SAMPLE	6.00	.8
E LOG	1.50	.2
DST OR CORE	----	----
HIGH GAS	----	----
TRIPS BITS	39.25	11.5
DIRECTIONAL	31.00	4.0
LOG/CORE/TESTS	4.50	.6
WIPER	12.25	1.6
SURVEYS	36.50	4.7
BOPE NIPPLE UP OR DOWN	12.00	1.6
TEST BOPE	1.00	.1
WIRE LINE LOGGING	20.00	2.6
TESTING	----	----
CORING	----	----
FISHING/INCLUDES TRIPS	----	----
WORKING OR STUCK PIPE	----	----
DRILL/MILL/WORK JUNK	----	----
CASING RUN & CEMENT	13.00	1.7
WAIT ON CEMENT	8.00	1.0
DRILL CEMENT	10.50	1.4
REPAIR RIG	.50	.1
CUT & SLIP LINE	4.50	.6
SERVICE RIG	----	----
OTHER	21.50	2.8
WAIT ON ORDERS	.50	.1
TOTALS	768.00	100.0

*TIME PERIOD COVERS FROM SPUD ON FEBRUARY 7, 1985 TO FEBRUARY 26, 1985 AT 11:59 P.M.

20 DAYS @ 24 HOURS/DAY = 480 HOURS.

WELL HISTORY DAILY REPORT

DATE	DEPTH	ACTIVITY
2-7	685'	Rig up. Make up kelly, mix spud mud. Pick up monel, make up BHA and RR #1, RIH to 60' and drill 12-1/4" hole to 150'. Unload casing. Drill to 685' with surveys at 200', 351', 502' and 655'.
2-8	915'	Drill to 915'. Circulate 1/4 hour, survey. Wipe hole to surface. RTB, circulate bottoms up for casing. POOH for casing. Rig up and run 9-5/8" casing, rig up for top job, test flange weld to 750 psi for 1/4 hour-held. Nipple up. CASING AND CEMENT DETAILS: Ran 24 joints, 9-5/8", 36#, K55, ST&C casing with shoe set at 915' and insert valve at 882'. Preflushed with 150 cf water and 150 cf mud-flush. Cemented with 255' cf class "G" premixed with 1:1 perlite, 2% gel, 2% CaCl2 and 1/4 lb/sack flocele. Followed by 172 cf class "G" with 2% CaCl2. Displaced with 68-1/2 barrels drilling mud. Bumped plug with 1500 psi. CIP @ 1420 hours, Halliburton. No returns to surface. Top job performed.
2-9	1154'	Nipple up. Test blind rams to 1000 psi for 1/4 hour. Lay down 12-1/2" drilling assembly, make up 8-3/4" drilling assembly with new bit #2. Pressure up BOPE to 1000 psi. Test witnessed and approved by Division of Oil and Gas. RIH and drill out float at 882', circulate out cement to shoe. Drill out shoe and drill to 1142', circulate 1/2 hour, survey, POOH. Check bit, pick up and make up stabilizers. Check BOPE, RTB and drilling.
2-10	1855'	Drill to 1646', circulating and surveying at 1307', 1460' and 1584'. Circulate and clean cellar. Gravel pack casing at surface, weld brace plate to casing. Survey, POOH. Make up dynadrill and new bit #3. RTB, orient tool and dynadrill to 1855' with surveys at 1689', 1750' and 1811'.
2-11	2799'	Dynadrill to 1873', survey, POOH. Lay down dynadrill, make up BHA and new bit #4. RIH to 1740', ream dyna-drill to bottom and drill to 2088' with surveys at 1968' and 2088'. Drill to 2520', circulating and surveying at 2211', 2335' and 2520'. Repair rotary clutch hose and drill to 2704', circulate 1/4 hour, survey, POOH. Make up new bit #5 and stabilizers. RTB and drilling.

DATE	DEPTH	ACTIVITY
2-12	3379'	Drill to 3359', circulating and surveying at 2829', 2952', 3072' and 3193'. Drill to 3315', circulate samples 1 hour, survey, POOH. Change out kelly, service kelly spinner and POOH. Check BOPE. Make up new BHA with dynadrill and new bit #6. RIH, circulate out 20' fill. Survey, orient tool, dynadrill with survey at 3290'.
2-13	3797'	Dynadrill to 3428' with surveys at 3332' and 3363', pump pill, POOH. Make up new bit #7 and new BHA. RIH to 3315', ream to bottom and drill to 3797' with surveys at 3480', 3664' and 3776'. Pump pill and POOH. Make up new bit #8. Check BOPE.
2-14	4339'	Slip and cut drilling line 120'. RTB and drill to 4339' with surveys at 3940', 4125', 4309' and 4339', POOH for bit #9.
2-15	4710'	RTB and drill to 4525', survey. Drill to 4710', circulate 1/2 hour, survey.
2-16	5015'	Drill to 4863', survey, pump dry job, POOH. Make up new bit #10. RIH to 4822', ream to bottom (15' of fill) and drilling.
2-17	5304'	Drill to 5304' with surveys at 5016' and 5200', pump dry job, POOH. Make up new bit #11.
2-18	5579'	RIH to shoe, slip and cut drilling line 15' - 1/2 hour. RIH to 5294', circulate out 10' of fill to bottom. Drill to 5417', survey and drilling.
2-19	5912'	Drill to 5599', survey. Drill to 5720', wipe hole 8 stands. RTB and drill to 5813', survey and drilling.
2-20	6109'	Drill to 6000', circulate 1/2 hour, wipe hole 10 stands. RTB and drill to 6022', pump dry job, POOH for dynadrill. Make up dynadrill and new bit #12. RIH to 5959', ream to bottom, circulate and orient dynadrill. Dynadrill to 6109' with surveys at 6050' and 6080'.

DATE	DEPTH	ACTIVITY
2-21	6225'	Dynadrill to 6173' circulating and surveying at 6111' and 6142'. Circulate 1/2 hour, POOH. Make up new bit #13 on dynadrill. RIH to shoe, slip and cut drilling line 20' - 1/2 hour. RIH to 6140', ream to bottom, survey and orient dynadrill. Dynadrill to 6216' with survey at 6204', POOH one stand and circulate. Call Geologist - 1-1/2 hours, RTB and dynadrilling.
2-22	6404'	Dynadrill to 6231', survey, POOH one stand. Circulate out samples 1/2 hour, POOH. Lay down dynadrill, make up drilling assembly and RR#11. RIH to 6022', ream dynadrill run to bottom. Drill to 6278', circulate, survey and drilling.
2-23	6669'	Drill to 6587' with survey at 6463'. Wipe hole 5 stands, RTB and drill to 6649', survey and drilling.
2-24	6927'	Drill to 6831', circulate 1/2 hour, survey. Drill to 6922', wipe hole 5 stands, RTB and drilling.
2-25	7051'	Drill to 6984', circulate 1/2 hour, survey. Drill to 7000', circulate samples 1 hour, pump dry job, POOH 2 stands. RTB and drill to 7051', circulate samples 1-1/2 hours, pump dry job. Wipe hole to shoe for E-logs. RTB and circulate out for E-logs - 1-1/2 hours, POOH. Rig up Schlumberger; run DIL-FDC-CNL-GR-CAL log.
2-26	7051'	Run DIL-FDC-CNL-GR-CAL, HDT. Rig down Schlumberger, run in hole with drill collars. POOH and stand back collars, slip and cut drilling line - 1 hour. Unload and pick up tubing and drill pipe. RIH to 7004', circulate and condition mud - 1-1/2 hours. Set cement plug at 7004', POOH 7 stands, circulate 1 hour, POOH. PLUG DETAILS: Stinger hung at 7004'. Set cement plug at 7004' with 150 cf class "G" and displaced with 534 cf drilling mud. CIP at 2100 hours, Halliburton.
REDRILL #1		
2-27	5668'	POOH. Change BHA, RIH to 6745', drill cement to 6800'. POOH to 6463', circulate 1/2 hour, RIH to 6745' and tag cement for Division of Oil and Gas. Plug at 6740' (witnessed and approved by M. J. Pratovil, California Division of Oil and Gas representative). Circulate and pump dry job 1/2 hour, POOH. Pick up tubing, RIH to 6056', circulate and rig up cementers 1/2 hour. Circulate and condition mud at 6056' - 1 hour, cement plug, POOH to 5132'.

DATE	DEPTH	ACTIVITY
		PLUG DETAILS FOR PLUG AT 6054': Set plug at 6054'. Cemented with 250 cubic feet Class "G" with 20% sand and 0.5% CFR2. Displaced with 454 cubic feet drilling mud. CIP @ 1130 hours. Halliburton. Circulate to clear drill pipe - 1 hour, POOH. Lay down tubing and tear out cementers, make up RR#6, RIH to 5353', circulate and condition mud - 1 hour, drill out cement to 5638' and drilling.
2-28	6018'	Drill cement from 5668' to 5823', circulate 1/2 hour. Drill cement to 5915', circulate 1/2 hour, POOH. Make up NB#14 and dynadrill. RIH to shoe, slip drilling line 20' - 1/2 hour. RTB, circulate 1/4 hour, survey and orient dynadrill - 1/2 hour. Dynadrill to kick off plug and dynadrilling with surveys at 5879', 5941' and 5971'.
3-1	6079'	Dynadrill to 6079', circulate 1 hour, survey, POOH. Lay down dynadrill and pick up tubing to cement back. RIH with tubing to 6056', rig up cementers, work plugged drill pipe - unable to unplug drill pipe. POOH to clear plug in pipe. Lay down plugged drill pipe. RIH to 1515', unplug pipe (unable to get to bottom with tubing), POOH. Make up RR#14 and BHA. RIH to 1180', circulate 1/4 hour, ream from 1180' to 1250'. RIH to 6039', ream to 6079', circulate and condition mud - 2-1/2 hours, POOH.
3-2	5745'	POOH. Pick up tubing and RIH to 6050', circulate 1 hour. Rig up cementers, work plugged drill pipe. POOH to 5100' and clear plugged drill pipe. RIH to 5965', circulate 1 hour and cement plug, POOH. PLUG DETAILS FOR PLUG SET AT 5965': Set cement plug with stinger held at 5965'. Cemented with 160 cubic feet Class "G" with 20% sand and 0.5% GER. Displaced with 450 cubic feet drilling mud. CIP at 0400 hours. Halliburton. Lay down tubing, make up BHA and slip drilling line 20' - 1/2 hour. RIH to 5169', circulate and wait on cement - 3-1/2 hours. Clean out cement from 5641' to 5696'. Lay down drill pipe, circulate and wait on cement - 2 hours. Clean out cement to 5728', circulate and wait on cement - 2-1/2 hours. Clean out hard cement to 5745', circulate and condition mud 1 hour, POOH.

DATE	DEPTH	ACTIVITY
3-3	5855'	POOH. Make up dynadrill and NB#15. RIH to shoe, rig up Eastman-Whipstock eyetool. RIH to 5700' (tight), work plugged bit - no good. POOH to clear jets. Clear bit jets, change out dynadrill. RIH to 5668', ream to 5745'. RIH with eyetool and orient eyetool. Dynadrill with eyetool to 5792', POOH eyetool and make connection (60'). RIH with eyetool, set and orient eyetool. Dynadrill with eyetool to 5855', pull eyetool and tear out Eastman-Whipstock, POOH.
3-4	6125'	Change BHA, make up NB#16. RIH to 3000' and break circulation. RIH to 5745', ream dynadrill run to bottom and drill to 6111' with surveys at 5891' and 6645'. Circulate and pump dry job, POOH. Make up new BHA and NB#17. RIH to 3000' and break circulation, RTB and drilling.
3-5	6262'	Drill to 6196' with survey at 6165'. Wipe hole 10 stands, RTB and drilling.
3-6	6543'	Drill to 6288', circulate samples 1/2 hour. Wipe hole 8 stands, RTB and drill to 6442' with survey at 6320'. Wipe hole 10 stands, RTB and drilling with survey at 6471'.
3-7	6779'	Drill to 6548', wipe hole 8 stands. RTB and drill to 6659', circulate 1/4 hour, survey. Wipe hole 10 stands, RTB and drilling.
3-8	6967'	Drill to 6844', circulate 1/4 hour, survey. Wipe hole 8 stands, RTB and drill to 5970'. Wipe hole 10 stands, RIH - hit bridge at 6855'. Circulate out fill to bottom and drilling.
3-9	7169'	Drill to 7004', wipe hole 8 stands. RTB and drill to 7028', survey. Drill to 7126', pump dry job, wipe hole 10 stands. RTB and drilling.
3-10	7200'	Drill to 7200' (T.D.). Circulate and pump sweep - 2 hours. POOH to shoe, slip and cut drilling line 1 hour. RIH to 7180' and wash to bottom. Circulate and pump sweep for E-Logs - 2-1/2 hours, POOH. Rig up Schlumberger, run DIL-SFL-FDC-CNL-GR-CAL log. Tear out Schlumberger, wait on orders - 1/2 hour. RIH to plug well. Unit released by Mr. Bill Barker at 11:59 P.M.

LITHOLOGICAL AND SHOW DESCRIPTIONS

2975' SAND: Predominantly clear, light gray, frosted, very fine to medium, trace coarse, fair sorting, subangular to sub-round, moderately calcareous, unconsolidated, clayey in part, abundant fossil fragments, trace micromica scattered traces sandstone.

3020' CLAY: Light to medium gray, very soft to soft, easily soluble to slowly soluble, slightly sticky, sandy.

3105' SAND: Frosted, clear, quartz, abundant dark gray, gray, and black good trace green mafic fragments, fine to coarse, predominantly medium, subangular to well rounded, trace angular, primarily rounded, good sort, unconsolidated with some siliceously cemented sandstone, clayey matrix, abundant fossil shell fragments, no stain, cut or fluorescence.

3315' SAND/SANDSTONE: Clear, grayish, frostey, abundant green and yellow quartz, very fine to fine with abundant medium, fair sorting, subangular to rounded, unconsolidated to firm friable in part, very calcareous, abundant micro-fossils, trace pyrite and micromica.

3500' CLAY: Light gray to gray with a bluish cast, very soft, massive, interbedded with sandy siltstone, slightly sticky, easily soluble.

3720' SANDSTONE: Light gray and white, easily friable to firm, interbedded with siltstone and clay, very fine to fine, well sorted, calcareous cement, primarily cement supported, may grade to very sandy siltstone, slight trace pyrite, very good trace fossil shell fragments, slow bright yellow cut fluorescence, very faint visible cut.

4000' SANDSTONE: Light gray to white, firm to easily friable, very fine to fine, very abundant calcareous cement, primarily cement supported grains, trace quartzite, well sorted, interbedded with sandy siltstone, clay and claystone, trace loose quartz grains, good trace biotite inclusions, slight trace pyrite, trace fossil shell fragments, no stain, cut or fluorescence.

4050' CLAYSTONE: Gray to bluish gray, easily friable with some firm friable, non-calcareous, interbedded with clay, sandy siltstone and sandstone, poorly soluble to insoluble, slight trace fossil shell fragments.

4260' SAND: Predominantly clear and frosted, some dark gray, slight trace green, quartz, slight trace mafics, very fine to medium, primarily medium, subangular to well rounded, predominantly rounded and well rounded, good to fair sort, unconsolidated with trace very fine sandstone, very abundant kaolin and pyrite, slight trace fossil shell fragments, very slow light yellow cut fluorescence, no visible cut or odor, clayey matrix.

4320' CLAYSTONE: Very light gray to gray, greenish gray, slightly firm to firm, silty, occasional fine sands, interbedded.

4355' CLAY/CLAYSTONE: Rusty brown, tan, yellowish, very soft to soft, very slowly soluble to insoluble, silty, sandy, very sticky.

4460' SILTSTONE: Dark brown to dark reddish brown, easily friable with some firm friable, non-calcareous, massive with interbeds of claystone and stringers of selenite gypsum, very clayey, slightly micromicaceous, trace pyrite, no oil stain.

4550' CLAY: Brown, reddish brown and rust, soft to slightly firm in parts, interbedded with siltstones and sands, non-calcareous, clayey to sandy in parts, trace pyrite, slight trace selenite gypsum stringers, easily soluble to slow soluble, sticky to very sticky.

4575' Very abundant selenite gypsum noted in samples, interbedded within siltstones.

4625' SILTSTONE: Dark brown to brown, some light brown and grayish brown, firm to easily friable, non-calcareous, interbedded with gypsum and claystones, clayey in parts, may grade to claystone, sandy in parts, trace pyrite, no oil staining.

4700' SILTSTONE: Light to dark brown, tan, reddish to yellowish cast, easily friable to firm friable, massive, occasional streaks gypsum, trace fine sand and pyrite, very clayey, may grade to clay or claystone, no oil.

4940' SANDSTONE: Light to dark grayish, brown, tan, some greenish, very fine to fine with trace medium, easily friable to firm friable, calcareous in part, interbedded, very silty and clayey, trace mica, no stain, cut, or fluorescence.

5100' SILTSTONE: Medium to dark brown with reddish cast, some tan to rusty, soft to very firm, massive to interbedded with sands and occasionally fine sandy, abundant streaks gypsum, scattered traces kaolin, pyrite and shell fragments, may grade to clay, no oil, stain or cut.

5270' CLAYSTONE: Green to pea green, easily friable with some firm friable, non-calcareous, interbedded within siltstones, insoluble, slightly sandy in part, may grade to sandy siltstone in parts.

5325' Very abundant gypsum stringer in siltstone, easily friable to firm, slight trace microfossils.

5370' SILTSTONE: Medium to dark brown, grayish brown, tan, occasional reddish cast, slightly firm to very firm, calcareous in part, massive to interbedded with sands, fine sandy in part, very clayey in part, abundant streaks clear to milky gypsum, scattered traces shell fragments and pyrite.

5400' SAND: Predominantly clear, very fine to medium, predominantly fine, subangular to subround, well sorted, unconsolidated, interbedded with siltstones and clays, slight pale yellow cut fluorescence, faint visible cut, faint fleeting petroleum odor, no stain.

5500' SILTSTONE: Brown to reddish brown, some tan to grayish brown, easily friable to firm friable, massive with abundant stringers and thin interbeds of gypsum, non-calcareous, slightly micromicaceous in parts, clay mostly with some slightly sandy, may grade to sandy siltstone in part, good trace pyrite, slow bright yellow cut fluorescence, straw visible cut, no stain.

5505' CLAY: Brown to orangish brown, some orange, very soft to slightly firm, massive to interbedded with siltstone and thin sandstone stringers, soluble to slow soluble, trace insoluble, sticky.

5700' SAND/SANDSTONE: Predominantly clear, whitish, grayish, some frosted quartz, fine to medium with traces coarse, fair sort, subangular to subround, calcareous, very silty, abundant kaolin and gypsum, very faint visible cut, pale yellow cut fluorescence, trace fleeting odor.

5770' SAND/SANDSTONE: Clear to grayish, white, brown, fine to coarse, predominantly medium, subangular to subround, unconsolidated to slightly hard, calcareous, interbedded, abundant gypsum and kaolin, trace pyrite and mica, clayey matrix, no oil stain, cut or fluorescence.

5815' SAND: Predominantly clear, gray, frosted, scattered traces white and green quartz, fine to coarse, subangular to subround, poorly consolidated, calcareous in part, very clayey matrix, trace whitish to yellow cut fluorescence, very faint visible cut.

5900' CLAY: Brown to orangish brown and some tan, firm to soft, massive to interbedded with siltstone and sands, slow soluble to soluble, very sandy.

6080' SAND: Frosted, clear, some gray, white and yellow, quartz, fine to medium, primarily medium, subangular to rounded, trace well rounded, predominantly subrounded, good sort, unconsolidated, clayey matrix, good trace free biotite flakes, interbedded with siltstones, no oil stain, cut or fluorescence.

6230' SAND: Clear, light to medium gray, frosted, green, scattered white and yellow quartz, fine to medium with abundant coarse, subangular to occasionally rounded, fair sorting, calcareous in part, interbedded with siltstones, good trace gypsum and pyrite, scattered trace fossil fragments, clayey matrix, very faint yellow cut fluorescence, faint visible cut, occasionally live, dull orange oil pops, fleeting petroleum odor, no visible oil stain.

6525' SILTSTONE: Light to medium brown, occasionally reddish brown, clayey, easily friable to firm friable, slightly calcareous, massive, predominantly sandy matrix, trace micromica and pyrite, trace kaolin, interbedded with very fine sands.

6740' SAND: Clear, frosted, slight trace gray and green, quartz, very fine to medium, predominantly medium, subangular to rounded, some well rounded, trace angular, primarily subrounded, well sorted, unconsolidated with trace gray very fine sandstone, clayey matrix with thin interbeds of siltstone, trace kaolin, slow bright yellow cut fluorescence, light straw visible cut, no visible oil stain.

6920' SAND: Clear to frosted, light to medium gray, some white and green grains, fine to coarse, angular to subangular, poorly sorted, interbedded with siltstone, slightly calcareous, poorly consolidated, traces montmorillonite, gypsum and pyrite, pale yellow cut fluorescence, straw visible cut, trace dull orange pops in mud, fair petroleum odor.

6990' SAND: Predominantly clear, frosted, light to medium gray, traces white, green and yellow quartz, fine to coarse with trace granular, poorly sorted, angular to subangular, calcareous in part, massive to interbedded, good traces opaque waxy montmorillonite, pyrite, kaolin and shell fragments, trace mica, clayey matrix in part, pale yellow cut fluorescence, faint to straw visible cut, trace dull orange oil pops in mud, faint petroleum odor, no visible oil stain.

7040' SILTSTONE: Brown to grayish brown, easily friable with some firm friable, interbedded with sand and sandstone beds, slightly calcareous with trace good calcareous cement, no oil staining.

REDRILL #1

5860' SAND: Clear, frosted, trace light gray and green, quartz, fine to coarse, primarily medium, subangular to rounded, trace well rounded, predominantly subrounded, good sorting, unconsolidated clayey matrix, no oil stain, fast bright yellow cut fluorescence.

6025' SILTSTONE: Dark brown to occasionally brownish black, easily friable to firm friable, slightly calcareous, interbedded, fine sandy in part, traces gypsum and kaolin, very clayey, no oil or stain.

6060' SAND: Predominantly clear with light gray, frosted, scattered green and brownish quartz, fine to medium, fair sorting, subangular to subrounded, trace calcareous, interbedded, abundant kaolin, trace mica and gypsum, clayey matrix, no stain, cut or fluorescence.

6115' SILTSTONE: Brown to dark brown, some grayish brown, easily friable to firm friable, slightly to non-calcareous, massive to interbedded with sand, sandstone and clay, clayey to very sandy in parts, grading to very sandy siltstone, trace pyrite, slight trace oil staining, slow bright yellow cut fluorescence, very faint visible cut.

6255' SAND: Clear, frosted, trace light gray and white, quartz, very fine to coarse, primarily medium, subangular to rounded and well rounded, trace angular, primarily sub-rounded, good sort, unconsolidated with some white and gray sandstone, clayey matrix, trace pyrite, fast bright yellow cut fluorescence, light straw visible cut, no odor.

6500' CLAY: Brown to brown with an orange cast, very soft to soft, massive to interbedded with siltstones and sands, easily soluble with trace insoluble.

6525' SAND: Clear, frosted, some light and dark gray, slight trace green, quartz, very fine to medium, trace coarse, subangular to well rounded, some angular, primarily rounded, good to well sorted, unconsolidated with abundant gray and greenish gray sandstone, clayey matrix, slight trace free biotite, no oil stain, slow yellow cut fluorescence, very faint visible cut.

6700' SAND: Predominantly clear with scattered frosted, green and yellow quartz, very fine to coarse, predominantly medium, fair sorting, subangular to subrounded, slightly calcareous, poorly consolidated, interbedded, good trace kaolin, trace biotite as inclusions, trace pyrite and gypsum, clayey matrix, no oil stain, cut or fluorescence.

6780' SAND: Clear, frosted, good trace gray and green, slight trace yellow, quartz, very fine to coarse, predominantly coarse, angular to subrounded and rounded, trace well rounded, primarily subrounded, good sorting, unconsolidated with trace sandstone, clayey matrix, good trace kaolin, no oil staining.

6970' CLAYSTONE: Brown to light brown, some reddish brown, easily friable with some firm, non-calcareous, massive with interbeds of sand and gypsum, no oil stain, cut or fluorescence.

7050' SAND: Light gray to clear, occasionally light green and white, trace orange grains, very fine to coarse, fair sorting, unconsolidated, predominantly subangular to angular, trace subrounded, trace kaolin, bright yellow mineral fluorescence, dull yellow cut fluorescence, light straw visible cut, occasional fair petroleum vapors, no visible oil stains.

7155' SAND: Frosted, clear, trace gray, green and yellow, slight trace rose, quartz, fine to coarse, predominantly coarse, angular to subrounded with some rounded, primarily sub-angular, good to fair sort, unconsolidated with some sandstones, clayey matrix, moderately slow light bright yellow cut fluorescence, very faint visible cut, no oil stain, abundant kaolin,

SURVEYS

DEPTH	DEVIATION	DIRECTION
200 '	0° 15'	N55W
351	0 45	N65W
502	1 00	N85W
655	1 00	N65W
805	1 00	N40W
915	0 45	N70W
1307	3 00	N69W
1460	3 30	N60W
1584	4 00	N71W
1646	4 00	N75W
1705	1 00	DUE W
1767	1 30	S75E
1828	4 45	S72E
1941	6 00	S80E
2083	5 30	S80E
2106	6 00	S82E
2340	6 30	S80E
2495	6 45	S80E
2648	6 30	S80E
2804	8 30	S78E
2927	10 00	S70E
3047	10 30	S66E
3168	12 00	S63E
3290	14 00	S63E
3332	14 00	S65E
3363	13 45	S72E
3480	13 30	S83E
3634	14 00	S81E
3746	14 15	S82E
3940	14 30	S84E
4125	15 00	S84E
4309	15 15	S84E
4495	15 45	S86E
4680	15 45	S85E
4833	16 00	S85E
5016	16 15	S83E
5200	16 30	S80E
5387	16 30	S81E
5569	16 45	S82E
5783	16 45	S85E
5970	16 00	S89E
6066	17 00	S86E
6097	17 30	S83E
6128	17 30	S80E
6159	17 45	S75E
6186	17 30	S70E
6253	17 00	S65E
6438	17 45	S60E
6624	18 00	S58E
6806	18 00	S58E
6959	17 30	S54E

SURVEYS
MAY PETROLEUM, INC.
RINCON DEL MAR RANCH #1 & RD #1

REDRILL #1

DEPTH	DEVIATION	DIRECTION
5705'	16° 45'	S85E
5757	16 00	S89E
5820	15 30	N76E
5891	16 45	N77E
6045	17 00	N77E
6165	18 15	N74E
6320	20 00	N73E
6471	20 00	N71E
6635	23 30	N70E
6813	26 00	N69E
6997	28 00	N66E

MAY PETROLEUM, INC.
RINCON DEL MAR RANCH #1 & RD #1

BIT RECORD

NO.	SIZE	MAKE	TYPE	NOZZLE SIZE	SERIAL #	TO	FOOTAGE	HOURS	WT/1000#	RPM	PUMP	PRESENT CONDITION
RR#1	12-1/4	SMITH	DSJ	3-16	EL9547	915	855	21	5/10	85/90	650	4-I
2	8-3/4	SEC	S33F	"	410149	1646	731	14-1/2	"	100	1300	5-4-I
3	"	SMITH	FDT	"	EP2452	1872	227	5-1/2	5/8	DD	600	5-3-I
4	"	"	DTJ	3-10	ES1292	2704	831	12	20/25	100	1200	5-5-I
5	"	SEC	S33F	"	410085	3315	611	13	"	70/80	1300	4-3-I
6	"	SMITH	FDT	3-14	EP6056	3428	113	4	8/10	DD	750	2-2-I
7	"	REED	KP11	3-10	TXV555	3797	369	14	20/25	80/90	1300	4-4-I
8	"	SMITH	FDT	"	JZ6754	4339	542	18	"	90	"	3-3-I
9	"	"	"	"	EP1607	4863	524	21	"	90/100	1500	4-4-I
10	"	HTC	JD3	"	FT164	5304	441	31	"	"	1400	6-3-I
11	"	SMITH	F2	"	ES9726	6022	718	52-1/2	25/30	50/60	1500	2-2-I
12	"	"	FDT	3-15	EP1004	6173	151	13	10/20	DD	"	3-€
13	"	"	"	3-14	EP0458	6231	58	10	"	"	"	3-4-I
RR#11	"	"	F-2	3-10	ES9726	7051	820	67	25/30	60/70	1600	4-5-I
RR#6	"	"	FDT	3-14	DP6056	5915	465	5	5/10	75	1000	4-3-IG
14	"	"	"	3-15	EP1807	6079	164	15-1/2	5/20	DD	"	5-3-IG
RR#14	"	"	"	"	"	"	REAM	2	5/10	70/80	825	5-4-IG
15	"	"	"	"	EN5707	5855	110	9-1/2	15/20	DD	1200	3-2-IG
16	"	SEC	S33F	2-10/1-11	408853	6111	256	13-1/2	30	100	1500	2-3-1/16
17	"	SMITH	F-2	3-10	ET7573	7200	1089	115-1/2	30	40/50	1600	5-5-IG

MUD REPORT DATA

MAY PETROLEUM, INC.
RINCON DEL MAR RANCH #1 & RD #1

1.	DATE	2/8	9	10	11	12	13
2.	TIME	0500	----	0500	0500	0500	0430
3.	DEPTH	860	900	1393	1900	3075	3428
4.	WEIGHT (LB/GAL)	9.0	9.0	8.9	9.1	8.8	9.2
5.	MUD GRADIENT (PSI/FT)	.465	.465	.460	.470	.455	.480
6.	FUNNEL VISCOSITY (SEC/QT)	45	45	48	45	43	42
7.	PLASTIC VISCOSITY (CPS)	7	8	10	7	7	11
8.	YIELD POINT (LB/100 SQ FT)	10	11	7	10	13	6
9.	GEL STRENGTH (10 SEC)	4	4	5	2	3	1
10.	GEL STRENGTH (10 MIN)	20	20	20	16	14	3
11.	PH STRIP	10.2	10.2	11.0	10.2	9.5	9.0
12.	FILTRATE (ML/30 MIN)	18.0	17.0	12.6	14.5	14.2	8.4
13.	FILTER CAKE (32NDS)	3	3	3	2	3	2
14.	CL- PPM	300	300	350	250	275	300
15.	RM @ 77°F	----	----	----	----	5.42	3.80
16.	RMF @ 77°F	----	----	----	----	4.45	3.74
17.	ALKALINITY FILTRATE (PF)	.2	.2	1.0	.2	.1	.1
18.	ALKALINITY FILTRATE (MF)	.3	.3	1.5	.5	.3	.5
19.	CALCIUM (PPM)	44	44	40	8	8	16
20.	SAND CONTENT (% BY VOLUME)	TRACE	TRACE	TRACE	1/4	TRACE	TRACE
21.	SOLIDS CONTENT (% BY VOLUME)	4	4	5	6	5	6
22.	OIL CONTENT (% BY VOLUME)	0	0	0	0	0	0
23.	WATER CONTENT (% BY VOLUME)	96	96	95	94	95	94
24.	METHYLENE BLUE (LB/BBL BENTONITE)	22.5	22.3	20.0	17.5	22.5	25.0
25.	ANNULAR VELOCITY (DP)	68	68	100	92	115	122
26.	ANNULAR VELOCITY (COLLARS)	103	103	205	188	234	249
27.	UP TIME (MIN) (GX)	13	14	18	22	33	37
28.	TOTAL CIRCULATING VOLUME	1600	1600	483	586	616	640
29.	CIRCULATING PRESSURE	650	650	1300	1300	1300	770

MUD REPORT DATA
MAY PETROLEUM, INC.
RINCON DEL MAR RANCH #1 & RD #1

1.	2/14	15	16	17	18	19	20	21	22
2.	0500	0500	0500	0500	0500	0500	0500	0500	0500
3.	3869	4405	4820	5091	5332	5658	5992	6030	6231
4.	9.2	9.4	9.3	9.5	9.4	9.5	9.5	9.5	9.5
5.	.485	.490	.485	.495	.490	.495	.495	.495	.495
6.	44	48	45	48	45	60	48	47	43
7.	13	17	11	16	12	22	12	12	12
8.	6	8	6	10	7	12	8	7	7
9.	1	2	2	2	2	5	3	3	3
10.	4	16	28	25	20	30	25	20	18
11.	8.7	8.6	8.3	9.5	9.5	10.0	9.6	9.0	9.0
12.	7.8	7.4	14.2	5.8	6.6	7.4	5.7	5.7	5.8
13.	2	2	3	2	2	2	2	2	2
14.	400	450	450	600	500	600	570	600	600
15.	2.78	2.24	2.13	1.10	.83	.65	.85	.85	1.00
16.	2.60	1.88	1.72	.80	.57	.52	.70	.70	.78
17.	.05	.05	.0	.3	.2	.5	.3	.2	.2
18.	.5	.6	1.1	2.5	1.1	3.5	3.0	1.6	1.6
19.	16	24	210	40	100	28	36	40	44
20.	TRACE	1/4	TRACE	TRACE	TRACE	1/4	TRACE	TRACE	TRACE
21.	6	6	6	8	8	9	8	8	8
22.	0	0	0	0	0	0	0	0	0
23.	94	94	94	92	92	91	92	92	92
24.	22.5	22.5	20	22.5	20	27.5	22.5	22.5	20.0
25.	101	101	108	108	108	108	108	123	123
26.	205	205	220	220	220	220	220	251	251
27.	40	41	43	47	51	51	52	55	48
28.	572	509	799	708	753	776	824	827	838
29.	1300	1500	1500	1500	1400	1500	1500	1500	1400

MUD REPORT DATA
MAY PETROLEUM, INC.
RINCON DEL MAR RANCH #1 & RD #1

1.	2/23	24	25	26	27	28	3/1	2	3
2.	0500	0500	0500	0500	0500	0400	0500	2200	0500
3.	6463	6720	7000	7051	7051	----	6079	6079	5745
4.	9.6	9.5	9.5	9.5	9.5	9.2	9.1	9.2	9.2+
5.	----	.495	.495	.495	.495	.480	.470	.480	.485
6.	48	48	48	43	45	50	37	49	48
7.	14	14	15	14	14	11	7	16	16
8.	11	11	12	10	11	13	2	10	10
9.	3	3	2	2	2	4	1	2	2
10.	18	26	24	22	22	30	3	18	4
11.	8.8	9.0	8.9	8.8	8.8	11.5	12.0	12.5	12.5
12.	6.0	6.0	5.4	5.6	5.8	8.8	13.8	9.4	6.6
13.	2	2	2	2	2	3	3	2	2
14.	550	550	600	600	600	600	500	500	450
15.	.97	.94	.90	----	----	----	----	----	.86
16.	.81	.91	.85	----	----	----	----	----	.64
17.	.15	.2	.2	.15	.2	2.5	2.5	2.0	1.9
18.	1.5	1.8	2.0	1.8	2.0	6.0	3.1	2.5	2.4
19.	64	40	40	40	60	16	8	24	24
20.	1/4	1/4	1/4	TRACE	1/4	1/4	TRACE	TRACE	TRACE
21.	10	10	9	8	8	5	5	5	6
22.	0	0	0	0	0	0	0	0	0
23.	90	90	91	92	92	95	95	95	94
24.	25	25	22	17.5	17.5	15.0	15.0	12.5	20.0
25.	108	110	110	----	----	----	123	----	----
26.	220	224	224	----	----	----	251	----	----
27.	59	58	58	----	----	----	51	----	----
28.	854	872	892	----	----	----	827	----	804
29.	1600	1600	1600	----	----	----	1000	----	----

MUD REPCRT DATA
MAY PETROLEUM, INC.
RINCON DEL MAR RANCH #1 & RD #1

1.	3/4	5	6	7	8	9	10
2.	0500	0500	0500	5000	0500	0500	0500
3.	5906	6153	6351	6589	6845	7000	7200
4.	9.3	9.5	9.5	9.4	9.3	9.3	9.4+
5.	.485	.495	.495	.490	.485	.485	.490
6.	50	51	48	47	50	47	51
7.	17	18	18	16	18	16	19
8.	10	10	10	7	10	7	12
9.	2	2	2	2	2	2	2
10.	10	8	12	22	20	14	16
11.	12.0	11.0	11.5	11.5	10.0	9.8	9.5
12.	5.8	6.0	5.4	6.0	6.8	7.8	7.2
13.	2	2	2	2	2	2	2
14.	500	550	550	550	500	500	500
15.	.88	1.05	1.18	1.33	----	----	----
16.	.72	.85	.97	1.14	----	----	----
17.	1.6	1.6	1.4	.4	.3	.2	.2
18.	1.9	1.8	1.9	1.3	1.1	.9	1.4
19.	44	40	48	48	88	130	48
20.	1/2	1/4	1/4	1/4	1/4	1/4	1/4
21.	7	8	9	8	9	8	9
22.	0	0	0	0	0	TRACE	TRACE
23.	93	92	91	92	91	92	91
24.	22.5	22.5	22.5	25	25	22.5	25
25.	115	108	110	110	110	110	110
26.	235	220	224	224	224	224	224
27.	63	65	68	64	65	66	69
28.	815	832	846	863	854	942	890
29.	1500	1550	1550	1600	1600	1650	1600

111-21336
35-4-25

26-FEB-85

DIVISION OF OIL AND GAS
RECEIVED
MAR - 1985
CALIFORNIA

CALIFORNIA
DIVISION OF OIL AND GAS

January 9, 1985

To: Floyd L. Clawson
May Petroleum Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

From: Division of Oil and Gas
P.O. Box 67
Santa Paula, CA 93060

Subject: ☒ Request for confidential status dated January 2, 1985.

☐ Request for extension of confidential status dated _____, 19___.

☒ Subject request is approved

☐ Subject request is partially approved

☐ Subject request is denied.

Records approved for confidential status are:

WELL NAME AND NUMBER	FIELD OR COUNTY	DATE ON WHICH RECORDS WILL BECOME PUBLIC
"Rincon Del Mar Ranch" 1	Rincon Creek Sec.35,T.4N,R.25W, SBB&W	2 years after cessation of drilling operations

Murray W. Dosch
District Deputy

cc: Petrol. Inform.
M.J. Systems

SEE REVERSE SIDE FOR RECORDS DENIED CONFIDENTIAL STATUS OR EXTENSION OF CONFIDENTIAL STATUS AND REMARKS.

OGD181 (3-79-DWRR-2M)

STATE OF CALIFORNIA
DIVISION OF OIL AND GAS

BOND STATUS REPORT

TO: District ALL
Dist 2

FROM: Sacramento

DATE: 3/2/88

BOND NO. 680 F 822A

BOND DATE: 2/17/84

Surety/operator has inquired about release of the bond covering the well indicated below. Please check the appropriate items and give the information specified.

Operator: MAY PETROLEUM, INC.

Well designation: Blanket Bond (Onshore) - $100,000

Location: Section_____, Township_____, Range_____, _____B&M.

A. BOND IS NOT ELIGIBLE FOR RELEASE BECAUSE:

DIVISION OF OIL AND GAS
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VENTURA, CALIFORNIA

- ☐ 1. Well is in process of being drilled.
- ☐ 2. Well is standing uncompleted/idle.
- ☐ 3. Required records have not been filed.
- ☐ 4. Drilling operations have not yet started.
- ☐ 5. Other _____

NOTE: *Give statement of condition of well or records required if items 2 or 3 above have been checked. Give brief statement of work required for abandonment.*

B. BOND IS ELIGIBLE FOR RELEASE.

Form OGD150 (old form 150b) attached (or was submitted dated _____).

C. REMARKS: _____

This report completed by Pat Kinnear

Pat Kinnear
Signature

CLAWSON PETROLEUM CONSULTANTS INC.
2977 SEXTON CANYON ROAD
VENTURA, CALIFORNIA 93003
805 644-9575

DIVISION OF OIL AND GAS
RECEIVED
JAN 9 1985
SANTA PAULA, CALIFORNIA

Murray Dosch
Division of Oil & Gas
P.O. Box 67
Santa Paula, CA. 93060

SUBJECT: Confidential Status, May Petroleum, Inc.
Rincon Del Mar Ranch # 1.

Dear Murray:

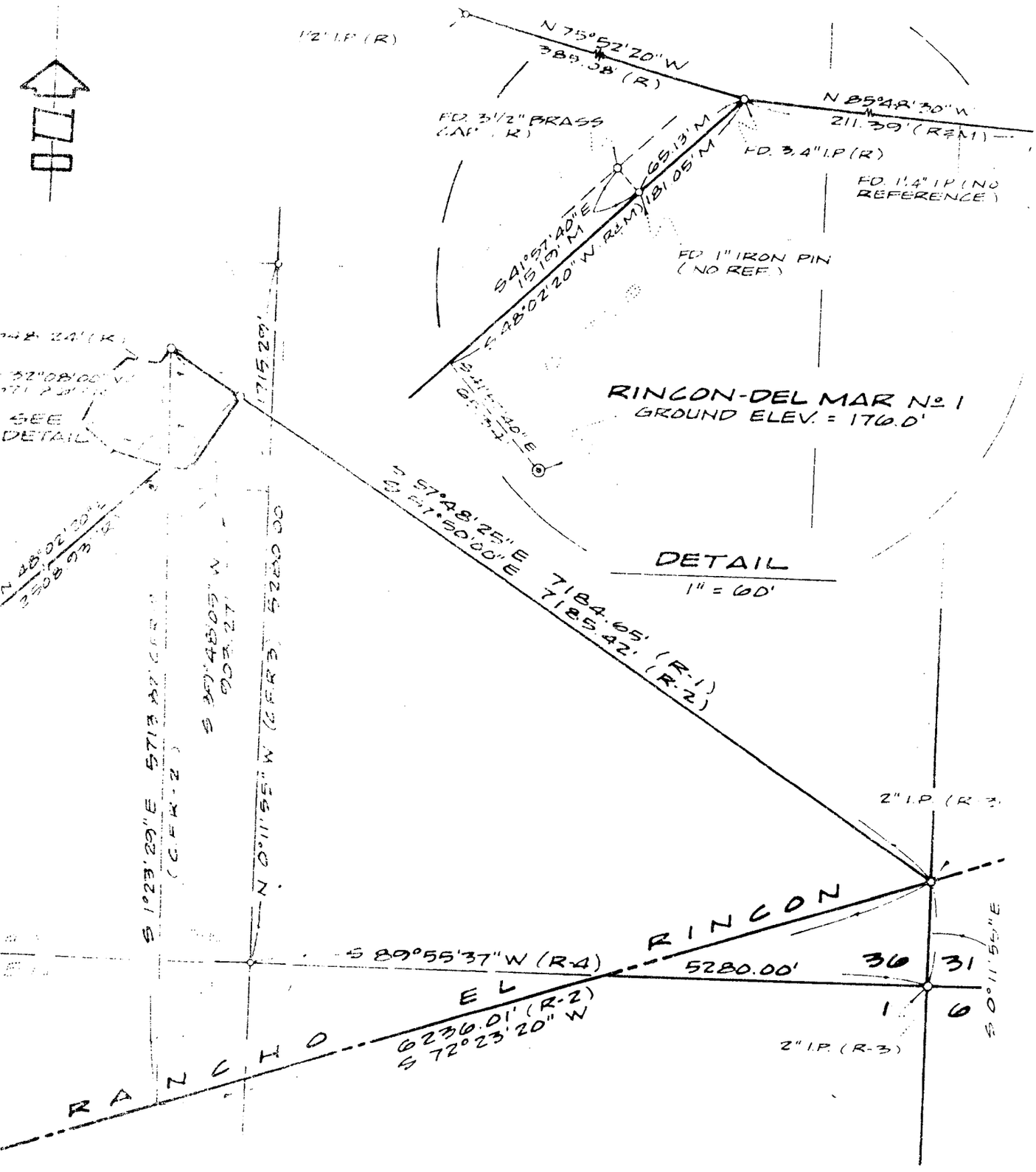
As per our conversation of January 8, 1985, please put May Petroleum's proposed Rincon Del Mar Ranch #1 on the confidential list.

Yours sincerely,

F. Lloyd L. Clawson

Floyd L. Clawson

FLC/vca



= 8 P.M. 44
-1 = 15 P.M. 97
-2 = ASSESSOR'S
-3 = 25 P.M. 74
-4 = RECORDS ON FILE AT LEWIS & LEWIS, INC.

ROJECTED SECTIONS PER R-1 & R-2

LEWIS & LEWIS, INC.
surveyors
1600 Callens Road P. O. Box 878
Ventura, CA 93002 Tel. (805) 644-7405

ENERGETICS, INC.

SKETCH SHOWING

RINCON-DEL MAR WELL Nº 1

PROJECTED SECTION 35
T 4 N R 25 W
RANCHO EL RINCON
(1 A M.R. 12)

VENTURA COUNTY CALIFORNIA

MARCH 1982

SCALE: 1" = 1000'

Drilled in 3/83 to T.D. @ 6284' - No shows

Redrill in 4/83 to T.D @ 7010' - No prod

Redrill in 5/83 to T.D @ 7656' - Plug back & Suspended

Casing Record: 13 3/8" cem. 515'
9 5/8" cem. 4400'
5 1/2" cem. 3895'

Cement Plugs: 3496 - 3179
1953 - 1830
715 - 578
36 - 11

Plugged & Abandoned in 1986 - Complete

↳ No additional P & A required - Meets current standards.

50 SHEETS EYE-EASE® 5 SQUARE
100 SHEETS EYE-EASE® 5 SQUARE
200 SHEETS EYE-EASE® 5 SQUARE
RECYCLED WHITE 5 SQUARE
42-381
42-382
42-389
42-392
Made in U.S.A.
National® Brand

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF WELL ABANDONMENT

Ventura, , California

Aug. 28, 1986

Agnes V. List, Agent
Energetics Operating Co.
% CT Corporation System
800 S. Figueroa St.,
Los Angeles, CA 90017

Your report of abandonment of well "Del Mar" 43-35 (Name and number),
A.P.I. No. 111-21226, Section 35, T. 4N, R. 25W, S.B. B. & M.,
Rincon Creek field, Ventura County,
dated 6-12-86, received 6-16-86, has been examined in conjunction with records filed in this office, and we have determined that all of the requirements of this Division have been fulfilled.

Cons.Comm.
b

MAP	MAP BOOK	CARDS	BOND	EDP	FORMS 114	FORMS 121
W2-1	8-16-86 BW	—	BB	✓	—	✓

M.G. MEFFERD
State Oil and Gas Supervisor

By Murray W. Dosch
Deputy Supervisor

Murray W. Dosch

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

API No. 111-21226

WELL SUMMARY REPORT

Operator	Well				
Energetics Operating Company	Del Mar #43-35				
Field	**County**	**Sec.**	**T.**	**R.**	**B.&M.**
Rincon Creek	Ventura	35	4N	25W	SB

Location (Give surface location from property or section corner, street center line and/or California coordinates)

1854.69' FNL, 1061.46' FEL Sec.35, T4N, R25W SB B&M

Elevation of ground above sea level: 174.2

Commenced drilling (date): 3/10/83

Completed drilling (date): 6/6/83

Commenced producing (date): N/A

☐ Flowing ☐ Pumping ☐ Gas lift

Name of producing zone(s): None

Total depth (1st hole)	(2nd)	(3rd)
6284	7010(MD)	7656 (MD)

Present effective depth: 0 (Plugged & Abandoned)

Junk:

Depth measurements taken from top of: ☐ Derrick Floor ☐ Rotary Table ☒ Kelly Bushing

Which is 22' feet above ground

GEOLOGICAL MARKERS	DEPTH
Santa Barbara Formation	Surface
Rincon	2850'
Vaqueros	3775'
Sespe	4320'

Formation and age at total depth: Sespe

	Clean Oil (bbl per day)	Gravity Clean Oil	Percent Water including emulsion	Gas (Mcf per day)	Tubing Pressure	Casing Pressure
Initial Production	None					
Production After 30 days						

CASING RECORD (Present Hole)

Size of Casing (API)	Top of Casing	Depth of Shoe	Weight of Casing	Grade and Type of Casing	New or Second Hand	Size of Hole Drilled	Number of Sacks or Cubic Feet of Cement	Depth of Cementing (if through perforations)
13-3/8	Base Cellar (37'KB)	505 KB	54.5	J-55 ST&C	New	17½	350 SX	
9-5/8	Top 13-3/8 (36'KB)	4400KB	36	580/K-55 ST&C	New	12¼	1600 CF	
5½"	4570' (Stub)	6201 KB	15.5	K-55 LT&C	New	8-3/4	900 CF	(Note-2nd Hole
5½"	1953' (Stub)	3895 KB	15.5	K-55 ST&C	New	8-3/4	760 CF	(Note-3rd Hole

PERFORATED CASING (Size, top, bottom, perforated intervals, size and spacing of perforation and method.)

Was the well directionally drilled? If yes, show coordinates at total depth
☒ Yes ☐ No Surveys on file with DOG

Electrical log depths: On File with DOG

Other surveys: On File with DOG

DIVISION OF OIL AND GAS
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JUN 13 1986
VENTURA, CALIFORNIA

In compliance with Sec. 3215, Division 3 of the Public Resources Code, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Name	Title	
Mac Jones	Agent	
Address	**City**	**Zip Code**
102 Inverness Terrace East	Englewood, CO	80112
Telephone Number	**Signature**	**Date**
(303) 799-8282	Mac Jones	6/12/86

OG100 (12/83/DWRR/5M)

SUBMIT IN DUPLICATE

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator Energetics Operating Company Field Ricon Creek County Ventura
Well "Del Mar" 43-35, Sec. 35, T 4N, R 25W, SB B. & M.
A.P.I. No. 111-21226 Name Mac Jones (Person submitting report) Title Agent (President, Secretary or Agent)
Date 6/12/86, 19

Signature Mac Jones

102 Inverness Terrace East, Englewood Colorado 80112 (Address) (303) 799-8282 (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date	
6/2/86	Commenced plugging operations in compliance with Notice of Abandonment filed by Mr. J. W. Decker 3/10/86 and Permit No. P-286-81 issued 3/18/86. RU Otis 1 1/4" coiled tubing unit 6:30 AM. Could not get below old casing stub at 1953' (KB). Displaced 9 5/8" casing with 9.6 ppg mud. Called DOG to report inability to get below stub; Mike Stettner approved 100' plug from 1953' to 1853'. Spotted 38 cu ft Class "G" + 2% calcium chloride from 1953' to 1853'. Plug spotted 1 PM. WOC 4 hrs. Tagged plug w/ Otis coiled tubing @ 1843' 5 PM, witnessed by DOG (Stephen Mulqueen). DOG made the additional requirement that 9 5/8" casing be perforated at 700' and squeezed to protect fresh water sands. Removed flange from wellhead. RU Welex. Perforated 700-701 (KB) w/4 holes. SDON.
6/3/86	Installed flange, RU Otis, ran coiled tubing to 714' KB. Spotted 3 bbls fresh water over perfs, established 1.5 bbl/min pumping rate at 300 psi. Spotted 99 cu ft Class "G" + 2% calcium chloride balanced plug w/bottom of plug at 714' KB. Squeezed away 55 cu ft to bring top of cement outside 9 5/8" casing to 515' KB (base of 13 3/8" surface casing), left 44 cu ft for plug inside 9 5/8". Displaced w/9.6 ppg mud. Squeeze complete at 8:30 AM, SIP 0. WOC 4 hrs. While WOC, dug down beside 13 3/8" wellhead to expose 2" outlet. Broke off bull plug, pumped 10 cu ft Class "G" in annular space between 13 3/8" surface casing and 9 5/8" intermediate. Reinstalled bull plug and levelled cellar floor. RU Otis and tagged top of plug at 578' KB, witnessed by DOG (Stephen Mulqueen). Pulled coiled tubing to 57' KB. Spotted 11 cu ft plug from 57' to 32' KB (from base of cellar to 25' below base of cellar). Witnessed by DOG. Plug spotted 1:30 PM. Rig down and released rig 2:30 PM. Hauled one load of waste mud to disposal.
6/4/86	Hauled remainder of waste mud to disposal and cleaned rental tanks.
6/5/86	Rental tanks off location.
6/9/86	Filled and leveled cellar. Location now ready for final inspection.

DIVISION OF OIL AND GAS
RECEIVED
JUN 13 1986
VENTURA, CALIFORNIA

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T286-147

DIVISION OF OIL AND GAS

Report on Operations

Agnes V. List, Agent
Energetics Operating Co.
% CT Corporation System
800 S. Figueroa St.
Los Angeles, CA 90017

Ventura Calif.
June 17, 1986

Your operations at well "Del Mar" 43-35, API No. 111-21226,
Sec. 35, T. 4N R. 25W SB B.& M. Rincon Creek Field, in Ventura County,
were witnessed on 6/3/86. S. Mulqueen, representative of
the supervisor, was present from 1230 to 1430. There were also present Mac Jones,

Present condition of well: 13 3/8" cem 515'; 9 5/8" cem 4400' perf 700', drilled thru 1989';
5 1/2" cem 3895', perf 3394' and 3625' WSO (cem off), cp 3514', perf 3474-3480' and
3634-3640', TD 7656'. Plugged w/cem 3496-3179', 1953-1830', 715-578' and 36'-11'.

The operations were performed for the purpose of abandonment

DECISION:

THE PLUGGING OPERATIONS AS WITNESSED AND REPORTED ARE APPROVED.

b

M. G. MEFFERD

Murray W. Dosch

OG109 (9/83/GSR1/15M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 286-81

601
(field code)
00
(area code)
10
(new pool code)
00
(old pool code)

PERMIT TO CONDUCT WELL OPERATIONS

Energetics Operating Co.
Agnes V. List, Agent
c/o CT Corp. System
800 S. Figueroa St.
Los Angeles, CA 90017

Ventura, California
March 18, 1986

Your proposal to abandon well "Del Mar" #3-35,
A.P.I. No. 111-21226, Section 35, T 4N, R 25W, S.B. B. & M.,
Rincon Creek field, any area, Sespe pool,
Ventura County, dated 3/10/86, received 3/13/86 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Hole fluid of sufficient quality and quantity shall be maintained in the hole to control any subsurface condition, and a reserve supply shall be on hand for emergencies.
2. Blowout prevention equipment of at least DOG Class II 2M shall be installed and maintained in operating condition at all times.
3. All portions of the hole not plugged with cement shall be filled with inert mud fluid having a minimum density of 72 lbs./cu.ft. and a minimum gel shear strength (10 min) of 20 lbs./100 sq.ft., (30 sacks of Bentonite per 100 bbls. of water).
4. The hole shall be plugged from at least 1953' to 1853'.
5. The hole shall be plugged from at least 2039' to 1939'.
6. This office shall be consulted before initiating any changes or additions to this proposed operation, or if operations are to be suspended.
7. THIS DIVISION SHALL BE NOTIFIED:
   a. TO WITNESS the clean out depth.
   b. TO WITNESS the filling of the hole with mud fluid.
   c. TO WITNESS the location and hardness of the cement plug at 1853'.
   d. TO WITNESS the location and hardness of the cement plug at 1939'.
   e. TO WITNESS the placing of the cement plug from 50' to surface.
   f. TO INSPECT the well site after cleanup and restoration operations are completed.

MS:ljg

Engineer Michael Stettner

Phone (805) 654-4761

M. G. MEFFERD, State Oil and Gas Supervisor

By _____
Deputy Supervisor

A copy of this permit and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

STATE OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS
RECEIVED
MAR 13 1986
VENTURA, CALIFORNIA

Notice of Intention to Abandon Well

FOR DIVISION USE ONLY			
CARDS	BOND	FORMS	
		OGD114	OGD121
	—	✓	✓

DIVISION OF OIL AND GAS

In compliance with Section 3229, Division 3, Public Resources Code, notice is hereby given that it is our intention to abandon well "Del Mar" 43-35, API No. 111-21226, Sec. 35, T. 4N, R. 25W, S.B. B. & M., ---, Field, Ventura, County.

commencing work on _____, 19____.

The present condition of the well is:

1. Total depth PBTD - 3197'

2. Complete casing record, including plugs and perforations (present hole)

SEE ATTACHED FOR COMPLETE DETAILS

3. Last produced ____ (Date) (Oil, B/D) (Gas, Mcf/D) (Water, B/D)

or

4. Last injected N/A (Date) (Water, B/D) (Gas, Mcf/D) (Surface pressure)

Additional data for dry hole (show depths):

5. Oil or gas shows

Sespe sand	5603'-5624'	7434'-7585'
	5645'-5672'	
	7104'-7108'	
	7174'-7178'	

6. Stratigraphic markers

Santa Barbara	1990'	Sespe	3675'
Rincon	2794'	Bates	5925'
Vaqueros	3445'		

7. Formation and age at total depth Sespe

8. Base of fresh water sands ---

The proposed work is as follows:

1) MI & RU
2) Load hole w/ 9.5 ppg gelled fluid
3) Run OET to 100' below 5-1/2" casing stub 1953'
4) Pump 50 sacks class "G" cement, displace w/ 9.5 ppg gelled fluid
5) Trip out of hole to 50' and pump 15 sacks class "G" cement
6) Trip out of hole, WOC, cut off 13-5/8" surface casing and 9-5/8" csg at 5' below surface. Weld on plate.
7) Recontour surface & rehabilitate surface to state requirements

It is understood that if changes in this plan become necessary, we are to notify you immediately.

Address 1600 Stout Street, Suite 1900 (Street)

Denver (City) CO (State) 80202 (Zip)

Telephone Number (303) 629-5486 (Area Code) (Number)

Energetics Operating Company (ITR Petroleum, Inc., Agent For) (Name of Operator)

By _____

J W Decker (Print Name)

J W Decker (Signature) 3/10/86 (Date)

OG108 (8/83/GSR1/5M)

#2

13-3/8" csg @ 515'

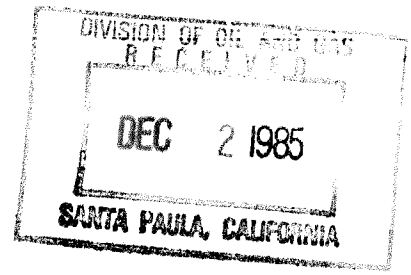
9-5/8" to 1989' (orig cmtd @ 4400') Now sidetracked below 1989'

5-1/2" 0' to 3895' w/cmt to 3823'

W.S.O. holes @ 3675' (Sqz'd w/100 c.f.), 3630' (Sqz'd w/58 c.f.), 3514' (Sqz'd w/ 80 c.f.)

3466' tested no flow; Perfed 4 SPF 3634'-3640' (no oil). Set plug across zone up to 3575'. Perfed 4 SPF 3474'-3480', swabbed 68 BBL 1% oil. Set plug across zone TOC = 3197'. Cut $5\frac{1}{2}$ csg @ 1953' & pulled salvageable csg.

Del Mar 43-35



November 27, 1985

California Division of Oil and Gas
6401 Telephone Road, Suite 240
Ventura, California 93003

Attention: Mr. Mike Stetner

RE: Del-Mar #43-35 Well

Dear Mr. Stetner,

Pursuant to our recent telephone conversation, it has been determined that Energetics Operating Company (EOC) was responsible for the plugging and abandoning of the referenced well in 1983, previous to their sale to Rincon Oil Company of the property on which the well is situated. ITR Petroleum (Delaware), Inc. took over all of EOC's operations as of July 1, 1985 - well after the period in which Energetics should have plugged this well. Energetics Operating Company, therefore, remains the responsible party in the plugging and abandoning of the Del-Mar #43-35 well.

Please contact Energetics Operating Company about this matter at the following address:

102 Inverness Terrace East
Englewood, Colorado 80112
Telephone: (303) 799-8282

Please feel free to contact ITR if you have any questions or problems on this matter in the future.

ITR PETROLEUM (DELAWARE), INC.

Kay Litz

By Kay Litz
Land Assistant

Sunny Wyman
303 799 8282

cc: Energetics Operating Company
102 Inverness Terrace East
Englewood, Colorado 80202 303-790-8855

Jay Decker

CLAWSON PETROLEUM CONSULTANTS INC.
2977 SEXTON CANYON ROAD
VENTURA, CALIFORNIA 93003
805 644-9575

MS

May 6, 1985

Mr. Mike Stettner
DIVISION OF OIL & GAS
146 South Ojai Street
P.O. Box 67
Santa Paula, California 93060

SUBJECT: "Del Mar" 43-45 (111-21226)

Dear Mike,

I am returning your letter regarding the future disposition of the "Del Mar" 43-35 well drilled and suspended by Energetics on 7-30-83. We did not handle the completion or suspension work on this well. It is my understanding that the work was handled by Mr. Leonard Taylor, currently a vice president of Rincon Oil Co. I believe that Rincon Oil purchased the producing well, Del Mar 32-35, as well as the suspended Del Mar 43-35 location from Energetics. I believe your inquiry regarding the future plans for the 43-35 well should be directed to Mr. Bill Barker of Rincon Oil.

If we can provide any additional information, please let us know.

Respectfully yours,

Glen M. Webster
Glen M. Webster

DIVISION OF OIL AND GAS
RECEIVED
MAY - 7 1985
SANTA PAULA, CALIFORNIA

Attachment

GMW/rmb

STATE OF CALIFORNIA-RESOURCES AGENCY
GEORGE DEUKMEJIAN, Governor
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS
146 SOUTH OJAI STREET, P. O. BOX 67
SANTA PAULA, CALIFORNIA 93060
(805) 525-2105

April 9, 1985

Mr. Floyd Clawson, Agent
Energetics, Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Re: "Del Mar" 43-35
(111-21226)

The Division has determined, according to the records of this office, that drilling equipment has been removed from the well for a period of more than six months and that the well has not been satisfactorily completed or abandoned. The present condition of the well is in violation of Section 3237, Article 4, Chapter 1, Division 3, Public Resources Code, which is stated below:

> Section 3237. The supervisor or his deputy may order the abandonment of any well that has been deserted whether or not any damage is occurring or threatened by reason of such well. Suspension of drilling operations and removal of drilling machinery is prima facie evidence of desertion after the elapse of six months unless a request for an extension of time for a period not to exceed an additional six months is theretofore filed. Removal of production equipment or facilities is prima facie evidence of desertion after the elapse of two years after April 1, 1973. At any time, the supervisor may, for good cause shown, extend these periods. Such order may be appealed to the director.

Please respond in writing within 15 days of the above date why the Division should not issue an order to abandon the well.

Michael Stettner
Associate Oil & Gas Engineer
MS:b

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

REPORT OF PROPERTY AND WELL TRANSFER

Field or county	District
Ventura County	2
Former owner	**Date**
Energetics, Inc.	Feb. 1. 1984

Name and location of well(s)

ALL WELLS

Description of the land upon which the well(s) is (are) located

Date of transfer, sale, assignment, conveyance, or exchange	New owner	Type of organization
1/27/84	Energetics Operating Company Address 102 Inverness Terrace East Englewood. Colorado 80112	Corp. Telephone No.

Reported by

Confirmed by

New operator new status (status abbreviation)	Request designation of agent
PA	
Old operator new status (status abbreviation)	**Remarks**
PA	(NAME CHANGE ONLY)

Deputy Supervisor	Signature
Murray W. Dosch	Murray W. Dosch

OPERATOR STATUS ABBREVIATIONS

PA – Producing Active
NPA – No Potential, Active
PI – Potential Inactive
NPI – No Potential, Inactive
Ab – Abandoned or No More Wells

FORM AND RECORD CHECK LIST

Form or record	Initials	Date	Form or record	Initials	Date
Form OGD121	BB	2-1-84	Map and book		
Form ODG148			Notice to be cancelled		
New well cards			Bond status		
Well records	BB	2-1-84	EDP files		
Electric logs					
Production reports					

State of California

Memorandum

To : M. G. Mefferd, State Oil & Gas Supervisor

Date : December 30, 1983

Subject: FIELD BOUNDARY
RINCON CREEK FIELD
MAP #W2-1

From : **Department of Conservation—**
Division of Oil and Gas

Place: Santa Paula

Energetics, Inc. has discovered a new field in the area of Rincon Creek. The discovery well, "Del Mar" 32-35 has been producing between 1000 to 5000 BBL/Month of 41°-45° gravity oil and condensate since April of this year. The production is from three different zones in the Sespe Formation. The field is believed to be a fault trap with an active water drive.

It is recommended that the following described area as shown on the attached map be established as the Rincon Creek Field.

The SE 1/4 of the NE 1/4 of Sec. 35, T. 4N., R. 25W.,

Wells affected by the establishment of the Rincon Creek Field:

Energetics, Inc. "Del Mar" 32-35	Producing	Sec. 35, T. 4N., R.25W.
Energetics, Inc. "Del Mar" 43-35	Suspended-Drilling	Sec. 35, T. 4N., R.25W.

A map showing the field boundary and wells is attached.

Murray Dosch
District Deputy
MD:b
cc: Energetics, Inc.
Conservation Committee
AAPG Nomenclature Committee
Geo.Borkovich

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 283-199

REPORT ON PROPOSED OPERATIONS

000 (field code)
00 (area code)
00 (new pool code)
00 (old pool code)

Mr. Floyd Clawson, Agent
Energetics, Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, California
Aug. 8, 1983

Your ____ proposal to plug back and suspend well "Del Mar" 43-35,
A.P.I. No. 111-21226, Section 35, T. 4N, R. 25W, SB B. & M.,
---, field, any, area, no breakdown pool
Ventura County, dated 7/26/83, received 7/28/83 has been examined in conjunction with records filed in this office.

THE PROPOSAL, COVERING ABANDONMENT OPERATIONS, IS APPROVED ACCORDING TO PRIOR AGREEMENT PROVIDED THAT:

1. The wellhead shall be equipped with a valve in order to safely close the well in at the surface.
2. This office shall be advised of the well status six months from the above date.

Blanket Bond
MS:b

M. G. MEFFERD, State Oil and Gas Supervisor

By _____
Murray W. Dosch, Deputy Supervisor

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

OG111 (4/83/DWSB/5M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

DIVISION OF OIL AND GAS RECEIVED AUG 18 1983 SANTA PAULA, CALIFORNIA

DOG

API No. 111-21226

WELL SUMMARY REPORT

Operator	Well				
Energetics Operating Co.	Del Mar 43-35				
Field	County	Sec.	T.	R.	B.&M.
7	Ventura	35	4N	25W	SB

Location (Give surface location from property or section corner, street center line and/or California coordinates)
1854.49' S FNL & 1061.46' W FEL Sec. 35 NE cor

Elevation of ground above sea leve
173

Commenced drilling (date): 3-11-83
Completed drilling (date): 6-6-83
Commenced producing (date):
☐ Flowing ☐ Pumping ☐ Gas lift
Name of producing zone(s): Vaqueros

Total depth: (1st hole) 6284' (2nd) 7010' (3rd) 7656'

Present effective depth:

Junk: 5½" csg. 4410'± - 7010' in 2nd hole. Salvaged above 4410
9 5/8" csg. 1910' - 4400'
Sidetracked to drill hole #3.

Depth measurements taken from top of: ☐ Derrick Floor ☐ Rotary Table ☒ Kelly Bushing
Which is 22 feet above ground = 195' KB

GEOLOGICAL MARKERS		DEPTH
1st hole	Santa Barbara	1990'
	Rincon	3240'
	Vaqueros	4260'
3rd hole	Santa Barbara	1990'
	Rincon	2794'
	Vaqueros	3445'

R. Vaqueros 3637', Sespe 3675', Bates 5925'.

Formation and age at total depth: Sespe

	Clean Oil (bbl per day)	Gravity Clean Oil	Percent Water including emulsion	Gas (Mcf per day)	Tubing Pressure	Casing Pressure
Initial Production						
Production After 30 days						

CASING RECORD (Present Hole)

Size of Casing (API)	Top of Casing	Depth of Shoe	Weight of Casing	Grade and Type of Casing	New or Second Hand	Size of Hole Drilled	Number of Sacks or Cubic Feet of Cement	Depth of Cementing (if through perforations)
13 3/8"	0"	503"	ST&C	J-55 ST	NEW	17½	600	
9 5/8" Now sidetracked @ 1910:	0'	4400'	36#	S-80 & K-55 ST & LT	NEW	12 ¼"	1600 c.f.	
5½"	0'	6623'	15.5#	K-55, ST	NEW	8 3/4"	900	(Hole #2)
5½"	0'	3895'	15.5#	K-55, ST	Re-Run	8 3/4"	760	(Hole #3)

PERFORATED CASING (Size, top, bottom, perforated intervals, size and spacing of perforation and method.)

Was the well directionally drilled? If yes, show coordinates at total depth
☒ Yes ☐ No Hole #1 984.32'S & 601.84'E, Hole #2 1756.35'S & 1756.35'E, Hole #3 77.08'N & 209.95'E

Electrical log depths
1st hole 4400' & 6284', 2nd hole 7010', 3rd hole 6978'.

Other surveys
DIL, G-FDC, CNL, CDM, SWS.

In compliance with Sec. 3215, Division 3 of the Public Resources Code, the information given herewith is a complete and correct record of the present condition of the well and all work done thereon, so far as can be determined from all available records.

Name	Title	
Floyd L. Clawson	Agent	
Address	City	Zip Code
2977 Sexton Canyon Road	Ventura	93003
Telephone Number	Signature	Date
(805) 644-9575	Floyd L. Clawson	8-10-83

OG100 (3/82/GSR1/5M)

SUBMIT IN DUPLICATE

Division of Oil, Gas, and Geothermal Resources
District 2-Ventura
Log Report

Operator **Energetics Operating Co.**

Well Designation: **Del Mar** **43-35**

API Number: **11121226** Sec. **35** T. **4N** R **25W** SB

Date Run	*Type*	*Depth from*	*Depth to*
4/18/1983	Acoustic Cement Bond Log	4250	6045
3/31/1983	Annotated Dual Induction Gamma Ray	4404	6280
6/30/1983	Annotated Dual Induction-GR	1977	6972
4/15/1983	Annotated Dual Induction-SFL	4405	7004
3/31/1983	Annotated Raw Dual Induction Gamma Ray	4404	6280
5/30/1983	Borehole Compensated Sonic Log	1977	6972
5/31/1983	Compensated Neutron Formation Density	977	6975
3/22/1983	Cyberdip	503	4402
4/15/1983	Cyberdip	4405	7010
5/31/1983	Cyberdip	1977	6977
3/31/1983	Cyberlook	4404	6270
3/22/1983	Dipmeter Arrow Plot	520	4364
3/31/1983	Dipmeter Arrow Plot	4422	6220
4/15/1983	Dipmeter Arrow Plot	4422	6958
5/31/1983	Dipmeter Arrow Plot	2058	6948
4/15/1983	Dipmeter Arrow Plot 2 inch	4422	6958
5/31/1983	Dipmeter Arrow Plot 2 inch	2058	6948
5/30/1983	Dual Induction Log	1977	6972
3/21/1983	Dual Induction-SFL	503	4400
3/31/1983	Dual Induction-SFL	4404	6280
4/15/1983	Dual Induction-SFL	6280	7004
4/1/1983	Mud Log	500	6284
4/16/1983	Mud Log	4410	7010
6/4/1983	Mud Log	1990	7656

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Energetics Operating Company

Operator (ITR Petroleum, Inc., Agent For) **Field** - **County** Ventura
Well "Del Mar" 43-35, **Sec.** 35, **T** 4N, **R** 25W S.B. **B. & M.**
A.P.I. No. 111-21226 **Name** J. W. Decker (Person submitting report) **Title** Operations Manager (President, Secretary or Agent)
Date February 26, 19 86

Signature J W Decker

1600 Stout Street, Suite 1900, Denver, CO 80202 (Address) (303) 629-5486 (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date	
3/10/83	Spud Date
3/12/83	Set 13-3/8" csg @ 503' (17-1/2" Hole) cemented w/600 c. f.
3/24/83	Set 9-5/8" csg @ 4400' (12-1/4" Hole) cemented w/1600 c. f.
	* This hole was plugged and a sidetrack was made @ 1989' in the 9-5/8" csg
5/7/83	Milled window sidetrack in 9-5/8" csg (sidetracked below 1989')
5/9/83	Cement placed just below sidetrack
6/5/83	Drilled deviated hole to TD of 7656' (8-3/4" Hole)
6/6/83	Ran 99 jts 5½ 15.5# K-55 ST&C to 3897' cemented w/500 c.f. 50-50 poz & 260 c.f. class "G" (Tagged cmt 3823')
6/7/83 through 6/27/83	W.S.O. holes @ 3675' (Sqz'd w/100 c. f.); 3630' (Sqz'd w/58 c. f.); 3514' (Sqz'd w/80 c. f.) Perf'd 3466' tested no flow; perf'd 4 SPF 3654'-3640', tested no oil; set Plug across zone up to 3575'. Perf'd 4 SPF 3494'-3480', swabbed 68 BBLS - 1% oil Set plug across zone up to 3197' (PBTD = 3197'). Cut csg @ 1953' and pulled salvageable csg.

DIVISION OF OIL AND GAS
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MAR 13 1986
VENTURA, CALIFORNIA

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator ENERGETICS INC. Field - County Ventura
Well DEL MAR 43-35, Sec. 35, T 4N, R 25W, SB B. & M.
A.P.I. No. 111-21226 Name Floyd L. Clawson (Person submitting report) Title Agent (President, Secretary or Agent)
Date ....., 19.....

Signature .....

2977 Sexton Canyon Road, Ventura, California 93003 (Address) 805-644-9575 (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date 1983	
3/10	Rig up CAL PAC #5, drld rat hole. Spud @ 11 AM. Drld 17½" hole with B #1.
3/11	Drld to 355'. trip for B #2, drld to 448'. Surveys @ 102' = 0°, 201' = 45' S 30°W, and 292' = 45' due South. Mud: wt 9.6, vis 56, wl 14, cl 300.
3/12	Drld to 511', circ & wipe hole. RU & ran 13 jnts of 13-3/8" J-55, 54.5#, ST&C casing. Guide shoe @ 505', float collar @ 424'. Cmt. w/200 sax 50/50 Poz w/2% $CaCl_2$, followed by 150 sx Class "G" w/3% $CaCl_2$. Displ w/69 bbls mud, bumped plug w/750 psi - good returns. C.I.P. Surveys 386' = 15'S 69°E, 480' = 15' S 69°E.
3/13	Welded 13-3/8" casing head & tested to 1000 psi. Inst. spool & B.O.P.E. and tested to 1000 psi.
3/14	RIH w/12¼" bit #3, drld on plugs & float collar. POOH - bit locked w/rubber (FR. plugs), RIH w/B #4, drld out float collar @ 424', drld out cmt & shoe (424'-505') Drld. to 674', survey. POOH. Change B.H.A. Hung 1" pipe @ 70', mix and pump approx 80 sx Class "G" w/3% $CaCl_2$, C.I.P. Survey @ 631' = 0°45' S 38°W. Mud: wt 8.8, vis 36, wl 18, pH 10.8, cl 600.
3/15	Drld. to 1156', trip for B #5, drld to 1624'. Surveys @ 793' = 2°30' N 70°W; 913' = 2°30' N 73°W; 1034' = 2°45' N 73°W; 1156' = 2°30' N 73°W; 1281' = 2°00' N 72°W; 1406' = 1°45' N 69°W; 1562' = 1°30' N 76°W. Mud: wt 8.9, vis 38, wl 18, sol 3.5, PV/YP 7/12, gels 10/20, pH 9.6, cl 100, ca 40
3/16	Drld to 1996', trip for B #6 & dynadrill. Drld to 2133', brk survey line - trip to retrieve instr. Dynadrld to 2196'. Surveys @ 1718' = 1°15' S 82°W; 1874' = 1°00' S 67°W; 1996' = 1°30' S 40°W; 2036' = 1°45' S 07°W; 2067' = 2°15' S 13°E; 2098' = 3°00' S 27°E; 2129' = 3°30' S 35°E.

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
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DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator ENERGETICS INC. Field ..... County .....
Well DEL MAR 43-35 , Sec. ....., T ....., R ....., B. & M.
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Date	
1983	
3/16 (contd)	Mud: wt 9.0, vis 40, wl 12, sol 4, PV/YP 12/8, gels 2/4, pH 7.6, cl 50, ca 20.
3/17	Drld to 2409'. POOH & chg B.H.A. RIH w/B #3, reamed 1990' to 2409'. Drld to 2658'. Surveys @ 2191' = 5°00' S 45°E; 2222' = 6°00' S 44°E; 2252' = 6°30' S 36°E; 2282' = 7°30' S 32°E; 2313'= 8°00' S 30°E; 2344' = 9°30' S 33°E; 2486' = 11°45' S 25°E. Mud: wt 9.0, vis 38, wl 12, sol 4, PV/YP 12/6, gels 2/8, pH 7.6, cl 50, ca 40.
3/18	Drld to 2702', POOH & chg G.H.A., RIH w/B #3, drld to 3194'. POOH to PU dynadrill & B #7. Surveys @ 2671' = 16°00' S 16°E; 2787' = 17°15' S 15°E; 2912' = 18°15' S 13 E; 3034' = 18°30' S 13°E; 3156' = 18°45' S 10°E. Mud: wt 9.0, vis 40, wl 12, sol 4, PV/YP 10/6, gels 2/6, pH 7.6, cl 50, ca 40.
3/19	RIH w/dynadrill. Drld to 3367', POOH to chg dynadrill. RIH w/ dynadrill & B #8. Drld to 3397'. Surveys @ 3196' = 19°00' S 10 E; 3239' = 19°45' S 12°E; 3301' = 20°00' S 20°E; 3332' = 20°00' S 21°E. Mud: wt 9.1, vis 40, wl 10.2, sol 5, PV/YP 12/6, gels 2/12, pH 7.0, cl 200, ca 60.
3/20	Dynadrld to 3508', trip to chg B.H.A. & for B #9. Drld to 3705' (reamed 3196'-3508'). Surveys @ 3363' = 20°00' S 25°E; 3394' = 20°00' S 29°E; 3426' = 20°00' S 32°E; 3456' = 20°00' S 36°E; 3546' = 20°00' S 40°E; 3684' = 20°00' S 40°E.
3/21	Drld to 4178', trip for B #10 - strap in hole. Drld to 4230'. Surveys @ 3834' = 19°30' S 39°E; 4024' = 18°30' S 37°E; 4178' = 18°00' S 36°E. Mud: wt 9.1, vis 38, wl 8.6, sol 5, PV/YP 14/8, gels 2/4, pH 7.0, mbt 20, cl 350, ca 20
3/22	Drld to 4400', circ & cond for logs. RU & ran Schlumberger DIL/ sonic, FDC/CNL (2 runs). Survey @ 4362' = 18°30' S 35°E. Mud: wt 9.2, vis 38, wl 10.2, sol 5, PV/YP 12/8, gels 4/12, pH 7.0, mbt 22.5, cl 500, ca 20.

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Date	
1983	
3/23	Ran Schlumberger dipmeter & S.W.S. (missed 26 of 45 shots), RIH, circ & cond, LD 8" DC's, RU & run 9-5/8" casing.
3/24	Ran 108 jnts 9-5/8" S-80 & K-55, 36#, ST&C casing with fillup shoe @ 4400', DFC @ 4324'. Cement with 1250 c.f. 1:1 Poz w/4% gel followed by 350 c.f. Class "G" (preceded by 100 c.f. water & 50 c.f. mud sweep), Disp. w/347 bbls mud. Bumped plug w/1750 psi, float held O.K. C.I.P. Tested packing unit w/2000 psi, flanged up & tested B.O.P.E. w/1500 psi, make up B.H.A.
3/25	RIH w/B #11, drld out float, cmt, & shoe, drld. to 4463'. Trip to chg B.H.A. & B #12, drld. to 4670'. Surveys @ 4432' = 18°30' S 32°E; 4463' = 18°30'; 4544' = 18°45' S 33°E. Mud: wt 9.0, vis 42, wl 12.8, sol 4, PV/YP 10/15, gels 10/20, pH 10.5, mbt 18, cl 300, ca 40.
3/26	Drld to 5039'. Circ @ 4988' - Gas = 3400 units. Surveys @ 4698' = 19°30' S 29°E; 4854' - 21°00' S 30°E; 5008' = 21°30' S 26°E. Mud: wt 9.0, vis 38, wl 7.4, sol 4, PV/YP 10/8, gels 2/4, pH 7.4, mbt 18, cl 300, ca 40.
3/27	POOH @ 5039' for dynadrill & B #13, drld to 5272'. Various drlg bks 5115'-5258': 1600-4000+ units. TG = 3300 units, Surv. G = 3800 units. Surveys @ 5039' = 21°15' S 25°E; 5130' = 18°15' S 35°E; 5247' = 16°00' S 47°E. Mud: wt 9.0, vis 38, wl 9.8, PV/YP 10/8, gels 2/6, pH 7.6, mbt 20, cl 350 ca 40
3/28	Shut well in, circ through choke, raise mud wt to 9.5 ppg, circ. btms up - pull to shoe - wait 1 hr, RIH circ btms up, POOH. Chg B.H.A., RIH w/B #12. Ream dynadrill run 5039'-5272', drld. to 5380'. TG = 1900 units; BG = 200 units. Survey @ 5316' = 16°15' S 52°E. Mud: wt 9.5, vis 41, wl 10.8, sol 7, PV/YP 18/10, gels 4/15, pH 7.2 mbt 20, cl 750, ca 100.

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Date	
1983	
3/29	Drld to 5535', trip to chg BHA & for B #14. Drld to 5750', lsng mud @ 3 bbl/hr. BG = 35 units. Surveys @ 5410' = 16°15' S 52°E; 5535' = 17°00' S 51°E; 5650' = 16°15' S 49°E. Mud: wt 9.5, vis 38, wl 10.8, sol 7, PV/YP 14/8, gels 2/12. pH 8.3, mbt 22.5 cl 700, ca 80.
3/30	Drld to 5881'. Trip to chg BHA, drld to 5975'. BG = 40 units, TG = 4800 units. Surveys @ 5774' = 13°45' S 48°E; 5867 = 13°00' S 49°E; 5974' = 13°00' S 47°E. Mud: wt 9.5, vis 38, wl 10, sol 7, PV/YP 14/8, gels 2/12, pH 8.3, mbt 18, cl 650, ca 80.
3/31	Drld to 6230'. Wiper trips @ 6024' & 6161'. BG = 30 units, TG = 260 units. Survey @ 6129' = 13°45' S 46°E. Mud: wt 9.5, vis 38, wl 9.8, PV/YP 12/6, gels 2/10, pH 8.3, mbt 18, cl 700, Ca 80.
4/1	Drld to 6284',wipe hole to shoe - 20' fill, wipe hole (10 stds) - 10' fill, wipe hole (5 stds) circ. & cond for logs. Ran Schlumberger DIL & Gamma ray, dipmeter + density -- pulled tight w/10' fill, RIH to C.O. & cond. BG = 20 units, TG = 90 units. Survey @ 6284' = 13°45' S 43°E. Mud: wt 9.5, vis 36, wl 9.0, sol 7, PV/YP 10/4, gels 2/10, pH 8.3, mbt 18, cl 700, ca 80.
4/2	Wiped hole, ran sonic & S.W.S. (98 shots - rec. 85). RIH, circ & cond, pull to shoe. Mud: wt 9.5, vis 38, wl 10.6, sol 7, PV/YP 12/8, gels 2/12, pH 8.3, mbt 18, cl 650, ca 80.
4/3	RIH w/O.E.D.P., hung @ 5190', mixed & eqlz'd 475 c.f. 1:1 Dia-Mix "G" + 4% gel w/100 c.f. water ahead and 25 c.f. water behind. Disp. w/67 bbls. mud. C.I.P. Pulled into casing, circ. POOH. RIH w/RRB#11, C.O. soft cmt 4389'-4600'. Plug witnessed & approved by D.O.G. P.O.O.H. RIH & hung O.E.D.P. @ 4590', mixed & pumped 150 c.f. Class "G" + 20% sand, 0.75% D-31 w/100 c.f. water ahead and 25 c.f. water behind. Disp w/56 bbls mud. C.I.P. Pulled to 3660', circ, POOH. RIH w/RRB#11, circ & W.O.C.

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Date	
1983	
4/4	Locate T.O.C. @ 4300'. C.O. soft cmt to 4550', circ. Mud: wt 9.1, vis 38, wl 20, sol 4, PV/YP 10/4, gels 2/8
4/5	POOH, RIH w/O.E.D.P. Hung @ 4550', circ & eqlz'd 150 c.f. Class "G" + 20% sand, 0.75% D-31 w/100 c.f. water ahead & 25 c.f. water behind. Disp w/55.8 bbls mud, C.I.P. Pulled to 3820' & circ. POOH. RIH w/RRB#11, W.O.C. C.O. soft cmt 4292'-4320', C.O. hard cmt 4320'-4410'. Circ.
4/6	POOH. RIH w/dynadrill & B #15, drld to 4530', trip to chg kick sub and B #16; dynadrld to 4590'. Surveys @ 4434' = 19°15', S32°E, 4494' = 21°S30°E, 4534' - 24°, S30°E. Mud: wt 9.1, vis 36, wl 18, sol 4, PV/YP 8/4, gels 2/10, pH 11.5, mbt 12, cl 650, ca 180.
4/7	Drld to 4614', trip for B #17, LD dynadrill, MU BHA, drld to 4955'. Surveys @ 4579' = 24°30' S 29.5°E; 4700' = 27°15' S 27°E; 4762' = 28°30' S 28°E; 4855' = 29°45' S 28°E. Mud: wt 9.4, vis 38, wl 12.6, sol 6, PV/YP 12/12, gels 5/10, pH 10.8, mbt 18, cl 650, ca 160.
4/8	Drld to 5299', trip for B #18 & chg BHA, ream 5205-5299', drld to 5360'. Surveys @ 4947' = 31°00' S 29°E; 5008' = 31°15' S 29°E; 5070' = 32°00' S 29°E; 5132' = 33°00' S 29°E; 5194' = 34°00' S 29°E; 5256' = 34°30' S 29°E; 5323' = 34°15'. Mud: wt 9.5, vis 38, wl 12.8, sol 7, PV/YP 10/10, gels 5/10, pH 10.8, mbt 20, cl 600, ca 140.
4/9	Drld to 5830'. Gas 5625'-5716', various sands. Gas 10-100 units, 5768'-5785' gas = 2000 units, cl 750 ppm. BG running 30-65 units Surveys @ 5384' = 34°15' S 28°E; 5447' = 35°00' S 28°E; 5509' = 35°00' S 28°E; 5571' = 36°00' S 29°E; 5633' = 36°00' S 29°E; 5694' = 36°15' S 29°E; 5756' - 37°00' S 29°E. Mud: wt 9.5, vis 38, wl 12.8, sol 7, PV/YP 12/10, gels 10/10, pH 9.6, mbt 20, cl 600, ca 120.

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Date	
1983	
4/10	Drld to 5838', trip for RRB#12, dld to 6050'. Wiper trip to shoe @ 6026' -- O.K. Surveys @ 5818' = 37°15' S 29°E; 5882' = 36°45' S 29°E; 5943' = 36°00' S 29°E; 6006' = 36°00' S 28°E. Mud: wt 9.5, vis 38, wl 8.8, sol 7, PV/YP 12/8, gels 2/10, pH 9.3, mbt 18, cl 600, ca 80.
4/11	Drld to 6273'. Wiper trip @ 6149' - O.K. BG = 20 units. TG = 63 units. Surveys @ 6067' = 35°15' S 28°E; 6129' = 34°30' S 28°E; 6191' = 33°30' S 28°E. Mud: wt 9.5, vis 38, wl 9, sol 7, PV/YP 12/10, gels 5/10, pH 9.3, mbt 20, cl 650, ca 80.
4/12	Drld to 6492'. Wiper trips @ 6273' & 6397' -- O.K. BG = 3 units, TG = 116 units. Surveys @ 6253' = 32°45' S 28°E; 6314' = 31°45' S 27°E; 6377' = 30°45' S 26°E; 6440' = 30°30' S 27°E. Mud: wt. 9.5, vis 40, wl 9.0, sol 7, PV/YP 12/10, gels 5/20, pH 9.3, mbt 20, cl 600, ca 80.
4/13	Drld to 6521'. Trip for RRB#13, drld to 6675'. Surveys @ 6501' = 29°30' S 26°E; 6563' = 29°00' S 26°E; 6625' = 28°00' S 25°E. Mud: wt 9.5, vis 40, wl 10.6, sol 8, PV/YP 12/10, gels 10/15, pH 9.2, cl 600, ca 160.
4/14	Drld to 6915'. Wiper trip @ 6860'. TG = 20 units. Surveys @ 6718' = 27°00' S 24°E; 6779' = 26°15' S 24°E, 6840' = 25°30' S 23°E. Mud: wt 9.5, vis 45, wl 10.6, sol 7, PV/YP 12/10, gels 15/25, pH 9.0, cl 600, ca 180.
4/15	Drld to 7010'. Wipe hole to shoe & ream tight hole @ 5892', 5900', 6320', 6325', & 6635'-6650'. Circ & cond mud. Ran Schlumberger DIL/gamma ray & dipmeter. Surveys @ 6903' = 25°00' S 25°E; 6980' = 24°30' S 25°E. Mud: wt 9.4, vis 42, wl 10, sol 7, PV/YP 8/8, gels 10/15, pH 7.2, mbt 18, cl 400, ca 120.

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Date	
1983	
4/16	Ran density & sonic logs, S.W.S. (rec. 30 of 90 shots). RIH to cond. for casing. Mud: wt 9.4, vis 42, wl 10, sol 7, PV/YP 8/8, gels 10/15.
4/17	Circ & cond., wiper trip, POOH, laying down 2000' 4½" DP & 13 DC's. Ran 157 jnts 5½" casing as follows: 2.10 Howco diff. shoe 39.63 1 jnt 5½" 15.5# LT&C 1.70 Howco diff. collar 1585.38 40 jnts 5½", 15.5#, LT&C 4594.09 116 jnts 5½", 15.5#, ST&C 6222.90' Total w/shoe @ 6200.90' Cmtd w/900 c.f. 50/50 Poz + 1/4 #/bbl Flocel w/100 c.f. water & 100 c.f. mud flush ahead. Disp. w/154 bbls mud. Bumped plug w/ 1450 psi -- float held. C.I.P. & W.O.C. Mud: wt 9.5, vis 40, wl 9.8, PV/YP 12/8, gels 5/10, pH 8.0, mbt 18, cl 400, ca 160.
4/18	Removed 13-5/8" B.O.P. stack & installed 6" B.O.P. stack. Picking up 2-3/8" tubing.
4/19	Picked up 2-3/8" tubing & 5½" casing scraper. C.O. to 6030', circ. & cond. POOH. Ran Dresser Atlas CBL from 6039' to 4250'. Shot 4 - 1/2" holes @ 5802' and 5775'. Tested blind rams to 2000 psi & RIH w/RTTS tool.
4/20	Set RTTS @ 5362', got brkdwn of 8 c.f./min. @ 1200 psi. Mixed & pumped 100 sx "G" w/½ lb/sk D-19 & 20 gal D-31 w/25 c.f. water ahead and 5 c.f. behind. Disp. w/29 bbls. mud. Final press. 2250 psi. C.I.P. Cmtrs backscuttle @ 5150', POOH, P.U. 6 - 3-3/8" DC & chg kelly. RIH. C.O. soft cmt 5590'-5690'.* POOH. RIH w/Dresser Atlas CBI, shot 4 - ½" holes @ 5686' & 5665'. RIH w/ RTTS & 30' stinger.

*Note: Calc'd 87 c.f. cmt. sqz'd thru holes @ 5802' & 5775.'

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Date	
1983	
4/21	Set RTTS @ 5264', tail @ 5295'. Got brkdwn of 5 c.f./min. @ 1750 psi. Mixed & pumped 75 sx Class "G" with ½ lb/sk D-19 & 37 gal. D-31 w/25 c.f. water ahead & 5 c.f. behind. Disp. w/27.4 bbl. mud. Final press. 3000 psi. Pull to 5105' & backscuttle. POOH. RIH w/4-3/4" mill & 5-1/2" casing scraper to 5127' & W.O.C. C.O. to 5674'. Test holes @ 5665' w/2500 psi. Lost 300 psi in 5 mins.
4/22	C.O. cmt to 5696' = test holes @ 5665' & 5686' w/2500 psi -- lost 300 psi in 5 mins. POOH. RIH w/RTTS & set @ 5260'. Got brkdwn of 1 c.f./min. @ 3750 psi. POOH. Made up 403 ft. stinger below RTTS & RIH. Hung RTTS & tail @ 5695', eqlz'd 35 sx Class "G" with 1/2 #/sk D-19 & 3/4 #/sk D-31, disp w/22 bbls. mud. Pulled up & set RTTS @ 4400'. Sqzd away approx. 5 sx through holes @ 5665' & 5686'. Held 3800 psi for 4½ hrs. POOH.
4/23	C.O. cmt 5522' to 5674'.-Test holes @ 5665' w/2500 psi -- O.K. C.O. cmt 5696', test holes @ 5686' w/2500 psi - no good. .C.O. cmt. to 5810' & tested hole @ 5775 N.G. RIH w/RTTS, set @ 5740', got brkdwn of 4 c.f./min. @ 2700 psi. POOH & m.u. 465' tubing tail below RTTS, RIH.
4/24/83	Hung 2 3/8" tubing @ 5807', eqlz'd 50 sx class "G" w/½ #/sk D-19 & 3/4 #/sk D-31, w/25 c.f. water ahead & 5 c.f. water behind. DISP w/20.8 bbls mud. C.I.P., Pulled up & set RTTS @ 4472' w/tail to 4937'. Sqz'd away 16 sx w/final press 3100 psi.- held press. for 5 hrs. POOH. RIH w/4 3/4" mill & 5½" csng scraper to 5000'. C.O. cmt 5000' to 5696' & tested holes @ 5665' & 5686' w/2000 psi. C.O. to 5810' & tested holes @ 5775' & 5802' w/2500 psi-O.K. Circ. hole clean, cleaned pits, & chgd. over to 2% KCI water.
4/25/83	Rigged up Dresser Atlas perf. gun & finished change over. RIH. Gun stopped @ 5772'. POOH, RIH w/4 3/4" bit to 5818'- backscuttle hole clean. POOH-Rig up gun-RIH- ran collar log & used collars & centralizers to adjust to depth. Shot 4-½" holes/ft 5792 - 5782.

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Date	
4/26/83	Set OTIS packer @ 5763', OTIS X–nipple @ 5732' ran seal ass. w/1500' water cushion & stabbed into packer. Opened well to surf, had light blow. Rigged up OTIS coil tubing & ran to 5755', blew well dry. S.I.
4/27/83	Blew well down w/OTIS coil tubing. Rec. ½ bbl oil & 3/4 bbl water (oil approx 30°). Rig up & acidize well w/500 gal. Blew well down & flow tested 2 hrs. Blew well down & rec. 1 bbl. oil, 1 bbl emulsified water/oil, & 11 bbl water. Rigged up Dresser Atlas & re–perf'd 5782' – 5792' *w/1 11/16" through tubing @ 2 shots/ft. Rig up OTIS coil tubing unit.
4/28/83	Blew well down. Well making 21 bbls/hr. water. Pulled coil tubing, Remove X – Mas tree, pulled packer loose, POOH. Did not rec. packer – found perf. holes in seal & latch assembly. RIH, latch onto packer & POOH w/packer. Set HOWCO 5½" EZSV retainer @ 5740' w/wireline. *Gun had hung up in pkr. assembly & shot in wrong loc.
4/29/83	Rig up cmtrs., got brkdwn. of 4 c.f./min. @ 3000psi. sqz'd 25sx class "G" w/½ #/sk D – 19 & 3/4#/sk D–31. . Disp. w/20 bbls 2% KCL water. Final press 3500 psi. C.I.P., POOH, installed lubricator. Perf'd 5682' – 5672' w/4 shots/ft. w/4" csng gun (32 gr. charges). Set OTIS 5½" packer @ 5615'. Install wellhead & rig up OTIS coil tubing unit. Blew well down – 2 hr. flow test. Rec 11 bbls water w/light oil film. 2 hr. flow test (#2). Rec. 8 bbls water. Rigged down coil tubing unit, removed wellhead, pulled packer loose.
4/30/83	POOH w/packer, serviced, RIH & re – set @ 5615'. Closed pipe rams & test w/500 psi. Installed wellhead & rig up coil tubing unit. Ran tubing to top of packer (5600'). Acidized perfs @ 5672' – 5682' w/500 gal – blew well down, 2 hrs. flow test rec. 10 bbls water. Second 2 hr. flow test rec. 14 bbls. water.
5/1/83	Third 2 hr. flow test rec. 15 bbls water. Fourth 2 hr. flow test rec. 15 bbls. water. Rigged down coil tubing unit. Removed wellhead, pulled packer loose & POOH RIH w/O.E. tubing & tagged retainer @ 5730'. Eqlz'd 25 sx neat "G" w/20 c.f. water ahead & 4 c.f. water behind. Disp. w/21 bbls 2% KCL water. Pulled to 5360' & reversed out. Pulled to 5265', closed rams & press to 2000 psi. POOH. RIH w/ 4 3/4" bit & 5½" csng. scraper to 5450'. Found T.O.C. @ 5540'. POOH.

SUBMIT IN DUPLICATE

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Well DEL MAR 43 – 35 , Sec....., T....., R ....., B. & M.
A.P.I. No..... Name..... Title .....
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Date	
/2/83	Rig up WELEX, shot 4 – ½" holes @ 5110' & 5133'. RIH w/ RTTS & set @ 4690'. Pumped away 5 bbls @ .7 bbl/min. @ 2800 psi. Bled off & fluid came back. POOH. RIH w/RTTS & 315 ft. stinger below packer. w/2 3/8" tubing hung @ 5146' – eqlz'd 25 sx "G" w/½ #/sk D – 19 & 3/4 #/sk D – 31, w/20 c.f. water ahead & 4 c.f. water behind. DISP w/19 bbls. 2% KCL water C.I.P., pulled to 4881' & rev. out. Pulled to 4596' & set packer. Sqz'd away 17 sx cmt. Final press 3200 psi – held press 5 hrs. POOH. RIH w/ 4 3/4" mill & 5½" csng. scraper. C.O. cmt. to 5100', W.O.C.
/3/83	C.O. cmt. to 5120' – Press test holes @ 5110' w/ 2500 psi – O.K. – C.O. Cmt. to 5150' & C.O. cmt to 5540'. Press test w/2500 psi – O.K. Backscuttle hole clean POOH. Install lubricators. Shot 4 – ½" holes/ft. 5114' – 5128'. Set packer @ 5075'. Install wellhead & R.U. coil tubing unit – blew well dry. 2 hr. flow test – gas only – 2 hr. flow test – gas only (small amt.).
/4/83	Acdz'd w/500 gal. 7½% acid – blew well dry. 2 hr. flow test – rec. sm. amt. gas. Blew well down 2 hr. flow test – Rec. sm. amt. gas & ½ bbl water. Rigged down coil tubing unit & removed wellhead pulled packer loose & POOH. RIH w/ 2 3/8" tubing hung @ 5150'. Eqlz'd 25 sx "G" w/20 c.f. water ahead & 4 c.f. water behind. DISP. w/18 bbls. 2% KCL water. Pulled to 4865' & rev. out.
/5/83	POOH. Chgd. KELLYS & L.D. 3 3/4" DC's & 750' 2 3/8" tubing. RIH & found T.O.C. @ 4893' – witnessed & approved by D.O.G. L.D. 2 3/8" tubing. Removed 6" B.O.P. stack & tubing head. Installed 13 5/8" B.O.P. stack.
/6/83	Tested B.O.P.E. to 1500 psi. Made two shot runs to cut 5½" csng. @ 4400'. Attempt to pull csng no good. Ran free – point & found csng to be free @ 4575'. Shot csng. @ 4560'. Layed down 112 jnts & 2 cut offs.
/7/83	RIH w/ O.E. DP, hung @ 4450'. Eqlz'd 75 sx "G" w/ 1% $CaCl_2$, w/35 bbls water ahead & 3/4 bbl water behind. DISP w/59 bbls mud. C.I.P. – pulled to 4147' & circ. W.O.C. – found T.O.C. @ 4350' – wit. & apprvd. by D.O.G. – cond. mud & POOH. M.U. 9 5/8" srvc. section mill & P.U. 9 dc's. RIH, cut out @ 1978' – milled to 1989'.

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Date	
-8-83	Milled section in csg from 1989' to 2014.' (Total section 36'). POOH. RIH w/15" SERVCO underreamer. Opened hole to 15" from 1978' to 2014.' POOH. RIH w/O.E.D.P., hung @ 2014', eqlz'd 140 sx "G" (17.2) w/20% sand, 3/4 #/sx D-31, w/7 bbl water ahead & 1.5 bbl water behind. DISP. w/2.4 bbl mud. . Pulled to 1740' & circ. POOH & W.O.C.
-9-83	LD 20 stnds D.P. RIH & found T.O.C. @ 1825.' C.O. from 1825' to 1890' then 1890' to 1935.' Md. Wt. 9.0, vis 38, wl 25, sol 4, PV/YP 5/8, gels 0.4, ph 11.5, mbt 18, cl 4800, ca 160.
-10-83	C.O. cmt 1935' to 2014.' RIH w/Dynadrill & 1½° kick sub. Dynadrilled 1981' to 2041.' POOH & RIH w/1° kick sub. Stopped @ 1981.' Rotate & C.O. to 1987.' Orient Dynadrill & C.O. to 2041.' Dynadrill to 2196.' Surveys @ 2037' = 1° 15' N15°E; 2099 = 3°00' N49°E. Md. Wt. 9.0, vis 38, wl 12.6, sol 4, PV/YP 8/6, gels 0/2, ph 12.5, mbt 18, cl 3200, ca 160.
-11-83	Drld to 2460.' POOH for B#20 & M.U. B.H.A. RIH & ream 1981'-2460.' Drld to 2784.' Surveys @ 2160' = 5°00' N43°E 2191=5°45' N44°E; 2253' = 7°15' N48°E; 2316'=9°00' N52°E; 2409'=11°00' N55°E; 2546'=13°00' N50°E. Md. Wt. 9.0, vis 38, wl 12.6, sol 4, PV/YP 8/6, gels 2/2, ph 10.8, mbt 18, cl 1800, ca 60.
-12-83	Trip for B#21, drld to 2972.' Trip for B#22. Drilled to 3346.' Surveys @ 2812'=12°45' N48°E; 2873' = 14°00' N50°E; 2905 = 15°00; 2935 = 15°30 N53°E; 3072' = 18°45' N53°E; 3165' = 19°45' N54°E; 3284'= 20°45, N 53°E; Md.Wt. 9.0, vis 40, wl 10.4, sol 4, PV/YP 10/10, gels 2/12, ph 9.6, mbt 18, cl 950, ca 60.
-13-83	Drld to 3377.' Trip for B#23 & Dynadrill. Drld to 3575.' Trip for B#24, chg Dynadrill. Drld to 3654.' Surveys @ 3400'=21°30' N51°E; 3464' = 20°30 N47°E;3526' = 18°00' N45°E; 3556' = 17°15' N44°E; 3619' = 17°00' N40°E. Md.Wt. 9.1, vis 38, wl 9.8, sol 4, PV/YP 13/9, gels 2/9, ph 9, mbt 18,cl 850, ca 60.
-14-83	Drld to 3747.' Trip for B#25 & 1½° Dynadrill. Drld to 3965.' POOH to chng B.H.A. Surveys @ 3681' = 16°30 N33°E; 3712 = 16°30' N31°E; 3745' = 16°45' N28°E; 3806'=17°00' N21°E; 3867'= 16°15' N13°E; 3898' = 16°15' N09°E; 3930' = 16°30' N05°E. Md. Wt. 9.2, vis 40, wl 9.8, sol 4, PV/YP 15/15, gels 2/10, ph 8, mbt 18, cl 600, ca 60.

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Date	
5/15/83	RIH w/B#21, ream Dynadrill runs drld to 4157.' Trip for B#26 & chg BHA. Drld to 4399.' Surveys @ 4008' = 16°45' NO2°W; 4132 = 18°45' NO2°W; 4224' = 18°15' NO1°W; 4380' = 17°30'N. Md. Wt. 9.3, vis 38, wl 14, sol 4.5, PV/YP 12/8, gels 2/12, ph 8, mbt 16, cl 300, ca 50.
5/16/83	Drld to 4644.' Trip for B#27 & chg BHA. Drld to 4850.' Surveys @ 4442' = 16°45' NO2°W; 4504' = 16°45' NO1°; 4564 = 16°00' No2°E; 4624' = 15°15'N; 4688' = 15°00' NO1°E; 4751' = 14°00'N; 4814' = 13°30' NO2°E. Md. Wt. 9.5, vis 38, wl 12, sol 5, PV/YP 12/8 ph8 mbt 18, cl 1000, ca 50.
5/17/83	Drld to 5097.' Trip for B #28 & chg BHA, drld to 5200.' Drlg break @ 5115' = 100 units. Survey @ 4875' = 13°15' NO2°E; 4937' = 12°15' NO2°E; 5030' = 11°30 NO3°E; 5062' = 11°15' NO3°E; 5150' = 10°30 NO2°E. Md. Wt. 9.3, vis 38, wl 10.8, sol 5, PV/YP 12/10, gels 6/12, ph 8.5, mbt 18, cl 650 ca 80.
5/18/83	Drld to 5450.' Trip for Dynadrill & B #29. Survey line break - chg lines. Surveys @ 5143' = 10°00' NO5°E; 5327' = 9°30' NO4°E. Md. Wt. 9.5, vis 42, wl 10.2, PV/YP 8/12, gels 4/12, ph 8.5, mbt 18, cl 650, ca 100.
5/19/83	Dynadrilled to 5575.' Stuck pipe while POOH @ 3584.' Spotted oil and worked over pipe. (Moving diesel @ 5 bbl/hr.). Surveys @ 5477' = 8°30 NO2°E; 5540' = 6°15' N. Md. Wt. 9.4, vis 38, wl 9.6 sol 7, PV/YP 8.6, gels 2/8, ph 8.8, mbt 20, cl 600, ca 80.
5/20/83	Circ. out oil. Ran free-pt. Pipe stuck @ 3515' (top of monel). Part. stuck @ 3484.' Backed off pipe @ 3388' (top of 1st jt. HUYWL). POOH. RIH w/BOWEN B.S. & jars on 6-6½" DC's. Scrw into T.O.F. @ 3388.' Jarred on fish and moved fish 33' up hole to T.O.F. 3355' (bit @ 3535').
5/21/83	Cont. jar on fish - jars failed - backed off @ 3385.' POOH - chg jars - RIH & scrw into fish - jarring - fish came free. POOH & rec. fish. Magnaflux 9 DC's & stabs. RIH & ream 3374' to 3683' and 5421' to 5575.' Drld to 5590' w/B #30. Md. Wt. 9.4, vis 40, wl 9.8, sol 6, PV/YP 8/6, gels 2/6, ph 8.5 mbt 20, cl 400, ca 100.

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Date	
5/22/83	Drld to 5860.' POOH - working through tight spot @ 4258.' Surveys @ 5624' = 5 °00' NO2°E; 5716' = 4°15' NO6°W; 5860' = 4°30' N10°W Md. Wt. 9.4, vis 40, wl 9.4, sol 7, PV/YP 10/8, gels 4/12, ph 8.3 mbt 22, cl 550, ca 100.
5/23/83	'Drld up" from 4258' to 4220.' Finish POOH. L.D. jars. RIH w/B #31. Ream 5790' to 5860.' Drld to 6090.' Surveys @ 5959' = 4°15' NO8°W; 6050 = 4°15' NO8°W. Md. Wt. 9.5, vis 38, wl 9.2, sol 7, PV/YP 10/8, gels 4/10, ph 8.5, mbt 22, cl 600, ca 100.
5/24/83	Drld to 6195.' Trip for B #32. Tight 4872' - 3646.' Wiped hole to 2438.' RIH to 6195,' circ. & cond., POOH - Tight 4510-4234.' M.U. Dynadrill, RIH. Surveys @ 6175' = 4°30 NO3°E. Md. Wt. 9.5, vis 38.
5/25/83	RIH, brk circ. @ 3270.' Ream 6180' - 6195.' Dynadrill to 6382.' POOH. tight @ 5250-4206.' Stuck pipe @ 4206.' Circ. & work pipe. Rig up Dialog & run free pt. Surveys @ 6248' = 4°00 N15°W; 6279' = 3°00 N15°W; 6279' = N15 W; 6342' = 2°00' N. Md. Wt. 9.6, vis 48.
5/26/83	Backed off DC's @ 4090,' POOH & MU fishing tools (screw-in sub, bumper sub, jars). RIH & screwed into fish & jarred loose. POOH. L.D. fishing tools. RIH w/B #21. Working pipe slowly. Reamed 6195' to 6382.'Drld to 6410.' Circ. & cond. - POOH. Surveys @ 6380' = 0°45' NO8°E. Md. Wt. 9.5, vis 40, wl 7.6, PV/YP 10/10, gels 4/10, sol 7, ph 8.5, mbt 22, cl 500, ca 100.
5/27/83	Chg. BHA & P.U. Dynadrill. RIH w/B #33, ream and wash 6343' to 6410.' Dynadrill to 6490.' POOH, L.D. Dynadrill & M.U. BHA, RIH-tight @ 4100 - 4110.' Survey @ 6441' = 1°00' S80°W. Md. Wt. 9.5, vis 38, wl 7.0, PV/YP 10/8, gels 2/8, ph. 8.5, mbt 20, cl 500, ca 120.
5/28/83	Reamed 6309' - 6490.' Drld to 6718,' wiper trip @ 6691,' tight spots 6123' - 5930' and 4541' - 4200.' Surveys @ 6516' = 2°45'' S58°W; 6609' = 2°45' S73°W; 6671 = 2°45' S80°W. TVD = 6551.' Md. Wt. 9.5, vis 38, wl 7.0, sol 7, PV/YP 12/8, gels 2/8 ph 8.5, mbt 20 cl 500, ca 120.

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Date	
5/29/83	Drld to 6755.' Dynadril to 6838,' trip for B#34, ream 6127' - 6230' and 6708' - 6838.' Surveys @ 6733' = 3°00 N87°W; 6808' = 3°15' S45°W. TVD = 6688.' Md. Wt. 9.5, vis 40, wl 7.0, sol 7, PV/YP 10/8, gels 2/10, ph 8.5, mbt 20, cl 500 ca 100.
5/30/83	Drld to 7000' - circ. & cond. - wiper trips to 1978' and 4920' (Tight spots @ 6096', 5535,', & 4977'). Surveys @ 6892' = 4°15' S36°W; 6980' = 4°00 S40°W. R.U. Schlumberger. Md. Wt. 9.5, vis 40, wl 6.8, sol 7, PV/YP 10/8, gels 3/10, ph 8.5, mbt 20, cl 500, ca 100.
5/31/83	Ran DIL & SONIC. Ran dipmeter and stuck @ 6154.' Stripped over and recovered w/Bowen overshot dressed w/3 5/8" grapple & 7 1/4" O.D. guide shoe. Md. Wt. 9.5, vis 40, wl 6.6, sol 7, PV/YP 10/8, gels 2/8, ph 8.5, mbt 20, cl 500, ca 100.
6/1/83	RIH, C.O. & circ. and cond. Ran Dipmeter, FDC/CNL. Md. Wt. 9.5, vis 40, wl 6.8 sol 7, PV/YP 10/10, gels 4/12, ph 8.5, mbt 20, cl 500, ca 80.
6/2/83	RIH w/B #34, drld to 7200.' Survey @ 7110' = 3°45' S70°W. Md. Wt. 9.5, vis 40, wl 7.2, sol 7, PV/YP 10/8, gels 4/12, ph 8.5, mbt 20, cl 500, ca 100.
6/3/83	Drld to 7400.' Surveys @ 7171' = 4°00 S75°W; 7260'=4°15 S88° W, 7351'=4 °45' N81°W. TVD 7204.' Md. Wt. 9.5, vis 40, wl 6.8, sol 7, PV/YP 10/8, gels 4/12, ph 8.5, mbt 18, cl 500, ca 80.
6/4/83	Drld to 7656,' circ. & cond. Surveys @ 7453' = 5°15' N76°W; 7543 = 5°45' N69°W; 7639 = 6°45' N60°W. Md. Wt. 9.5, vis 40, wl 6.6, sol 7, PV/YP 12/8 gels 4/12, ph 8.5, mbt 22, cl 600, ca 100.
6/5/83	POOH & L.D. 100 jts. D.P., stuck pipe @ 4625' worked loose. Worked thru tight spots pulling to shoe. RIH to 4000' & circ. & C.O. POOH laying down D.P. Md. Wt. 9.5, vis 40, wl 6.4, sol 7, PV/YP 10/8, gels 3/10, ph 8.5, mbt 20, cl 500, ca 100.

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Date	
6/6/83	L.D. D.P., HW, & D.C. RU & ran 5 1/2" liner to 3894' as follows: 2.10 Shoe 39.61' 1 jt. 15.5#, K55, ST&C 1.75' F.U. Collar 3853.21' 98 jts. 15.5#, K-55, ST&C 2.00' UP --- 3894.67' TOTAL Cmt'd w/150 c.f. mud sweep ahead, followed by 500 c.f. 1:1 POZ w/4% gel & 0.75% D-31, followed by 260 c.f. class "G" w/0.75% D-31. Disp. w/93.5 bbls. 2% KCl water. Released rig at 6 A.M.

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Date	
7-7-83	MI Hopps completion rig,, inst.BOP P.U. 2 3/8" tbg. & RIH w/ scraper to T.O.C. @ 3823'. Hole filled w/2% KCL wtr.
7-8-83	Ran Pengo GR-CCl-CBL w/VDL to 3811'. Correlation NG. Ran GR-N & correlation O.K. Shot 4 h. @ 3675'. Ran Baker Mdl "C" pkr to 3432' w/tail to 3463'. Broke dwn holes w/10 c.fm @ 2000psi. Displaced 48 c.f. & got 20 c.f. back. Mixed 100 sx G + FLA & 3% $CaCl_2$ & stage sqz'd to 2500 psi. Released pkr, pld. lstd, reversed to clear tbg. of any cmt. & P.O.O.H.
7-9-83	R.U. & C.O. cmt. 3515'-3650'. Scrapped hole to 3650'& circ. to clean hole. Shot 4 h. @ 3630' & ran Mdl "C".
7-10-83	Set pkr @ 3400' w/tail to 3431'. Est. break dn. w/1250psi @ 4 cfm. Spotted 63 c.f. G + FLA + 3% $CaCl_2$ & stage sqz'd to 2500 psi. Released & pulled pkr, pulled lstd & reverse circ. - no cmt. R.I.H. w/4 3/4" bit.
7-11-83	C.O. cmt. 3460' - 3630'. Shot 2 - ½" h. @ 3629'. Ran W.S.O. test on holes. Test dry & approved by D.O.G. RIH w/ 4 3/4" bit.
7-12-83	C.O. to 3670' & circ. hole clean. Pengo shot 4 hpf 3640'- 3654' (14'). Check perf loc. w/GR. Ran Baker Model "R" & set @ 3566' w/tail to 3597'. Swabbed dn to 3500'. Checked entry after 1 hr. Had 48' rise. Rec. 1 bbl. wtr. S.I.
7-13-83	Found FL @ 2607' = 893' rise (3.5 bbls.) in 10 hrs. Swab @ 3500'. Made swab runs after waits as follows: 1 hr. - no entry, 1 hr - 108' (0.4 bbls.), 2½ hrs. - 160' (0.6 bbls), 2 hrs.- 90' (0.3 bbls.), 2 hrs. - 147' (0.6 bbls.). Recovered 5 BW during day - no oil.
7-14-83	Had 585' (2.3 bbls.) rise in 12½ hrs. Two one hr. ckecks rec. 107' (0.4 bbls.) & 87' (0.3 bbls) Acidized w/500 gal. mud acid. Sqz'd w/1500 psi @ 4 cfm. Min press. 1000psi w/minor pressure fluctuations to 1500psi final at end of job. S.I. ½ hr. & attempted to swab. Had trouble w/ swab sticking. Swabbed 13.9 bbls. (584 gal.) dn. to 3560'. Had 139' (0.5 bbl.) rise in 2 hrs. Total rec. 17.8 bbls. S.D. overnight.

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RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator ENERGETICS, INC Field ..... County .....
Well DEL MAR 43-35 , Sec. ....., T ....., R ....., B. & M.
A.P.I. No. ..... Name ..... Title .....
Date ....., 19..... (Person submitting report) (President, Secretary or Agent)

Signature .....

..... (Address) ..... (Telephone Number)

History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date	
-15-83	Had 576' (2.2 bbl.) entry in 12½hrs. - dirty acid wtr. Checked entry w/swab as follows: 1hr. 20' (0.1 bbl.), 1 hr. 30' (0.1 bbl.), 1 hr. no rec., 2 hrs. 0.4 bbls. 2 hrs. ½ bbl. Total 3.75 bbls. in 9 hrs. S.D. overnight.
-16-83	Fourteen hr. entry was 408' (1.6 bbls.) Had trace oil. Checked entry as follows: 2 hrs. 0.4 bbl., 2 hrs. 0.5 bbl., 2 hrs. 0.3 bbls. Rec. approx. 3 bbls total. Released & pulled pkr.
-17 & -18-83	Shut dn. for weekend.
-19-83	Ran tbg. to 3655' & pumped in 20 cf. cmt. + FLA & 3% C_aCl_2. Found T.O.C. @ 3575'. Abandoned perf's 3640' - 3654'. Shot 2 h. @ 3514'. Broke dn perfs w/1250 psi @ 10cfm. Spotted 80 cf. G + FLA + 3% C_aCL_2 Stage sqz'd 62 cf thru to 2500 psi. RIH w/4 3/4" bit.
-20-83	C.O. cmt. 3442' - 3490'. Shot 2 h @ 3466'. Ran W.S.O. on holes for D.O.G. - Dry. C.O. to 3510'.
-21-83	Perf 3480' - 3494' w/4 hpf. Logged perfs w/GR-CCl. Set Bkr model R @ 3438' w/ tail to 3469'. Swabbed dn. to 3400'. Rec. 13¼bbls. Checked entry as follows. 1 hr. 345' (1.3bbls.), 1 hr. 3/4 bbl., 1 hr. 1/3 bbl. S.D. overnight.
-22-83	Fourteen hr. entry 1150' (4.5 bbls.) Made 9 entry tests averaging 0.4 bbl/hr. Rec. 9 bbls. w/tr.oil. Total rec. to date 27 bbls. incls. 14 bbls. load fluid. S.D. overnight.
-23-83	Overnight entry 3.05 BW w/tr. oil. Four 1 hr. entry tests averaging 0.4 bbls. Total rec. 4½ bbls. w/tr. oil. Acidized w/ 6 bbl. 15% HCL + 700 SCF N_2/bbl. @ 1000 psi, 12 bbls. 12% HCL + 3% HF + 800 SCF/bbl N_2 @ 2 BM & 2000 psi., then 6 bbl. 15% HCl 800 SCF/bbl. N_2 @ 2 BM & 2400 psi. Disp. w/14000 SCF N_2 @ 3000 psi. S.I.T.P. 2400 psi before blowing well dn. S.I. 30 min, blew well dn. w/no liquid rec. Swabbed from 1580' to 3408' rec. 7 bbls. acid wtr. Made 7 - 1hr. entry tests. Averaged 1.9 B/hr. - all wtr. Total rec. 20 bbls. w/no oil.- 4 bbls load acid to be recovered. S.D. overnight.

SUBMIT IN DUPLICATE

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

History of Oil or Gas Well

Operator ENERGETICS, INC Field ..... County .....
Well DEL MAR 43-35, Sec. ....., T ....., R ....., B. & M.
A.P.I. No. ..... Name ..... Title .....
(Person submitting report) (President, Secretary or Agent)
Date ....., 19.....

Signature .....

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History must be complete in all detail. Use this form to report all operations during drilling and testing of the well or during redrilling or altering the casing, plugging, or abandonment with the dates thereof. Include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests and initial production data.

Date	
7-24-83	Overnight entry 9.2 bbls. Made 11- 1 hr. entry tests averaging 1.2 B/hr. wtr. w/tr.oil. Total recovered is 42 bbls. or 18 over load fluid.
7-25-83	S.D. for Sunday.
7-26-83	Entry 6.8 bbls. while S.D. Made 6 entry tests averaging 0.3 B/hr. cutting 10% oil. Total rec. above load fluid is 27 bbls.
7-27-83	Overnight entry 2.7 bbls. water. Pulled pkcr. Pumped in 35sx. G + 3% C_aCL_2 thru tbg. @ 3496' for abandonment plug. Found T.O.C. @ 3197'.. Witnessed by D.O.G.
7-28-83	Rigged up NL Acme spear & bmpr sb. & set in 5½" csg. Unseated slips w/ 120,000# pull. Found csg. free at 3170'. (T.O.C. in 5½"). Jet cut csg. @ 3170' & could not pull w/125,000#. Attempted to jet cut 2 more times NG. Attempted cut @ 2200' - NG. Re-ran freepoint to 2200 - tool stopped. Fifth attempt @ 2175' NG.
7-29-83	Rigged up McCullough & made chem. ct. @ 2140'. Pulled to 125,000# - NG. Made cut @ 2110' & worked to 126000# NG.
7-30-83	Cut. @ 2000' & pipe would not come w/125000# pull. Cut @ 1953' & pulled & rec. 5½", 15.5# csg, L.D. 48 jts. & one cut off. Installed blind flange on wellhead & tore out equipment. Well suspended pending study for possible redrill.

Joe Johnson Directional Drilling

Drilling Assemblies

( ) Window 1978 - 2014
( )
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( )
( )
( )

Company Energetics Inc
Location Rincon Mountain
Well 43-35 RD-2 (DelMar)
Date 5/7/83

KB = 195'

TOTAL

Station No.	Measured Depth	Course Length	Angle		Vertical Depth		Deviation		Direction			North		South		East		West		Section	Dog Leg	WT.	R.P.M.	Bit	D.A.	Depth In
	1996	122	1	30	1995	21			S	40	W	1	66					42	55							
	2037	41	1	15	2036	21			N	15	E	1	87					42	94							
	2099	62	3	00	2098	17			N	49	E	3	82					41	72							
	2191	92	5	45	2189	90			N	44	E	8	65					36	63							
OURSE	2253	62	7	15	2251	50			N	48	E	13	53					31	58			COO	RDIN	ATES		
	2316	63	9	00	2313	87			N	52	E	19	25					24	76		N		S	E		W
	2409		11		2405	46				55		28	86					11	78							
	2546		13		2539	46				50		46	20			10	82									
	2640		12		2631	23				50		59	27			26	40									
	2764		11	45	2752	58				46		76	35			✓ 45	36									
	2812		12	45	2799	49				48		83	29			✓ 52	81									
	2873		14		2858	83				50		92	55			63	46									
✓	2905		15		2889	81				52		97	59	✓		69	69									
	2935		15	30	2918	76				53		102	40			175	95									
	3072		18	45	3049	68				53		126	67			108	17									
	3165		19	45	3137	48				54		144	91			132	81									
✓	3284		20	45	3249	13				53		169	91			165	92									
	3314		21		3277	16			N	53	E	175	84			174	46									
	3377		21		3335	98				53		189	43			192	49									
	3400		21	30	3357	41				51		194	56		—	199	06									
	3462		20	30	3415	29				47		209	14		—	215	83									
✓	3526		18		3475	71				45		223	80			231	01									
	3556		17	15	3504	31				44		230	28			237	37									
	3619	✓	17	00	3564	51	✓			40		244	06	✓	✓	249	79									
	3681	✓	16	30	3623	88	✓ 4			33		258	43	✓	✓	260	42				7					
29.72	3712	31	16	30	3653	60	8	80		31		265	78			264	95				7.35			4.53		
21.60	3745	33	16	45	3685	20	9	51		28		274	18			269	42				8.40			4.47		
18.33	3806	61	17		3743	53	17	83		21		290	82			275	81			1	6.64			6.39		
18.41	3867	61	16	45	3801	94	17	58		13		307	95			279	76			1	7.13			3.95		
19.68	3898	31	16	45	3831	62	8	93		9		316	77			281	16				8.82			1.40		
0.68	3930 ✓	32	16	30	3862	30	9	09	N	5	E	324	38	(325.83)	✓	284	93	(281.95)			9.06			0.79		

Joe Johnson Directional Drilling

4814
4709
105
5

Company ENERGETICS
Location RINCON MOUNTAIN
Well 43-35 RD-2
Date

KB=195'

Drilling Assemblies

( ) _____
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( ) _____
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Station No.	Measured Depth	Course Length	Angle		Vertical Depth		Deviation		Direction			North		South		East		West		Section	Dog Leg	W.T.	R.P.M.	Bit	D.A.	Depth In
	3930	32	16	30	3862	30	9	09	N	5	E	324	38			284	93	(281.95)			U		S	E	E	W
24.69	4008	78	16	45	3936	99	22	48	N	2	W	346	85			284	14			22	47					0.79
17.42	4132	124	18	45	4054	41	39	85	N	2	W	386	68			282	75			39	83					1.39
87.50	4224	92	18	15	4141	91	28	43	N	1	W	415	11			282	25			28	43					0.50
88.45	4317	93	18	—	4230	36	28	74	N	1	W	443	85			281	75			28	74					0.50
60.68	4380	63	17	30	4291	04	18	94	N	0	—	461	79	(462.79)		283	60			18	94					0
	4442		16	45	4350	23			N	2	W	480	04			283	28									
	4504		16	45	4409	60			N	1	E	497	91			283	12									
	4564		16	00	4467	17			N	1	E	514	82			283	42									
	4624		15	15	4524	95			N	0	—	530	98			283	56									
	4688		15		4586	73			N	1	E	547	68			283	71									
	4751		14	00	4647	73			N	0	—	563	46			283	84									
	4814		13	30	4708	92			N	1	E	578	43			283	97									
	4875		13	15	4768	27			N	2	E	592	54			284	34									
	4937		12	15	4828	74			N	2	E	606	21			284	82									
	5030		11	30	4919	75			N	3	E	625	33			285	66									
	5062		11	15	4951	12			N	3	E	631	63			285	99									
	5150		10	30	5037	54			N	2	E	648	22			286	71									
	5243		10	00	5129	06			N	5	E	664	74			287	72									
	5337		9	30	5221	70			N	3	E	680	62			288	83									
	5430		9	15	5313	46			N	4	E	695	74			289	76									
	5477		8	30	5359	89			N	2	E	702	98			290	14									
✓	5540		6	15	5422	37			N	0	E	711	07	✓		290	28									
	5624		5	00	5505	97			N	2	E	719	30			290	42									
	5716		4	15	5597	67			N	6	W	726	70			290	16									
✓	5840	✓	4	30	5721	31	✓		N	10	W	736	07	✓		288	85									
	5959	✓	4	15	5839	96	✓		N	8	W	745	05	✓		287	43									
	6080		4	15	5930	71			N	8	W	751	73			286	49									
	6175		4	30	6055	35			N	3	E	761	26			286	07									
	6240		4	00	6128	15			N	15	W	776	64			285	51									

Joe Johnson Directional Drilling

Drilling Assemblies

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Company ENERGETICS INC
Location Rincon Mountain
Well 43-35 RD-2
Date _____

KB = 195'

Station No.	Measured Depth	Course Length	Angle		Vertical Depth		Deviation		Direction			North		South		East		West		Section	Dog Leg	WT.	R.P.M.	Bit	D.A.	Depth In
	6279		3	15	6159	08			N	15	W	768	53			285	00									
	6342		2	00	6222	02				N		771	39			284	62									
	6380		0	45	6260	01			N	8	E	772	30			284	69									
	6441		1	00	6321	00			S	80	W	772	95			284	02									
	6516		2	45	6395	96			S	58	W	772	07			281	73									
	6609		2	45	6488	85			S	73	W	770	22			277	67									
	6671		2	45	6550	78			S	80	W	769	52			274	77									
	6733		3	00	6612	70			N	87	W	769	33			271	67									
	6808		3	15	6687	59			S	45	W	769	87			269	83									
	6892		4	15	6971	41			S	36	W	763	69			264	29									
88	6980		4	00	6859	20			S	40	W	758	98			260	34									
	7110		3	45	6963	94			S	70	W	756	39			253	46									
	7171		4	00	7024	80			S	75	W	755	15			249	53									
	7264		4	15	7117	56			S	88	W	754	16			242	91									
	7351		4	45	7204	29			N	81	W	754	70			236	10									
	7453		5	15	7305	90			N	76	W	756	47			227	39									
	7543		5	45	7395	45			N	69	W	759	07			219	16									
	7639		6	45	7490	88			N	60	W	763	57			209	73									
17	7656				7507	76						764	57			208	00									
	TD																									

ENERGETICS, INC.

Del Mar 43-35 (O.H.)

GEOLOGICAL SUMMARY

Surface Location: 1854' South and 1061' West from the north-east corner of Section 35, Township 4 North, Range 25 West. Ventura County, California.

Elevation: Ground Level 173', Kelly Bushing 195'.

Spudded: March 13, 1983

Logged: March 31, 1983 **Total Depth;** 6286'

Bottom Hole Location:
973' South and 599' East from surface location.

Purpose: The Del Mar 43-35 well was drilled to delineate the areal extent of the productive zone (Bates Sand) discovered in the Del Mar 32-35 well. It was projected to a target in a S29E direction to encounter the Bates Sand at an estimated drilled depth of 6440' (-6180 s.s.) and to be drilled to a total depth of 10,000' to test the Lower Sespe sands.

Formations Drilled:

The non-marine Casitas formation of Pleistocene age was drilled from the surface casing to 1383'. It consists of massive to lenticular beds of varicolored, poorly sorted, fine to coarse grained sandstones and possible conglomerate to pebble beds. Thin bedded medium to dark brown claystones and red-brown to dark brown siltstones are common. The contact with the underlying marine Santa Barbara formation was based on a color change of the clay beds to a light to medium brown and tan color, and electric-log correlations with the 32-35 well. Megafossil shell beds are common throughout the Santa Barbara formation.

Unconformably below the Pleistocene rocks, gray to light gray, firm, silty claystones and light to medium brown siltstones of the Rincon formation occurred from 3245' to 4260'. Minor amounts of very fine to fine quartz sands also occur. The Rincon formation is lower Miocene in age (Zemorrian to Saucesian microfaunal stage) and was probably deposited in an outer shelf water depth.

The shallow-water Vaqueros sandstone is probably transitional with the overlying Rincon formation and consists of fair sorted, fine to medium grained, gray quartz sand.

Conformably below the Vaqueros sandstone, the non-marine Sespe formation was drilled to the total depth of the well. Massive to thin bedded, lenticular sands are mostly gray to oil-stained, fine to medium grained, angular to subangular and well to fair sorted quartz sandstone.

Black and green chert, mica, and green rock fragments are common accessory grains. The interbedded siltstones are mostly brown to red-brown, firm and clayey. These fluvial rocks were probably deposited in a low to medium energy flood plain environment.

Formations, ages and drilled intervals are;

Casitas Formation - Pleistocene (non-marine)	503' to 1383'
Santa Barbara Formation - Pleistocene (probably Upper Hallian stage-marine)	1383' to 3245'
Rincon Formation - Lower Miocene (Lower Zemorrian stage-marine)	3245' to 4260'
Vaqueros Formation - Lower Miocene (Lower Zemorrian stage-marine)	4260' to 4318'
Sespe Formation - Oligocene (Refugian stage - non-marine, fluvial)	4318' to 6286'

Oil and Gas Shows:

From 2650' to 2770' and 2950' to 3055' dead tar occurred in the samples with no increase in ditch gas or chromatograph reading, and was therefore classified as a slight trace of oil. The Vaquero sands were wet.

Good oil and gas shows were encountered in the Sespe formation from 4905' to 4990', 5115' to 5145', and 5210' to 5420'. Total gas readings reached 2000-3000 units, chromatograph readings C_1-C_5 were excellent, with good staining, fluorescence and cuts in the ditch samples. Good sand porosities (greater 20%) were estimated from examination of the cuttings and drill rates. Shows continued to 6000', recycling of gas throughout the mud column probably accounted for the high gas readings below 5200'.

Sidewall cores indicated good to excellent shows, with a majority of the oil sands having fair to good petroleum odors and oil staining, gold to orange-gold fluorescence, straw to light straw cuts and a bright-yellow cut flourescence. Core laboratory analyses indicated excellent porosities and permeabilities in the oil sands, although oil-water ratios were generally poor. An A.P.I. oil gravity of 34° was indicated.

Electric logs (DIL) indicated low resistivity readings, less 10 ohms in the zones of interest, and therefore, these sands may have been depleted or badly faulted. Water

saturations (Sw) varied from 60 to 100% depending on the water restivities (Rw) used.

Structure: This well was directed south-easterly from the surface location encountering the Vaqueros sandstone at 4260' (-3971 S.S.) approximately 14' high to the 32-35 well. Dipmeter readings from 4275' to 4400' were 31° to 36° in a N 15° to 27° E direction indicating a fault or tight syncline between the 2 wells at the Vaqueros level. Northerly dips continued from 4400' to 4700', and from 4900' to 5100', with dips varying from 40° to 50°. Below 5100' dips were spotty and erratic, indicating steep dips (60-90°) and possible faulting. Also the lithology below 5600' was predominately a medium brown to red-brown siltstone to the total depth, indicating the well had crossed the faulted anticlinal axis and was drilling down the south flank of the anticline.

Conclusions: The 43-35 well encountered good oil and gas shows in the upper part of the Sespe formation, except the electric logs indicated low resistivities. The shows occurred near the axis of a faulted anticlinal fold and are separated from the 32-35 well by a tight synclinal fold and possibly three high-angle reverse faults. These faults occur at approximately 4750' to 4770', 5150' to 5200', and a questionable fault may occur below 6100'. They appear to dip northerly 70° and are up-thrown on the north, roughly paralleling the Red Mountain Thrust Fault. The oil sands encountered in this well appear to be stratigraphically younger than the Bates Sand in the discovery well.

April 20, 1983

California Registration No. 161

ENERGETICS, INC.

Del Mar 43-35 (Redrill-1)

WELL SUMMARY

Surface Location: 1854' South and 1061' West from the north-east corner of Section 36, Township 4 North, Range 25 West. Ventura County, California.

Elevation: Ground Level 173', Kelly Bushing 195'.

Redrilled: April 5, 1983 K.O.P. 4410'

Logged: April 15, 1983 Total Depth; 7010'

Bottom Hole Location:
1746' South and 876' East from the surface location.

Purpose: This well was to be directionally redrilled to test the shows in the upper Sespe sands in the 43-35 O.H. at a higher structural position.

Formations Drilled:
Sespe Formation - Oligocene (Refugian stage) - 4410' to 7010' TD.
Kick-off point at 4410' below 9 5/8" casing point at 4406'.

Oil and Gas Shows:
Oil and gas shows were drilled from 4900' to 5170', and from 5655' to 5800'. Although structurally higher, the shows were poorer than in the original hole, partly due to an increased mud-weight. Total gas values averaged 150 to 200 units except for the 5105' - 5120' interval where they were over 1000 units.

A fault may occur above the second show interval, indicating closure against the fault.

Sidewall cores included good oil sands in both intervals, but the electric log resistivities indicated the sands to be wet.

Structure: Although this well crossed the anticlinal axis higher than the original hole, faulting terminated the shows higher in the section. Dipmeter results indicate a sharp reversal in dip direction and angle near 5100', from a northerly direction to a steeper southerly direction, probably due to faulting. From 5100' to the total depth both the dipmeter and the lithology indicate steep beds dipping southerly.

Conclusions: The 43-35 Redrill well found the equivalent sands with oil shows in the original well at a higher structural position, and although good shows occurred in the sands, electric logs indicate the sands to be wet and/or depleted.

Casing will be run on this well and the oil sand intervals production tested.

April 20, 1983

California Registration No. 161

ENERGETICS, INC.

Del Mar 43-35 (Redrill 2)

GEOLOGICAL SUMMARY

Surface Location: 1854' South and 1061' West from the north-east corner of Section 35, Township 4 North, Range 25 West.

Elevation: Ground Level 173', Kelly Bushing 195'

Date Redrilled: May 9, 1983 K.O.P.; 1978'-2014'

Date Logged: May 30, 1983 Total Depth; 7656'

Bottom Hole Location:
765' North and 208' East

Purpose: The Del Mar 43-35 (Redrill 2) well was redrilled in a northerly direction to evaluate the Santa Barbara, Rincon, Vaqueros and Sespe Formations on a southerly dipping homocline north of the discovery well (Del-Mar 32-35).

Formations Drilled:

Poorly sorted, medium to coarse grained sandstones and gray to medium gray, soft claystones with abundant megafossils of the Santa Barbara Formation were drilled from 1990 to 2794', where medium to dark gray claystones and siltstones of the Rincon Formation were encountered.

At 3445' gray-green, glauconitic, very fine to fine grained Vaqueros Sandstone occured; from 3550' to 3640' poor crushed samples of a green to dark brown clayey siltstone with Kaolinite occurred indicating proximity to a fault zone, with a repeated Vaqueros Sandstone top at 3637'. One possible fault occurs from 3618' to 3638'. Below the Vaqueros Sandstone, medium brown to red-brown clays and siltstones, and poorly sorted reddish sandstones of the Sespe Formation were drilled from 3675' to 7656' T.D.

Formations, ages and drilled intervals are;

Santa Barbara Formation - Pleistocene-marine or nearshore lacustrine ..... 1975'-2794'

Unconformity

Rincon Formation - Lower Miocene-marine ..... 2794'-3445'

Vaqueros Formation - Lower Miocene-marine ..... 3445'-3497'

Fault Zone ..... 3497'-3637'

Vaqueros Formation (repeated) ..... 3637'-3675'

Unconformity

Sespe Formation - Oligocene-fluvial ..... 3675'-7656' TD

Oil and Gas Shows:

Slight shows occurred in the Vaqueros Sand from 3460' to 3550', total ditch-gas was only 11 units with the cuttings - gas up to 100 units, live oil was indicated in the samples. The DIL indicated no hydrocarbons in this interval and the FDC-CNL curves showed 9 to 18% porosity.

Minor shows occurred at 3640' to 3660' in the "repeated" Vaqueros Sand. The DIL indicated no hydrocarbons and the FDC-CNL curves "crossed-over", possibly indicating gas from 3633' to 3670'.

In the Sespe Formation, minor shows occurred from 3750' to 3760' and 5605 to 5670', where the samples had a dull-orange fluorescence, a poor-cut with no staining. Total ditch gas readings were 10 units or less.

From 5100' to 5130' total ditch gas peaked at 400 to 500 units through a 10' interval with good C1-C5 values. Samples from this interval had no staining, a dull-orange fluorescence, a dull-yellow cut fluorescence and a faint visual cut. The DIL indicated the sand to be wet. A possible fault may occur at 5144' to 5150' explaining the shows and repeating the sands at 5090' to 5117' and 5205' to 5238'.

No other shows were seen in the Sespe Formation, although below 7100' thin-bedded, very fine to fine grained sands and siltstones contained ditch gas in the range of 90 to 100 units.

Structure: This well was directed northerly and penetrated the southerly dipping homoclinal beds at a more normal angle than the 32-35 well. The formation tops and individual beds came in much higher than correlative beds in the 32-35 well.

Dipmeter results were consistently in a southern direction except near faulted or contorted zones. Average dip direction and dip angles are:

Santa Barbara Formation; S35 to 45W, 45 to 50°

Rincon Formation; upper 400' erratic dip directions and angles, from 3200' to 3637'-S7W, 75°.

Vaqueros Formation; scattered directions and dips, probably faulted.

Sespe Formation; consisent S6W, 50-60° to 6400', below 6400' to TD, S5E, 65°.

Conclusion: The Del Mar 43-35 (Redrill 2) well tested the southerly dipping Rincon, Vaqueros and upper Sespe Formations at a higher structural position than the 32-35 well with the productive Sespe Bates Sand being wet in the redrill.

All the oil and gas shows were considered minor to slight and with the exception of the Vaqueros Sand interval at 3633'-3670' the mudlogs and electric logs indicated no commercial hydrocarbons.

California Registration No. 151

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE ANALYSIS REPORT

FOR

ENERGETICS INC.

DEL MAR 43-35 RD-1
RINCON MOUNTAIN
VENTURA CO., CALIFORNIA

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions

1250 E. PACIFICO, ANAHEIM, CALIFORNIA 92805 · 714/937-1094

CORE LABORATORIES, INC.

May 10, 1983

Energetics, Inc.
Development Geology Dept.
102 Inverness Terrace East
Englewood, CO 80112-5397

Subject: Core Analysis Data
Del Mar 43-35 RD-1 Well
Rincon Mountain Field
Ventura County, California
CLI File 10-0803-01-002470

Gentlemen:

Percussion type sidewall core samples recovered from the subject well were submitted to our Anaheim, California laboratory for analysis. The results of these analyses are presented in the accompanying report with a general lithological description of the samples. The sample weights are also reported in order that these data may be taken into statistical account in evaluating the sampled intervals.

We sincerely appreciate this opportunity to serve you and hope these data prove beneficial in the development of this reservoir.

Very truly yours,

CORE LABORATORIES, INC.

James A. Cusator

James A. Cusator
Vice President, California Division
California Professional Engineer
Reg. No. P-1176

JAC:emk
4cc: Addressee
1cc: John J. Tonnsen
1cc: M. A. Janeczko
1cc: Bill Barker
1cc: Floyd L. Clawson
1cc: Jim Thompson

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

ENERGETICS INC.
DEL MAR 43-35 RD-1
RINCON MOUNTAIN
VENTURA CO., CALIFORNIA

DATE : 16-APR-83
FORMATION : UNKNOWN
DRLG. FLUID: WATER BASE MUD
LOCATION : 35-4N-25W

FILE NO : 0803-002470
LABORATORY: ANAHEIM
ANALYSTS : NH JW
ELEVAION : 197' KB

SIDEWALL CORE ANALYSIS

REC IN	DEPTH	PERM MD	POR %	OIL% PORE	WTR% PORE	O/W RATIO	SAMPLE WEIGHT	API OIL	DESCRIPTION
1.0	4966.0	250.	30.3	21.6	54.1	0.40	4.97		SD;TAN,VF-MGR,SSLTY,CALC,LTSTN,BRIYELFL
0.5	4976.0	250.	35.3	15.8	48.7	0.32	4.17		SAME
0.5	4995.0	250.	30.0	21.6	47.3	0.46	5.07	36	SD;LTBRN,VF-MGR,CALC,LTSTN,BRIYELFLU
0.5	5004.0	250.	25.9	24.6	45.6	0.54	4.65		SAME
0.5	5006.0	225.	31.3	17.0	38.3	0.44	2.98		SD;TAN;VF-MGR,SLTY,VCALC,LTSTN,BRIYELFL
0.5	5010.0	225.	28.0	13.6	42.4	0.32	4.37		SAME
0.5	5228.0	175.	32.0	0.0	90.1	0.00	4.65		SD;LTGY,VF-MGR,VSLTY,CALC,NOSTN,NOVISFL
0.5	5349.0	150.	20.9	0.0	46.9	0.00	5.13		SAME
1.0	5430.0	150.	22.2	0.0	77.6	0.00	8.55		SD;LTGY,VF-MGR,SSLTY,CALC,NOSTN,NOVISFL
1.0	5450.0	150.	28.0	0.0	69.8	0.00	6.51		SAME
1.0	5634.0	150.	26.1	0.0	73.8	0.00	5.27		SD;TAN,VF-MGR,SLTY,CALC,LTSTN,NOVISFLU
1.3	5673.0	200.	24.5	19.1	60.6	0.32	8.26	36	SD;BRN,VF-MGR,SSLTY,MSTN,GLDFLU
1.3	5677.0	200.	22.7	20.2	53.6	0.38	8.17		SAME
0.5	5716.0	150.	22.8	0.0	66.2	0.00	6.28		SD;LTGY,VF-MGR,SLTY,VCALC,NOSTN,NOVISFL
1.0	5722.0	150.	22.8	0.0	70.4	0.00	6.88		SAME
1.0	5724.0	200.	29.0	19.8	52.1	0.38	6.91		SD;BRN,VF-MGR,SLTY,SCALC,MSTN,GLDFLU
1.0	5784.0	200.	26.7	19.0	51.0	0.37	7.99		SAME

(*) PERMEABILITY VALUES FOR PERCUSSION TYPE SIDEWALL CORES DETERMINED EMPIRICALLY.
(**) SUMMATION OF FLUIDS METHOD - KEROGEN, IF PRESENT, WILL CONTRIBUTE TO PORE AND OIL VOLUMES.
(***) API OIL MEASUREMENTS TAKEN ON RETORTED SAMPLES, KEROGEN, IF PRESENT, MAY ALTER RESULTS.

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1250 E. PACIFICO, ANAHEIM, CALIFORNIA 92805 · 714/937-1094

CORE LABORATORIES, INC.

April 22, 1983

Energetics, Inc.
Development Geology Dept.
102 Inverness Terrace East
Englewood, CO 80112-5397

Subject: Preliminary Report
Del Mar 43-35 RD-1 Well
Rincon Mountain Field
Ventura County, California
CLI File 10-0803-01-002470

Gentlemen:

Enclosed please find a preliminary Sidewall Core Analysis Report for the subject well. A final report will be issued after the well is completed.

If you have any questions regarding the data, or if we can be of further service in any way, please do not hesitate to contact us.

Very truly yours,

CORE LABORATORIES, INC.

David E. Mazzanti emk

David E. Mazzanti
Laboratory Supervisor
Conventional Core Analysis

DEM:emk
4cc: Addressee
1cc: John J. Tonnsen
1cc: M. A. Janeczko
1cc: Bill Barker
1cc: Floyd L. Clawson
1cc: Jim Thompson

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

ENERGETICS INC.
DEL MAR 43-35 RD-1
RINCON MOUNTAIN
VENTURA CO., CALIFORNIA

DATE : 16-APR-83
FORMATION : UNKNOWN
DRLG. FLUID: WATER BASE MUD
LOCATION : 35-4N-25W

FILE NO : 0803-002470
LABORATORY: ANAHEIM
ANALYSTS : NH JW
ELEVAION : 197' KB

SIDEWALL CORE ANALYSIS

REC IN	DEPTH	PERM MD	POR %	OIL% PORE	WTR% PORE	O/W RATIO	SAMPLE WEIGHT	API OIL	DESCRIPTION
1.0	4966.0	250.	30.3	21.6	54.1	0.40	4.97		SD;TAN,VF-MGR,SSLTY,CALC,LTSTN,BRIYELFL
0.5	4976.0	250.	35.3	15.8	48.7	0.32	4.17		SAME
0.5	4995.0	250.	30.0	21.6	47.3	0.46	5.07	36	SD;LTBRN,VF-MGR,CALC,LTSTN,BRIYELFLU
0.5	5004.0	250.	25.9	24.6	45.6	0.54	4.65		SAME
0.5	5006.0	225.	31.3	17.0	38.3	0.44	2.98		SD;TAN;VF-MGR,SLTY,VCALC,LTSTN,BRIYELFL
0.5	5010.0	225.	28.0	13.6	42.4	0.32	4.37		SAME
0.5	5228.0	175.	32.0	0.0	90.1	0.00	4.65		SD;LTGY,VF-MGR,VSLTY,CALC,NOSTN,NOVISFL
0.5	5349.0	150.	20.9	0.0	46.9	0.00	5.13		SAME
1.0	5430.0	150.	22.2	0.0	77.6	0.00	8.55		SD;LTGY,VF-MGR,SSLTY,CALC,NOSTN,NOVISFL
1.0	5450.0	150.	28.0	0.0	69.8	0.00	6.51		SAME
1.0	5634.0	150.	26.1	0.0	73.8	0.00	5.27		SD;TAN,VF-MGR,SLTY,CALC,LTSTN,NOVISFLU
1.3	5673.0	200.	24.5	19.1	60.6	0.32	8.26	36	SD;BRN,VF-MGR,SSLTY,MSTN,GLDFLU
1.3	5677.0	200.	22.7	20.2	53.6	0.38	8.17		SAME
0.5	5716.0	150.	22.8	0.0	66.2	0.00	6.28		SD;LTGY,VF-MGR,SLTY,VCALC,NOSTN,NOVISFL
1.0	5722.0	150.	22.8	0.0	70.4	0.00	6.88		SAME
1.0	5724.0	200.	29.0	19.8	52.1	0.38	6.91		SD;BRN,VF-MGR,SLTY,SCALC,MSTN,GLDFLU
1.0	5784.0	200.	26.7	19.0	51.0	0.37	7.99		SAME

(*) PERMEABILITY VALUES FOR PERCUSSION TYPE SIDEWALL CORES DETERMINED EMPIRICALLY.
(**) SUMMATION OF FLUIDS METHOD - KEROGEN, IF PRESENT, WILL CONTRIBUTE TO PORE AND OIL VOLUMES.
(***) API OIL MEASUREMENTS TAKEN ON RETORTED SAMPLES, KEROGEN, IF PRESENT, MAY ALTER RESULTS.

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CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

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SANTA PAULA, CALIFORNIA

CORE ANALYSIS REPORT

FOR

ENERGETICS INC.

DEL MAR 43-35
RINCON RANCH
VENTURA CO. CALIFORNIA

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

ENERGETICS INC.
DEL MAR 43-35

DATE : 24-MAR-83
FORMATION : UNKNOWN

FILE NO : 0803-002463
LABORATORY: ANAHEIM,CA.

SIDEWALL CORE ANALYSIS

REC IN	DEPTH	PERM MD	POR %	OIL% PORE	WTR% PORE	O/W RATIO	SAMPLE WEIGHT	API OIL	DESCRIPTION
1.0	4947.0	250.	24.4	3.4	54.5	0.06	7.47		SAME
0.7	4952.0	250.	31.1	13.2	48.4	0.27	5.98	34	SAME
	4955.0								MUD-SHOT
0	4966.0	50.	37.0	1.2	64.4	0.02	8.05		SD;GY,VF-MGR,SLTY,SCALC,SPLTSTN,SPGLDFLU
	4995.0								SHATTERED
0.7	4999.0	<0.1	20.3	0.0	76.5	0.00	11.29		SH;GY,NOSTN,NOVISFLU
	5138.0								MUD-SHOT
1.2	5147.0	300.	29.9	12.1	48.6	0.25	7.33		SD;BRN,VF-MGR,SLTY,CALC,LTSTN,GLDFLU
0.5	5150.0	100.	28.8	2.4	41.2	0.06	5.93		SD;BRN,VF-FGR,SLTY,CALC,LTSTN,GLDFLU
1.0	5152.0	15.	17.2	0.0	73.3	0.00	10.18		SD;BRN,VFGR,VSLTY,CALC,NOSTN,NOVISFLU
1.0	5160.0	250.	25.0	3.3	60.4	0.05	7.62		SD;BRN,VF-MGR,SLTY,CALC,LTSTN,GLDFLU
1.0	5162.0	250.	24.9	12.3	50.0	0.25	9.20	34	SAME
1.0	5218.0	250.	27.8	2.2	56.5	0.04	6.92		SAME
1.0	5226.0	250.	29.0	2.1	56.2	0.04	6.78		SAME
1.0	5258.0	250.	27.6	2.3	56.3	0.04	6.40		SAME
1.0	5261.0	250.	25.0	1.6	56.8	0.03	10.63		SAME
0.7	5264.0	200.	32.2	8.3	52.4	0.16	8.97	34	SD;BRN,VF-MGR,SLTY,CLY,CALC,LTSTN,GLDFLU
1.0	5286.0	300.	24.9	2.2	58.9	0.04	7.68		SD;BRN,VF-MGR,SLTY,LTSTN,GLDFLU
.0	5290.0	300.	23.8	1.8	58.7	0.03	9.67		SAME
0	5294.0	300.	25.1	2.8	50.7	0.06	5.93		SAME
.0	5298.0	300.	24.6	2.3	48.9	0.05	7.62		SAME
1.0	5317.0	300.	23.1	3.1	59.2	0.05	9.21		SAME
	5328.0								SHATTERED
1.0	5336.0	200.	28.1	3.7	62.0	0.06	7.86		SD;RD/BRN,SLTY,SCALC,LTSTN,DGLDFLU
0.5	5338.0	200.	27.3	3.6	55.4	0.06	4.19		SAME
0.5	5340.0	200.	33.7	6.0	55.2	0.11	7.67		SAME
	5344.0								SHATTERED
	5350.0								MUD-SHOT
	5359.0								SHATTERED
1.0	5351.0	250.	22.2	1.8	48.2	0.04	10.69		SD;BRN,VF-MGR,SLTY,SCALC,LTSTN,GLDFLU

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CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

ENERGETICS INC.
DEL MAR 43-35
RINCON RANCH
VENTURA CO. CALIFORNIA

DATE : 24-MAR-83
FORMATION : UNKNOWN
DRLG. FLUID: CY PAN BENEX
LOCATION : 35-4N-25W

FILE NO : 0803-002463
LABORATORY: ANAHEIM,CA.
ANALYSTS : DD JW
ELEVAION : 197'KB

SIDEWALL CORE ANALYSIS

REC IN	DEPTH	PERM MD	POR %	OIL% PORE	WTR% PORE	O/W RATIO	SAMPLE WEIGHT	API OIL	DESCRIPTION
1.2	2715.0	200.	25.6	0.0	88.6	0.00	9.79		SD;GY,VF-FGR,SLTY,CALC,NOSTN,NOVISFLU
1.2	2730.0	200.	24.6	0.0	83.5	0.00	9.07		SAME
1.2	2754.0	200.	26.8	0.0	87.7	0.00	9.84		SAME
1.2	2905.0	400.	24.8	0.0	94.4	0.00	9.54		SD;GY,VF-MGR,SSLTY,NOSTN,NOVISFLU
1.2	2915.0	200.	29.1	0.0	97.1	0.00	7.59		SD;GY,VF-FGR,SLTY,CALC,NOSTN,NOVISFLU
1.2	2964.0	200.	28.9	0.0	93.2	0.00	8.81		SAME
0.7	3010.0	100.	22.3	0.0	76.9	0.00	7.57		SD;GY,VF-CGR,CALC,SSLTY,NOSTN,NOVISFLU
1.2	3015.0	100.	22.5	0.0	76.1	0.00	8.97		SAME
1.0	3037.0	200.	33.9	0.0	81.5	0.00	8.10		SD;GY,VF-FGR,SLTY,CALC,NOSTN,NOVISFLU
1.0	3046.0	150.	31.0	0.0	88.2	0.00	6.87		SD;GY,VF-MGR,FOS,CALC,NOSTN,NOVISFLU
1.0	3066.0	200.	28.4	0.0	96.6	0.00	8.99		SD;GY,VF-FGR,SLTY,NOSTN,NOVISFLU
1.0	3095.0	250.	23.6	0.0	79.7	0.00	7.44		SD;GY,VF-MGR,SLTY,NOSTN,NOVISFLU
0.7	3165.0	50.	22.5	9.9	66.7	0.15	8.06		SD;GY,VF-MGR,VSHLY,CALC,NOSTN,NOVISFLU
1.0	3179.0	300.	22.3	0.0	71.3	0.00	8.55		SD;GY,VF-MGR,SLTY,CALC,NOSTN,NOVISFLU
0.5	4288.0	100.	26.6	0.0	81.0	0.00	8.30		SD;GY,VF-MGR,SLTY,CALC,NOSTN,NOVISFLU
0.5	4293.0	100.	29.0	0.0	85.2	0.00	9.81		SAME
	4308.0								MUD-SHOT
	4756.0								SHATTERED
0.5	4866.0	200.	23.4	0.0	75.8	0.00	5.71		SD;GY,VF-MGR,SLTY,CALC,SPLTSTN,SPGLDFLU
0.5	4918.0	25.	22.1	0.0	88.9	0.00	4.54		SD;BRN,VFGR,VSLTY,NOSTN,NOVISFLU
0.2	4920.0	250.	34.0	2.9	56.5	0.05	3.90		SD;BRN,VF-MGR,SLTY,CALC,LTSTN,GLDFLU
0.2	4923.0	250.	26.8	2.8	54.9	0.05	5.45		SAME
0.7	4925.0	250.	25.0	16.2	52.7	0.31	6.24		SAME
0.7	4927.0	250.	25.6	3.7	48.8	0.07	6.63		SAME
0.5	4930.0	250.	22.9	5.0	58.3	0.09	5.49		SAME
0.5	4932.0	250.	33.6	3.2	57.0	0.06	5.36		SAME
0.5	4942.0	250.	23.3	3.0	56.1	0.05	6.04		SAME
0.5	4945.0	250.	25.8	1.5	61.5	0.02	5.19		SAME

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CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

ENERGETICS INC.
DEL MAR 43-35

DATE : 24-MAR-83
FORMATION : UNKNOWN

FILE NO : 0803-002463
LABORATORY: ANAHEIM,CA.

SIDEWALL CORE ANALYSIS

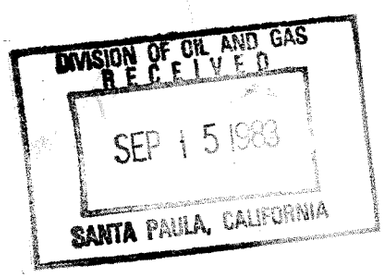
REC IN	DEPTH	PERM MD	POR %	OIL% PORE	WTR% PORE	O/W RATIO	SAMPLE WEIGHT	API OIL	DESCRIPTION
	5352.0								SHATTERED
0.5	5356.0	250.	30.7	2.9	46.1	0.06	6.47		SD;BRN,VF-MGR,SLTY,SCALC,LTSTN,GLDFLU
	5361.0								SHATTERED
.7	5372.0	250.	32.1	3.2	53.2	0.06	7.60		SD;BRN,VF-MGR,SLTY,SCALC,LTSTN,GLDFLU
	5377.0								INSUFFICIENT SAMPLE
	5406.0								MUD-SHOT
	5416.0								MUD-SHOT
0.5	5418.0	200.	35.6	7.2	57.7	0.12	10.39	34	SD;RD/BRN,SLTY,CALC,LTSTN,DGLDFLU
1.0	5629.0	225.	29.2	0.0	84.2	0.00	5.51		SD;GY,VF-MGR,SSLTY,CALC,NOSTN,NOVISFLU
1.0	5703.0	225.	30.2	0.0	90.0	0.00	9.14		SD;TAN,VF-MGR,SLTY,CALC,NOSTN,NOVISFLU

(*) PERMEABILITY VALUES FOR PERCUSSION TYPE SIDEWALL CORES DETERMINED EMPIRICALLY.
(**) SUMMATION OF FLUIDS METHOD - KEROGEN, IF PRESENT, WILL CONTRIBUTE TO PORE AND OIL VOLUMES.
(***) API OIL MEASUREMENTS TAKEN ON RETORTED SAMPLES, KEROGEN, IF PRESENT, MAY ALTER RESULTS.

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DSG — Directional Co.

HOLE #1



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ANGLE AVERAGING METHOD

VERTICAL SECTION OR CLOSURE DIRECTION IS 151.0 DEGREES

DELMAR43 03/31/83 15:04CST

MEAS. DEPTH	DEPTH (TVD)	NORTH -SOUTH	EAST -WEST	VERT. SECTION	DEPARTURE FEET	DIR	INCLINATION ANGLE	DIR	DOG LEG	FILE LINE
102	102.00	0.00	0.	-0.00	0	N 0E	0.	S 0W	0.	100
201	201.00	-0.56	-0.32	0.33	1	S30W	0.75	S30W	0.8	105
292	291.99	-1.71	-0.63	1.19	2	S20W	0.75	S 0W	0.4	110
386	385.99	-2.39	-0.17	2.01	2	S 4W	0.25	S65E	0.7	115
480	479.99	-2.53	0.22	2.32	3	S 5E	0.25	S69E	0.	120
631	630.98	-3.80	0.57	3.60	4	S 8E	0.75	S38W	0.6	125
793	792.91	-5.07	-3.85	2.57	6	S37W	2.50	N70W	1.5	130
913	912.80	-3.41	-8.81	-1.29	9	S69W	2.50	N73W	0.1	135
1034	1033.67	-1.79	-14.11	-5.28	14	S83W	2.75	N73W	0.2	140
1156	1155.55	-0.16	-19.46	-9.30	19	S90W	2.50	N73W	0.2	145
1281	1280.45	1.32	-24.14	-12.86	24	N87W	2.00	N72W	0.4	150
1406	1405.38	2.68	-27.99	-15.92	28	N85W	1.75	N67W	0.2	155
1562	1561.32	4.02	-32.21	-19.13	32	N83W	1.50	N76W	0.2	160
1718	1717.27	4.21	-35.95	-21.11	36	N83W	1.25	S82W	0.4	165
1874	1873.24	3.39	-38.90	-21.83	39	N85W	1.00	S67W	0.2	170
1996	1995.22	1.81	-41.04	-21.48	41	N87W	1.50	S40W	0.6	175
2036	2035.20	0.77	-41.49	-20.79	41	N89W	1.75	S 7W	2.4	180
2067	2066.18	-0.31	-41.43	-19.82	41	S90W	2.25	S13E	2.7	185
2098	2097.15	-1.65	-40.95	-18.41	41	S88W	3.00	S27E	3.2	190
2129	2128.10	-3.15	-40.04	-16.66	40	S85W	3.50	S35E	2.2	195
2160	2159.03	-4.82	-38.78	-14.58	39	S83W	4.25	S39E	2.6	200
2191	2189.93	-6.68	-37.11	-12.15	38	S80W	5.00	S45E	2.9	205
2222	2220.78	-8.80	-35.03	-9.28	36	S76W	6.00	S44E	3.2	210
2252	2250.61	-11.30	-32.93	-6.08	35	S71W	6.50	S36E	3.3	215
2282	2280.38	-14.33	-30.88	-2.44	34	S65W	7.50	S32E	3.7	220
2313	2311.10	-17.92	-28.73	1.74	34	S58W	8.00	S30E	1.8	225
2344	2341.74	-21.94	-26.27	6.45	34	S50W	9.50	S33E	5.1	230
2486	2481.30	-44.84	-13.57	32.64	47	S17W	11.75	S25E	1.9	235
2579	2571.96	-64.12	-5.98	53.18	64	S 5W	14.00	S18E	2.9	240
2671	2660.83	-86.89	0.98	76.47	87	S 1E	16.00	S16E	2.2	245
2787	2771.98	-118.87	9.85	108.74	119	S 5E	17.25	S15E	1.1	250
2912	2891.03	-155.85	19.07	145.55	157	S 7E	18.25	S13E	0.9	255
3034	3006.81	-193.32	27.72	182.52	195	S 8E	18.50	S13E	0.2	260
3156	3122.42	-231.50	35.49	219.68	234	S 9E	18.75	S10E	0.8	265
3196	3160.27	-244.25	37.74	231.92	247	S 9E	19.00	S10E	0.6	270
3239	3200.83	-258.25	40.46	245.48	261	S 9E	19.75	S12E	2.3	275
3301	3259.14	-278.51	46.27	266.02	282	S 9E	20.00	S20E	4.4	280
3332	3288.27	-288.44	49.98	276.51	293	S10E	20.00	S21E	1.1	285
3363	3317.40	-298.20	54.12	287.05	303	S10E	20.00	S25E	4.4	290
3394	3346.53	-307.65	58.94	297.65	313	S11E	20.00	S29E	4.4	295
3426	3376.60	-317.08	64.49	308.59	324	S11E	20.00	S32E	3.2	300
3456	3404.79	-325.58	70.23	318.81	333	S12E	20.00	S36E	4.6	305
3561	3503.46	-353.88	92.34	354.28	366	S15E	20.00	S40E	1.3	310
3684	3619.04	-386.11	119.38	395.58	404	S17E	20.00	S40E	0.	315
3834	3760.22	-425.22	151.62	445.42	451	S20E	19.50	S39E	0.4	320
4024	3939.87	-473.97	189.70	506.51	511	S22E	18.50	S37E	0.6	325
4178	4086.12	-512.73	218.39	554.33	557	S23E	18.00	S36E	0.4	330
4432	4327.35	-578.68	262.87	633.57	636	S24E	18.50	S32E	0.5	335
4463	4356.74	-586.98	268.16	643.38	645	S25E	18.50	S33E	1.0	340
4544	4433.50	-608.67	282.25	669.19	671	S25E	18.75	S33E	0.3	345
4698	4579.00	-651.92	308.23	719.62	721	S25E	19.50	S29E	1.0	350
4854	4725.36	-698.91	334.82	773.61	775	S26E	21.00	S30E	1.0	360
5008	4868.89	-748.20	361.02	829.41	831	S26E	21.50	S26E	1.0	365
5039	4897.78	-758.34	365.86	840.63	842	S26E	21.00	S25E	2.0	370
5130	4983.50	-784.81	381.14	871.19	872	S26E	18.25	S35E	4.8	375
5247	5095.31	-810.81	403.74	904.89	906	S26E	16.00	S47E	3.6	380
5316	5161.59	-823.25	418.32	922.84	923	S27E	16.25	S52E	2.0	385
5410	5251.84	-839.45	439.04	947.05	947	S28E	16.25	S52E	0.	390
5535	5371.61	-861.47	467.22	979.97	980	S28E	17.00	S52E	0.6	400
5650	5481.81	-882.39	492.61	1010.58	1011	S29E	16.25	S49E	1.0	405
5774	5601.58	-903.66	516.65	1040.84	1041	S30E	13.75	S48E	2.0	410
5876	5700.81	-919.29	534.32	1063.08	1063	S30E	13.00	S49E	0.8	415
5974	5796.30	-934.05	550.70	1083.92	1084	S31E	13.00	S47E	0.5	420
6129	5947.10	-958.73	576.71	1118.12	1119	S31E	13.75	S46E	0.5	425
6284	6097.66	985.01	602.53		1155	S31E	13.75	S43E		

CHANGE: TITLE, WELL, METHOD, VERTICAL SECTION, TVD, PLOT, OR STOP ?

Set plug across Shows. 308' 5200 - 4900'

STOP

MEAS. DEPTH	TVD	NORTH -SOUTH	EAST -WEST	VERT. SECTION	FL	TURE DIR	INCLINATION ANGLE	DIR	DOG LEG	FILE LINE
102	102.00	0.00	0.	0.00	0	N 0E	0.	S 0W	0.	100
201	201.00	-0.56	-0.32	0.33	1	S30W	0.75	S30W	0.8	105
292	291.99	-1.70	-0.63	1.18	2	S20W	0.75	S 0W	0.4	110
386	385.99	-2.33	-0.19	1.95	2	S 5W	0.25	S69E	0.7	115
480	479.98	-2.48	0.19	2.26	2	S 4E	0.25	S69E	0.	120
631	630.98	-3.57	0.49	3.37	4	S 8E	0.75	S38W	0.6	125
793	792.91	-4.76	-3.64	2.40	6	S37W	2.50	N70W	1.5	130
913	912.79	-3.10	-8.60	-1.46	9	S70W	2.50	N73W	0.1	135
1034	1033.67	-1.48	-13.90	-5.45	14	S84W	2.75	N73W	0.2	140
1156	1155.54	0.16	-19.24	-9.47	19	N89W	2.50	N73W	0.2	145
1281	1280.44	1.63	-23.92	-13.02	24	N86W	2.00	N72W	0.4	150
1406	1405.37	3.00	-27.78	-16.09	28	N84W	1.75	N69W	0.2	155
1562	1561.31	4.33	-31.99	-19.29	32	N82W	1.50	N76W	0.2	160
1718	1717.27	4.52	-35.71	-21.27	36	N83W	1.25	S82W	0.4	165
1874	1873.24	3.70	-38.65	-21.98	39	N85W	1.00	S67W	0.2	170
1996	1995.21	2.14	-40.77	-21.63	41	N87W	1.50	S40W	0.6	175
2036	2035.19	1.11	-41.22	-20.95	41	N88W	1.75	S 7W	2.4	180
2067	2066.17	0.03	-41.16	-19.99	41	N90W	2.25	S13E	2.7	185
2098	2097.14	-1.30	-40.68	-18.59	41	S88W	3.00	S27E	3.2	190
2129	2128.09	-2.80	-39.77	-16.83	40	S86W	3.50	S35E	2.2	195
2160	2159.02	-4.47	-38.51	-14.76	39	S83W	4.25	S39E	2.6	200
2191	2189.92	-6.33	-36.84	-12.32	37	S80W	5.00	S45E	2.9	205
2222	2220.77	-8.45	-34.76	-9.46	36	S76W	6.00	S44E	3.2	210
2252	2250.59	-10.95	-32.66	-6.26	34	S71W	6.50	S36E	3.3	215
2282	2280.37	-13.98	-30.62	-2.62	34	S65W	7.50	S32E	3.7	220
2313	2311.09	-17.56	-28.46	1.56	33	S58W	8.00	S30E	1.8	225
2344	2341.73	-21.58	-26.00	6.27	34	S50W	9.50	S33E	5.1	230
2486	2481.28	-44.46	-13.32	32.43	46	S17W	11.75	S25E	1.9	235
2579	2571.94	-63.73	-5.73	52.96	64	S 5W	14.00	S18E	2.9	240
2671	2660.80	-86.50	1.23	76.25	87	S 1E	16.00	S16E	2.2	245
2787	2771.95	-118.48	10.10	108.52	119	S 5E	17.25	S15E	1.1	250
2912	2891.00	-155.45	19.32	145.33	157	S 7E	18.25	S13E	0.9	255
3034	3006.78	-192.93	27.97	182.30	195	S 8E	18.50	S13E	0.2	260
3156	3122.39	-231.10	35.74	219.45	234	S 9E	18.75	S10E	0.8	265
3196	3160.23	-243.85	37.98	231.69	247	S 9E	19.00	S10E	0.6	270
3239	3200.80	-257.85	40.71	245.25	261	S 9E	19.75	S12E	2.3	275
3301	3259.11	-278.09	46.51	265.78	282	S 9E	20.00	S20E	4.4	280
3332	3288.24	-288.02	50.22	276.26	292	S10E	20.00	S21E	1.1	285
3363	3317.37	-297.78	54.37	286.80	303	S10E	20.00	S25E	4.4	290
3394	3346.50	-307.23	59.18	297.40	313	S11E	20.00	S29E	4.4	295
3426	3376.57	-316.66	64.73	308.34	323	S12E	20.00	S32E	3.2	300
3456	3404.76	-325.16	70.47	318.56	333	S12E	20.00	S36E	4.6	305
3561	3503.43	-353.46	92.57	354.02	365	S15E	20.00	S40E	1.3	310
3684	3619.01	-385.68	119.62	395.32	404	S17E	20.00	S40E	0.	315
3834	3760.18	-424.79	151.86	445.15	451	S20E	19.50	S39E	0.4	320
4024	3939.83	-473.53	189.94	506.25	510	S22E	18.50	S37E	0.6	325
4178	4086.08	-512.30	218.62	554.06	557	S23E	18.00	S36E	0.4	330
4434	4328.31	-580.94	264.92	636.54	638	S25E	19.75	S32E	0.8	340
4494	4384.55	-598.85	275.68	657.42	659	S25E	21.00	S30E	2.4	345
4534	4421.50	-612.14	283.27	672.72	675	S25E	24.00	S30E	7.5	350
4579	4462.53	-628.22	292.38	691.20	693	S25E	24.50	S30E	1.1	355
4700	4571.39	-674.73	317.37	743.99	746	S25E	27.25	S27E	2.4	360
4762	4626.20	-700.44	330.75	772.97	775	S25E	28.50	S28E	2.2	365
4855	4707.44	-740.41	352.00	818.23	820	S25E	29.75	S28E	1.3	370
4947	4786.81	-781.29	374.20	864.75	866	S26E	31.00	S29E	1.5	375
5008	4839.03	-808.87	389.48	896.28	898	S26E	31.25	S29E	0.4	380
5070	4891.82	-837.30	405.24	928.79	930	S26E	32.00	S29E	1.2	385
5132	4944.11	-866.44	421.39	962.10	963	S26E	33.00	S29E	1.6	390
5194	4995.81	-896.37	437.98	996.32	998	S26E	34.00	S29E	1.6	395
5256	5047.06	-926.89	454.90	1031.21	1032	S26E	34.50	S29E	0.8	400
5323	5102.36	-960.28	472.66	1069.03	1070	S26E	34.25	S27E	1.7	405
5384	5152.78	-990.74	488.51	1103.35	1105	S26E	34.25	S28E	0.9	410
5447	5204.62	-1022.34	505.32	1139.14	1140	S26E	35.00	S28E	1.2	415
5509	5255.41	-1053.74	522.01	1174.70	1176	S26E	35.00	S28E	0.	420
5571	5305.88	-1085.38	539.19	1210.70	1212	S26E	36.00	S29E	1.9	425
5633	5356.04	-1117.26	556.86	1247.14	1248	S26E	36.00	S29E	0.	430
5694	5405.31	-1148.71	574.29	1283.11	1284	S27E	36.25	S29E	0.4	435
5736	5439.02	-1170.62	586.44	1308.16	1309	S27E	37.00	S29E	1.8	440
5818	5504.40	-1213.91	610.43	1357.65	1359	S27E	37.25	S29E	0.3	445
5882	5555.51	-1247.60	629.11	1396.17	1397	S27E	36.75	S29E	0.8	450
5943	5604.63	-1279.24	646.64	1432.35	1433	S27E	36.00	S29E	1.2	455
6006	5655.59	-1311.78	664.31	1469.37	1470	S27E	36.00	S28E	0.9	460
6067	5705.18	-1343.15	680.99	1504.90	1506	S27E	35.25	S28E	1.2	465
6129	5756.04	-1374.45	697.64	1540.35	1541	S27E	34.50	S28E	1.2	470
6191	5807.44	-1405.06	713.91	1575.01	1576	S27E	33.50	S28E	1.6	475
6253	5859.37	-1434.98	729.82	1608.89	1610	S27E	32.75	S28E	1.2	480
6314	5910.95	-1463.85	744.85	1641.42	1642	S27E	31.75	S27E	1.9	485
6377	5964.81	-1493.10	759.43	1674.07	1675	S27E	30.75	S26E	1.8	490
6440	6019.03	-1521.82	773.75	1706.14	1707	S27E	30.50	S27E	0.9	495
6501	6071.85	-1549.12	787.36	1736.61	1738	S27E	29.50	S26E	1.8	500
6563	6125.95	-1576.34	800.64	1766.86	1768	S27E	29.00	S26E	0.8	505
6625	6180.43	-1603.05	813.38	1796.39	1798	S27E	28.00	S25E	1.8	510
6718	6262.92	-1642.12	831.18	1839.20	1840	S27E	27.00	S24E	1.2	515
6779	6317.46	-1667.09	842.30	1866.43	1868	S27E	26.25	S24E	1.2	520
6840	6372.34	-1691.51	852.92	1892.93	1894	S27E	25.50	S23E	1.4	525
6903	6429.32	-1716.06	863.85	1919.70	1921	S27E	25.00	S25E	1.6	530
6980	6499.25	-1745.27	877.47	1951.86	1953	S27E	24.50	S25E	0.6	535

CHANGE: TITLE, WELL, METHOD, VERTICAL SECTION, TVD, PLOT, OR STOP ?S

OPTION?BYE

OFF AT 10:06CST 04/15/83

Floyd Clawson
Del Mar
43-35

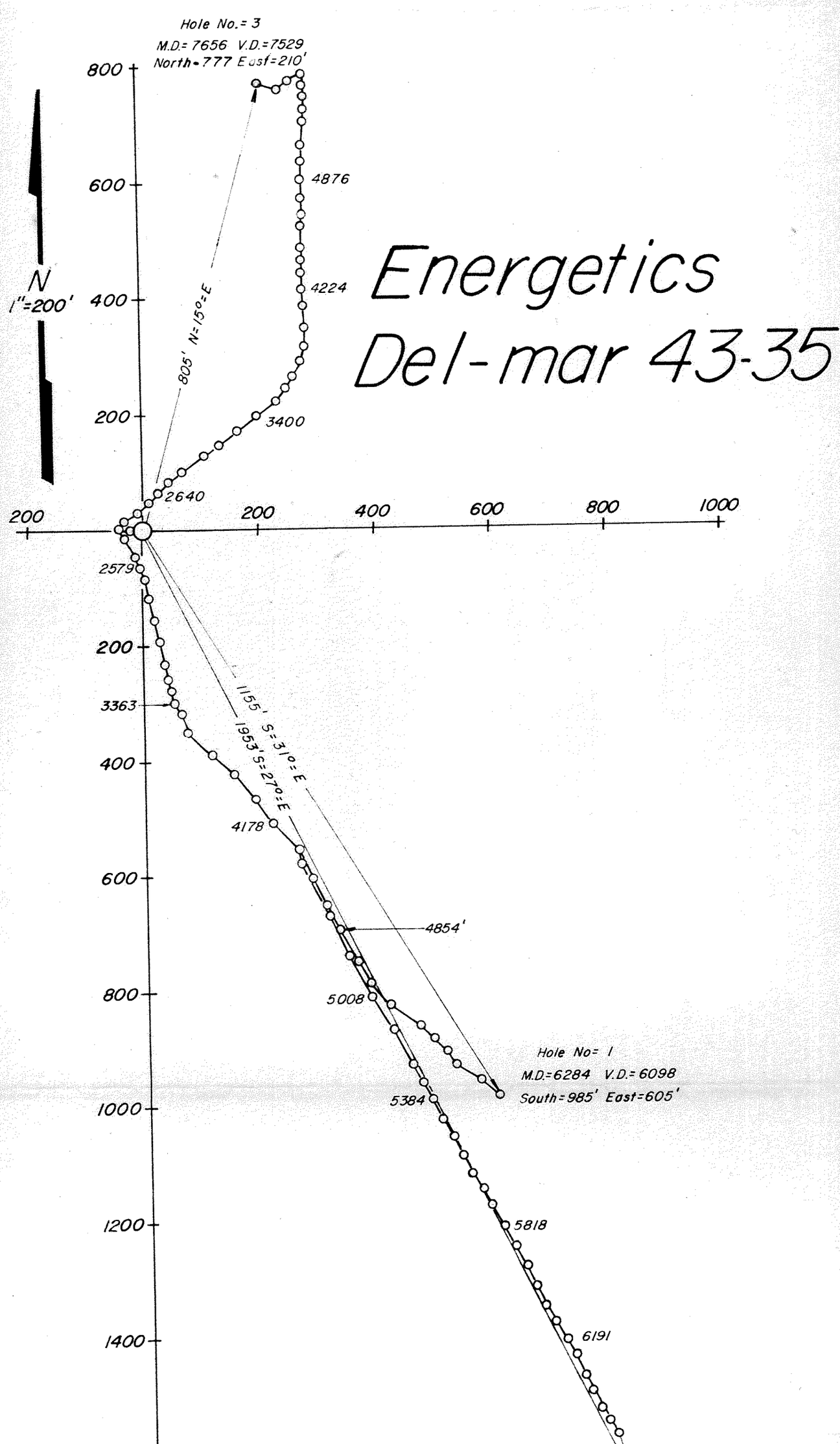
ANGLE AVERAGING METHOD

VERTICAL SECTION OR CLOSURE DIRECTION IS 0. DEGREES

DELMAR 06/15/83 09:03CDT

Hole #3

MEAS. DEPTH	DEPTH (TVD)	NORTH -SOUTH	EAST -WEST	VERT. SECTION	DEPARTURE FEET	DIR	INCLINATION ANGLE	DIR	DOG LEG	FILE LINE
102	102.00	0.00	0.	0.00	0	N 0E	0.	S 0W	0.	100
201	201.00	-0.56	-0.32	-0.56	1	S30W	0.75	S30W	0.8	105
292	291.99	-1.71	-0.63	-1.71	2	S20W	0.75	S 0W	0.4	110
386	385.99	-2.39	-0.17	-2.39	2	S 4W	0.25	S69E	0.7	115
480	479.99	-2.53	0.22	-2.53	3	S 5E	0.25	S69E	0.	120
631	630.98	-3.80	0.57	-3.80	4	S 8E	0.75	S38W	0.6	125
793	792.91	-5.07	-3.85	-5.07	6	S37W	2.50	N70W	1.5	130
913	912.80	-3.41	-8.81	-3.41	9	S69W	2.50	N73W	0.1	135
1034	1033.67	-1.79	-14.11	-1.79	14	S83W	2.75	N73W	0.2	140
1156	1155.55	-0.16	-19.46	-0.16	19	S90W	2.50	N73W	0.2	145
1281	1280.45	1.32	-24.14	1.32	24	N87W	2.00	N72W	0.4	150
1406	1405.38	2.68	-27.99	2.68	28	N85W	1.75	N69W	0.2	155
1562	1561.32	4.02	-32.21	4.02	32	N83W	1.50	N76W	0.2	160
1718	1717.27	4.21	-35.95	4.21	36	N83W	1.25	S82W	0.4	165
1874	1873.24	3.39	-38.90	3.39	39	N85W	1.00	S67W	0.2	170
2037	2036.21	5.49	-41.31	5.49	42	N82W	1.25	N15E	1.2	175
2099	2098.17	7.44	-40.10	7.44	41	N79W	3.00	N49E	3.4	180
2160	2159.02	10.40	-37.04	10.40	38	N74W	5.00	N43E	3.3	185
2191	2189.89	12.50	-35.04	12.50	37	N70W	5.75	N44E	2.4	190
2253	2251.49	17.38	-29.99	17.38	35	N60W	7.25	N48E	2.5	195
2316	2313.85	23.10	-23.17	23.10	33	N45W	9.00	N52E	2.9	200
2409	2405.44	32.71	-10.19	32.71	34	N17W	11.00	N55E	2.2	205
2546	2539.45	50.05	12.41	50.05	52	N14E	13.00	N50E	1.6	210
2640	2631.22	63.13	28.00	63.13	69	N24E	12.00	N50E	1.1	215
2764	2752.57	80.20	46.96	80.20	93	N30E	11.75	N46E	0.7	220
2812	2799.47	87.15	54.41	87.15	103	N32E	12.75	N48E	2.3	225
2905	2889.76	101.48	71.49	101.48	124	N35E	15.00	N52E	2.6	235
2935	2918.70	106.29	77.75	106.29	132	N36E	15.50	N53E	1.9	240
3072	3049.63	130.56	109.97	130.56	171	N40E	18.75	N53E	2.4	245
3165	3137.43	148.80	134.62	148.80	201	N42E	19.75	N54E	1.1	250
3284	3249.07	173.30	167.73	173.30	241	N44E	20.75	N53E	0.9	255
3314	3277.11	179.73	176.26	179.73	252	N44E	21.00	N53E	0.8	260
3400	3357.26	198.92	200.83	198.92	283	N45E	21.50	N51E	1.0	265
3464	3417.11	213.80	217.94	213.80	305	N46E	20.00	N47E	3.2	270
3526	3475.73	227.82	232.46	227.82	325	N46E	18.00	N45E	3.4	275
3556	3504.30	234.34	238.87	234.34	335	N46E	17.50	N44E	2.0	280
3619	3564.47	248.23	251.37	248.23	353	N45E	17.00	N40E	2.0	285
3681	3623.84	262.59	262.00	262.59	371	N45E	16.50	N33E	3.4	290
3722	3663.15	272.47	268.17	272.47	382	N45E	16.50	N31E	1.4	295
3745	3685.19	278.28	271.26	278.28	389	N44E	16.75	N25E	7.5	300
3806	3743.56	294.58	278.18	294.58	405	N43E	17.00	N21E	1.9	305
3867	3802.01	311.27	283.28	311.27	421	N42E	16.25	N13E	3.9	310
3898	3831.77	319.78	284.94	319.78	428	N42E	16.25	N 9E	3.6	315
3930	3862.47	328.74	286.03	328.74	436	N41E	16.50	N 5E	3.6	320
4008	3937.21	351.04	286.62	351.04	453	N39E	16.75	N 2W	2.6	325
4132	4055.31	388.82	285.30	388.82	482	N36E	18.75	N 2W	1.6	330
4224	4142.56	418.01	284.54	418.01	506	N34E	18.25	N 1W	0.6	335
4317	4230.94	446.93	284.03	446.93	530	N32E	18.00	N 1W	0.3	340
4380	4290.94	466.14	283.86	466.14	546	N31E	17.50	N 0W	0.9	345
4442	4350.19	484.39	283.54	484.39	561	N30E	16.75	N 2W	1.5	350
4504	4409.56	502.26	283.39	502.26	577	N29E	16.75	N 1E	1.4	355
4564	4465.44	524.12	283.96	524.12	596	N28E	26.00	N 2E	15.4	360
4624	4521.64	545.13	284.33	545.13	615	N28E	15.00	N 0E	18.4	365
4680	4575.73	559.62	284.45	559.62	628	N27E	15.00	N 1E	0.5	370
4751	4644.47	577.40	284.61	577.40	644	N26E	14.00	N 0E	1.5	375
4814	4705.66	592.37	284.74	592.37	657	N26E	13.50	N 1E	0.9	380
4875	4765.01	606.48	285.11	606.48	670	N25E	13.25	N 2E	0.6	385
4937	4825.48	620.15	285.59	620.15	683	N25E	12.25	N 2E	1.6	395
5030	4916.49	639.27	286.42	639.27	701	N24E	11.50	N 3E	0.8	400
5062	4947.86	645.58	286.75	645.58	706	N24E	11.25	N 3E	0.8	405
5160	5044.10	664.05	287.56	664.05	724	N23E	10.50	N 2E	0.8	410
5243	5125.77	678.79	288.46	678.79	738	N23E	10.00	N 5E	0.9	415
5337	5218.42	694.67	289.57	694.67	753	N23E	9.50	N 3E	0.6	420
5430	5310.17	709.79	290.50	709.79	767	N22E	9.25	N 4E	0.3	425
5477	5356.61	717.03	290.88	717.03	774	N22E	8.50	N 2E	1.7	430
5540	5419.09	725.12	291.02	725.12	781	N22E	6.25	N 0E	3.6	435
5624	5502.69	733.35	291.16	733.35	789	N22E	5.00	N 2E	1.5	440
5716	5594.39	740.76	290.90	740.76	796	N21E	4.25	N 6W	1.1	445
5860	5737.97	751.64	289.37	751.64	805	N21E	4.50	N10W	0.3	450
5959	5836.68	759.10	288.19	759.10	812	N21E	4.25	N 8W	0.3	455
6050	5927.41	765.97	287.22	765.98	818	N21E	4.50	N 8W	0.3	460
6175	6052.03	775.77	286.80	775.77	827	N20E	4.50	N 3E	0.7	465
6248	6124.83	781.15	286.23	781.15	832	N20E	4.00	N15W	1.9	470
6279	6155.76	783.05	285.72	783.05	834	N20E	3.25	N15W	2.4	475
6342	6218.70	785.83	284.98	785.83	836	N20E	2.00	N15W	2.0	480
6380	6256.69	786.74	284.92	786.74	837	N20E	0.75	N 8E	3.5	485
6441	6317.68	787.39	284.25	787.39	837	N20E	1.00	S80W	2.3	490
6516	6392.64	786.51	281.96	786.51	836	N20E	2.75	S58W	2.5	495
6609	6485.53	784.66	277.90	784.66	832	N20E	2.75	S73W	0.8	500
6671	6547.46	783.97	275.01	783.97	831	N19E	2.75	S80W	0.5	505
6733	6609.38	783.78	271.90	783.78	830	N19E	3.00	N87W	1.1	510
6808	6684.27	782.31	268.09	782.31	827	N19E	3.25	S45W	3.4	515
6892	6768.09	778.13	264.52	778.13	822	N19E	4.25	S36W	1.4	520
7110	6985.56	768.98	252.37	768.98	809	N18E	3.75	S70W	1.1	530
7171	7046.42	767.74	248.44	767.74	807	N18E	4.00	S75W	0.7	535
7260	7135.18	766.77	241.92	766.77	804	N18E	4.50	S88W	1.2	540
7351	7225.88	767.22	234.60	767.22	802	N17E	4.75	N81W	1.0	545
7453	7327.49	768.99	225.88	768.99	801	N16E	5.25	N76W	0.6	550
7543	7417.08	771.58	217.66	771.58	802	N16E	5.75	N69W	0.9	555
7639	7512.51	776.08	208.22	776.08	804	N15E	6.75	N60W	1.5	560
Proj. 7656	7529.39	777.08	209.95		805	N-15-E	"	"		


Hole No.= 3
M.D.= 7656 V.D.=7529
North= 777 East=210'
800
600
400
200
N
1"=200'
4876
4224
3400
805' N=15°=E
2640
200
200
400
600
800
1000
2579
200
3363
400
1155' S=31°=E
1953' S=27°=E
4178
600
4854'
800
5008
Hole No= 1
M.D.=6284 V.D.= 6098
South=985' East=605'
1000
5384
5818
1200
6191
1400
Energetics
Del-mar 43-35

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T 283-109

DIVISION OF OIL AND GAS

Report on Operations

Mr. Floyd Clawson, Agent
Energetics, Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, Calif.
Aug. 8, 1983

Your operations at well "Del Mar" 43-35, API No. 111-21226,
Sec. 35, T. 4N, R. 25W, SB B.& M. ---, Field, in Ventura County,
were witnessed on 7/26/83. M. Fulco, representative of
the supervisor, was present from 1630 to 1700. There were also present Mr. Doyle Thomas,
Drilling Foreman.

Present condition of well: 13 3/8" cem 503'; 9 5/8" cem 4400', window 1900-1930'; 5 1/2" cem 3894', perf 3394' and 3625' WSO, cut and pulled from 3100'. TD ~~3894'~~ 7656', Plugged with cement 3496-3179'.

The operations were performed for the purpose of witnessing the location and hardness of a cement plug from 3496' to 3179'.

DECISION:

THE PLUGGING/CEMENTING OPERATIONS AS WITNESSED AND REPORTED ARE APPROVED.

b

This is wrong!

M. G. MEFFERD
State Oil and Gas Supervisor

By Murray W. Dosch
Deputy Supervisor
Murray W. Dosch

OG109(12-80-15M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 283-199

REPORT ON PROPOSED OPERATIONS

000 (field code)
00 (area code)
00 (new pool code)
00 (old pool code)

Mr. Floyd Clawson, Agent
Energetics, Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, California
Aug. 8, 1983

Your plug back and proposal to suspend well "Del Mar" 43-35,
A.P.I. No. 111-21226, Section 35, T. 4N, R. 25W, SB B. & M.,
---, field any, area no breakdown, pool
Ventura County, dated 7/26/83, received 7/28/83 has been examined in conjunction with records filed in this office.

THE PROPOSAL, COVERING ABANDONMENT OPERATIONS, IS APPROVED ACCORDING TO PRIOR AGREEMENT PROVIDED THAT:

1. The wellhead shall be equipped with a valve in order to safely close the well in at the surface.
2. This office shall be advised of the well status six months from the above date.

RTanket Bond
MS:b

M. G. MEFFERD, State Oil and Gas Supervisor

By Murray W. Dosch, Deputy Supervisor

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

OG111 (4/83/DWRR/5M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

SUPPLEMENTARY NOTICE

DIVISION OF OIL AND GAS
RECEIVED
FEB 19 1983
SANTA PAULA, CALIFORNIA

FOR DIVISION USE ONLY		
BOND	FORMS	
	114	121
B5	—	✓

DIVISION OF OIL AND GAS

Santa Paula Calif.

A notice to you dated ---(Received 2-22-83)--- , 1983, stating the intention to

Drilling (Drill, rework, abandon), Well No. Del Mar 43-35, API No. 111-21226,

Sec. 35, T. 4N, R. 25W, S.B. B. & M., --- Field,

Ventura County, should be amended because of changed conditions.

The present condition of the well is as follows:

Total depth 7010' (1st hole to 6284', now sidetracked @ 4410').

Complete casing record including plugs and perforations:

13 3/8", 54.5#, J-55, ST&C casing @ 503.'
9 5/8", 36#, S-80, & K-55, ST&C cemented @ 4400' with calculated T.O.C. @ 500.'
8 3/4" hole drilled to 6284' PB with cement 5200' up to 4410' & hole sidetracked.
8 3/4" hole drilled from 4410' to 7010.'

We now propose

1. Run 5½", 15.5#, J-55, ST&C casing to 6200.'
2. Cement casing from 6200' up to 4600'± leaving 80 lineal ft. inside casing below float collar @ 6120'±.
3. Run G-CBL and evaluate cement outside 5½" casing.
4. Shoot and squeeze or shoot and test depending on CBL evaluation. Note: mud log shows are from 5800' (400' above 5½" shoe) up to 4900.' No shows of hydrocarbon between 5800' and 7010' T.D.

It is understood that if changes in this plan become necessary we are to notify you immediately.

Address 2977 Sexton Canyon Rd. (Street)
Ventura, Calif. 93003 (City) (State) (Zip)
Telephone Number 805-644-9575

Energetics, Inc. (Name of Operator)
By Edgar C. Dawson (Name) 4-20-83 (Date)
Type of Organization Corporation (Corporation, Partnership, Individual, etc.)

OG123 (4-75 GSR1 5M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 283-94

REPORT ON PROPOSED OPERATIONS

000 (field code)
00 (area code)
00 (new pool code)
00 (old pool code)

Mr. Floyd Clawson, Agent
Energetics, Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, California
April 22, 1983

Your supplementary proposal to drill well "Del Mar" 43-35,
A.P.I. No. 111-21226, Section 35, T. 4N, R. 25W, SB B. & M.,
---- field, any area, no breakdown pool,
Ventura County, dated 4/4/83, received 4/ 19/83 has been examined in conjunction with records filed in this office.

THE PROPOSAL, COVERING SIDETRACKING OPERATIONS IS APPROVED PROVIDED THAT IN ALL OTHER RESPECTS, THE PROVISIONS SET FORTH IN OUR REPORT NO.P283-34 DATED FEB.25,1983 SHALL APPLY.

Blanket Bond
MS:b

M. G. MEFFERD, State Oil and Gas Supervisor

By [signature]
Murray W. Desch, Deputy Supervisor

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS

APR 19 1983
SANTA PAULA, CALIFORNIA

SUPPLEMENTARY NOTICE

FOR DIVISION USE ONLY		
BOND	FORMS	
	114	121
BB	—	✓

DIVISION OF OIL AND GAS

SANTA PAULA, Calif.

A notice to you dated --- (Received 2-22-83), 19 83, stating the intention to

Drill (Drill, rework, abandon), Well No. Del Mar 43-35, API No. 111-21226,

Sec. 35, T. 4N, R. 25W, S.B. B. & M., --- Field,

Ventura County, should be amended because of changed conditions.

The present condition of the well is as follows:

Total depth 6284'

Complete casing record including plugs and perforations:

13 3/8", 54.5#, J-55, ST&C casing @ 503' with cement to surface.
9 5/8", 36#, S-80 & K-55, ST&C cement @ 4400' with T.O.C. calculated to 500.'
8 3/4" Hole drilled to 6284.'

We now propose

1. Plug back with open ended D.P. from 5200' to 4800' ± and test hardness of plug for D.O.G.

2. Run open-ended pipe to 4550' and plug back with sand-cement plug to 4250'±.

3. C.O. cement to 4410' (10' below casing shoe) and sidetrack old hole in Southeasterly direction building inclination to 30± °

4,

It is understood that if changes in this plan become necessary we are to notify you immediately.

Address 2977 Sexton Canyon Rd. (Street)
Ventura, Calif. 93003 (City) (State) (Zip)

Telephone Number 805-644-9575

Energetics, Inc. (Name of Operator)

By E. Lloyd R. Clawson 4-4-83 (Name) (Date)

Type of Organization Corporation (Corporation, Partnership, Individual, etc.)

Above changes reviewed with Mike Stettner
cc: File and Energetics, Inc.

PROPOSED PLUG BACK & SIDETRACK

Del Mar #43-35 4-1-83

1. After logging and shooting sidewall samples, R.I.H. open-ended to 5200'± and pump in 100 c.f. water followed by 475 c.f. 1:1 Diamix-G + 4% gel followed by 50 c.f. water to equalization.

2. Pull to shoe and condition mud.

3. Check top and hardness of cement @ 4800'± for D.O.G. (Ph. 1-525-2105).

4. Pull up to 4550' and pump in 100 c.f. water followed by 281 c.f. G + 20% sand + 0.75 D-31.

5. Pull above cement top @ 4250' and condition mud.

6. C.O. cement from 4250'-4410'± (≈10' below casing shoe) - testing drill off and waiting as necessary to insure cement is hard enough to sidetrack with Dynadrill.

7. Sidetrack old hole below 4410'± as directed.

F.L.C.

F.L. Clawson

cc: D.O.G.
Randy Smith
Kyle Swingle
File

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T 283-43

DIVISION OF OIL AND GAS

Report on Operations

Mr. Floyd Clawson, Agent
Energetics, Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, Calif.
April 19, 1983

Your operations at well "Del Mar" 43-35, API No. 111-21226,
Sec. 35, T. 4N R. 25W, SB B.& M. ---, Field, in Ventura County,
were witnessed on 4/2/83. R. Habel, representative of
the supervisor, was present from 2230 to 2300. There were also present Chuk Chuck Martin

Present condition of well: 13 3/8" cem 503'; 9 5/8" cem 4400'; TD 6284', plugged w/cem 5190-4600'.

The operations were performed for the purpose of abandonment of original hole

DECISION:

THE LOCATION AND HARDNESS OF THE CEMENT PLUG AT 4600' IS APPROVED.

b

M. G. MEFFERD
State Oil and Gas Supervisor

By _____
Deputy Supervisor
Murray W. Bosch

OG109(12-80-15M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

No. T 283-26

DIVISION OF OIL AND GAS

Report on Operations

Mr. Floyd Clawson, Agent
Energetics, Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, Calif.
March 30, 1983

Your operations at well "Del Mar" 43-35, API No. 111-21226,
Sec. 35, T. 4N, R. 25W, SB B.& M. ---- Field, in Ventura County,
were witnessed on 3/13/83. M. Stettner, representative of
the supervisor, was present from 0730 to 0930. There were also present Company Representative

Present condition of well: 13 3/8" cem 503'. TD 503'.

The operations were performed for the purpose of inspecting the blowout prevention equipment and installation.

DECISION:

THE BLOWOUT PREVENTION EQUIPMENT AND INSTALLATION ARE APPROVED.

b

M. G. MEFFERD
State Oil and Gas Supervisor

By
Deputy Supervisor

Murray W. Dosch

OG109(12-80-15M)

FORM OG111(10/81/DWRR/5M)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION
DIVISION OF OIL AND GAS

No. P 285-34

000
(field code)
00
(area code)
00
(new pool code)
--
(old pool code)

REPORT ON PROPOSED OPERATIONS

Mr. Floyd Clawson, Agent
Energetics, Inc.
2977 Sexton Canyon Rd.
Ventura, CA 93003

Santa Paula, California
February 25, 1983

Your -- proposal to drill well "Del Mar" 43-35,
A.P.I. No. 111-21226, Section 35, T 4N, R. 25W, S. B. B. & M.,
--, field Any, area No breakdown pool,
Ventura County, dated --, received 2/22/82 has been examined in conjunction with records filed in this office.

THE PROPOSAL IS APPROVED PROVIDED THAT:

1. Sufficient cement shall be pumped back of the 13 3/8" casing to fill to the surface.
2. Hole fluid of sufficient quality and quantity shall be maintained in the hole to control any subsurface condition, and a reserve supply shall be on hand for emergencies.
3. Unlined sumps, if they contain harmful waters, shall not be located over fresh water bearing aquifers.
4. Any sump used during these operations shall be thoroughly cleaned and filled with earth as soon as operations are completed.
5. Blowout prevention equipment of at least DOG Class III 1M B shall be installed on the 13 3/8" casing and Class III 3M B on the 9 5/8" casing and Class III 5M B on the 7" casing and maintained in operating condition at all times.
6. An approved blowout prevention, kick-control, and crew-training program shall be availabl during the proposed operations.
7. This office shall be consulted before placing any plugs or sidetracking any hole.
8. This office shall be consulted before initiating any changes or additions to this proposed operation, or if operations are to be suspended.
9. THIS DIVISION SHALL BE NOTIFIED TO WITNESS:
   a. A pressure test of the blowout prevention equipment before drilling below 500'.
   b. A pressure test of the blowout prevention equipment before drilling below 4500'.
   c. A pressure test of the blowout prevention equipment before drilling below 10,000.
   d. A test of the 7" shut-off above the zone to be produced.

b. BOPE test waived 3-23-83 MEM

Blanket Bond
MS:b

Supp notice will be sent in
MS/F. Clawson 4-11-83

M. G. MEFFERD, State Oil and Gas Supervisor

By [signature]
Murray M. Dyatch, Deputy Supervisor

A copy of this report and the proposal must be posted at the well site prior to commencing operations.

Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.

Form OG105 (8/80)

RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF CONSERVATION

DIVISION OF OIL AND GAS
Notice of Intention to Drill New Well

RECEIVED
FEB 22 1983
SANTA PAULA, CALIFORNIA

C.E.Q.A. INFORMATION			
EXEMPT ☐ CLASS____	NEG. DEC. ☒ S.C.H. NO. CUP 4075	E.I.R. ☐ S.C.H. NO.____	DOCUMENT NOT REQUIRED BY LOCAL JURISDICTION ☐
Mod 3 See Reverse Side			

FOR DIVISION USE ONLY					
MAP	MAP BOOK	CARDS	BOND	FORMS 114	FORMS 121
42-1		✓	66	✓	✓

In compliance with Section 3203, Division 3, Public Resources Code, notice is hereby given that it is our intention to commence drilling well ~~Rincon~~ Del Mar #43-35, API No. 111-21226 (Assigned by Division),

Sec. 35, T. 4N, R. 25W, SB B. & M., ---- Field, Ventura County.

Legal description of mineral-right lease, consisting of 457.76 acres, is as follows: (Attach map or plat to scale)

40 acre spacing

Do mineral and surface leases coincide? Yes X No____. If answer is no, attach legal description of both surface and mineral leases, and map or plat to scale.

Location of well 1854.49 feet South (Direction) along section / property line and 1061.46 feet West (Direction)

at right angles to said line from the NE corner of section / property 35 (Cross out one) or

T4N, R25W, SBBM

Is this a critical well according to the definition on the reverse side of this form? Yes ☐ No ☒

If well is to be directionally drilled, show proposed coordinates (from surface location) at total depth: 450' S feet (Direction) and 1150' E feet (Direction)

Elevation of ground above sea level 175 feet.

All depth measurements taken from top of KB (Derrick Floor, Rotary Table, or Kelly Bushing) that is 22 feet above ground.

PROPOSED CASING PROGRAM

SIZE OF CASING INCHES API	WEIGHT	GRADE AND TYPE	TOP	BOTTOM	CEMENTING DEPTHS	CALCULATED FILL BEHIND CASING (Linear Feet)
13 3/8"	48#	K-55, 8RD	0'	500'	500'	500'
9 5/8"	36#	K-55	0'	4,500'	4,500'	4,000' ✓
7"	23-26#	K-55 & N-80	0'	10,000'	10,000'	5,500'

(A complete drilling program is preferred and may be submitted in lieu of the above program.)

Intended zone(s) of completion Bates Sd (3000psi) & or Lower Sespe (4,400psi) Estimated total depth 10,000'
(Name, depth, and expected pressure)

It is understood that if changes in this plan become necessary we are to notify you immediately.

Name of Operator	Type of Organization (Corporation, Partnership, Individual, etc.)	
Energetics, Incorporated	Corporation	
Address	**City**	**Zip Code**
2977 Sexton Canyon Road	Ventura, California	93003
Telephone Number / **Name of Person Filing Notice**	**Signature**	**Date**
805-644-9575 CO Floyd L. Clawson	Floyd L. Clawson	

This notice and indemnity or cash bond shall be filed, and approval given, before drilling begins. If operations have not commenced within one year of receipt of the notice, this notice will be considered cancelled.

WELL PLAN OUTLINE

WELL NAME: DEL MAR 43-35 COUNTY: Ventura

LOCATION: 1861.21' FNL & 845.26' FEL STATE: California

Sec. 35, T4N, R25W, SBBM

DEPTH 1000'	FORMATION TOPS & TYPE	DRILLING PROBLEMS	TYPE OF FORMATION EVALUATION	HOLE SIZE	CASING SIZE	CASING DEPTH	FRACTURE GRADIENT PPG	FORMATION PRESSURE GRADIENT PPG	MUD WEIGHT PPG	MUD TYPE
1	Santa Barbara Non Marine Casitas Sds & Clay	Building incl. to 18° ± & getting well on course.		17½"	13 3/8"	500'	11.3	.83	9.0±	Gel Wtr. Low Solids - Non Dispersed
2	Marine Casitas Sds, clay, & siltstone			12¼"						
3	Shale Rincon Shale	Unstable Shale								
4	Vaqueros Sd. Vaqueros Sd. Sespe Shales & Sds				9 5/8"	4500	14.4	.83	9.5	
5	Sespe Sd.			8 3/4"						
6	6440' Bates Sd.	None Expected	Target 200' in diameter 1227' S68½°E of surface loc.							
7	C Fault									
8										
9	Lower Sespe				5½"	10000'	16.4	.83	9.6	
10										

FEB 28 1983
RECEIVED
DIVISION OF OIL AND GAS

PREPARED: 2-11-83 BY: E. Lloyd L. Clawson ATTACHMENT Nº

ENERGETICS Inc.

Revised

GEOLOGIC PROGNOSIS

☐ EXPLORATION-EARN ☒ DEVELOPMENT

WELL: Del Mar 43-35 DRILLING PROGRAM: 82 YE (81) ELEV. EST. 176' ACTUAL: _____ GR

PROSPECT: Rincon Mountain PROSPECT NO. CA-594 ELEV. EST. 196' ACTUAL: _____ KB

LOCATION SPOT: NE NE SE FOOTAGE 375' FEL & 2,285' FSL SEC. 35 TWP. 4N RGE. 25W

SURVEY (TEXAS): _____ LEASE LINE CALL (TEXAS): _____

COUNTY: Ventura STATE: California PREPARED BY: David L. Cook DATE: 11-17-82

OPTIMUM DIRECTION - MAXIMUM DISTANCE LOCATION CAN BE MOVED: 200' Diameter Target

PROPOSED TD: 10,000' FORMATION AT TD: Sespe Sand

FORMATION	DRILL DEPTH	OBJECTIVE[1]	DST[2]	CORE[3]	LITHOLOGY (BRIEF)	GEOLOGIC HAZARDS[4]
Santa Barbara	Surface				slst, ss, Cgl	
Rincon	3,045'	(-2,820')			slst, clay	Hole deviation due to
Vaqueros Silt	3,760'	(-3,525')			slst, ss	steep dips
Vaqueros Sand	4,290'	(-4,050')	1 ✓		ss, Cgl	4260 (-3971)
Sespe	4,370'	(-4,125')			sh, ss	4318 (-4026?)
Sespe Sand	5,280'	(-5,025')			ss, slst	
Bates Sand	6,440'	(-6,180')			ss, slst	
'C' Fault?	7,570'	(-7,300')				
Lower Sespe Sand	9,370'	(-9,090')	1		ss, slst, sh	
TD	10,000'	(-9,270')				
Note: Target objective is the Bates Sand at -6,180' subsea						
375' FEL and 2,285' FSL, Section 35						

1. P=PRIMARY S=SECONDARY O=OIL G=GAS; 2. HOW MANY, RFT 3. S=SIDEWALL (HOW MANY) C=CONVENTIONAL (LENGTH) 4. FRESH WATER ZONE (S), SLOUGHING SHALE; SALT; ANHYDRITE; H_2S; POTENTIAL LOSS ZONE (S); ABNORMAL PRESS (DEPTH EXPECTED GRADIENT EXPECTED); DAMAGE PRONE RESERVOIRS; OTHER (SPECIFY)

EVALUATION

2 Runs: Base Surface Casing & TD

WIRELINE LOGS

INDUCTION-SFL _____ TO _____

DUAL LATEROLOG-MSFL _____ TO _____

DUAL INDUCTION-SFL Surface TO TD

ACOUSTIC (BHC) Surface TO TD

DENSITY ONLY _____ TO _____

DENSITY/NEUTRON FDC/CNL Surface TO TD

FRACTURE _____ TO _____

OTHER-SPECIFY Dipmeter Surface TO TD

_____ TO _____

MUD LOGGER ☒ YES ☐ NO ☐ UNMANNED ☐ ONE MAN ☒ TWO MAN

FROM Burns GX Surface Casing TO TD

ADDITIONAL SERVICES-(SPECIFY) Numerous sidewall cores after log run

WELLSITE GEOLOGIST: ☒ YES ☐ NO

WHO: Howard Stark (805) 642-9509

FROM: Surface Casing TO TD

SAMPLE PROGRAM

INTERVAL 10' Surf. Csg. TO TD

INTERVAL _____ TO _____

INTERVAL _____ TO _____

SAMPLES TO:

1. Dry cut kept at well site
2. Nick Nickolevis (as directed)
3. 1461 Arundell Avenue
4. Ventura, California 93003 (805)644-2122

(SEE DISTRIBUTION LIST FOR ADDRESSES)

CORRELATION LOGS

1. OP: Energetics WELL: 32-35 Del Mar
   LOC: SE NE 35-4N-25W CO: Ventura STATE: California
   TYPE LOG: DIL SCALE: 5" = 100'

2. OP: Tiger WELL: Bates 1-36
   LOC: SE SE 36-4N-25W CO: Vetura STATE: California
   TYPE LOG: IEL SCALE: 2" = 100'

NOTIFICATIONS

	NAME	OFFICE TELEPHONE	HOME TELEPHONE
1ST	David L. Cook	(303) 694 7666	(303) 771 7470
2ND	Larry Carten	(303) 694 7667	(303) 694 2460
3RD	Cris Gaudi	(303) 694 7669	(303) 690 9720

APPROVED: _____ REGIONAL MANAGER _____ DATE

APPROVED: J. L. Carten 11/18/82 CHIEF DEVELOPMENT GEOLOGIST DATE

(ONLY SIGNATURE REQUIRED ON DEVELOPMENT WELLS)

prospect # CA 594

DRILLING PROGNOSIS

ENERGETICS, INC., DEL MAR 43-35
SURFACE LOCATION: 1854.49' SOUTH & 1061.46' WEST
SECTION 35-T4N-R25W, VENTURA COUNTY, CALIFORNIA

Elevation: 173' GR; 195' KB

Estimated Tops:

	TVD
Santa Barbara	Surface
Rincon	3,045'
Vaqueros Silt	3,760'
Vaqueros Sand	4,290'
Sespe	4,370'
Sespe Sand	5,280'
Bates Sand	6,440'
"C" Fault	7,570'
Lower Sespe Sand	9,370'
TD	10,000'

0-60'

1. Set 20" conductor @ 60' and cement with Redi Mix.

60'-500'

1. 17½" hole with 1-8" Monel, 4-8" DCS & 12-6½" DCS.

2. Deviation: Max 1 degree, max rate of change 1°/500'. Keep this section of the well as straight as possible. Survey interval: 100'.

3. Mud: LSND

   Mud up Directions:

   A. Fill pits with water and treat out any calcium in the system with soda ash (0.0015 lbs soda ash per barrel of mud for each ppm Ca^{++}).

   B. The starting formulation to mud up is:

      6 to 8 ppb Bentonite
      0.05 ppb Ben-ex

      Add one (2 lb) bag of Ben-ex with each five sacks of Bentonite.

      The ideal properties of a freshly mixed Ben-ex mud should be:

Yield Value:	4 to 8 lbf/100 ft^2
10 sec. gel strength:	2 to 4 lbf/100 ft^2
10 min. gel strength:	2 to 6 lbf/100 ft^2
API fluid loss:	15 to 30 cc
MBT:	6 to 8 ppb
Funnel Vis:	30 to 34 sec.

Maintenance

A. Run a controlled stream of water while drilling to maintain volume and for dilution of solids.

B. Excessive Ph will impair the function of Ben-ex; therefore Ph should be maintained between 7.0 and 9.0.

C. All solids removal equipment should be rigged up and ready for operation before spudding the well. This equipment will be run continuously while drilling the well.

D. To increase viscosity, add Bentonite in 1 ppb increments with one bag (2 lbs) Ben-ex with each five sacks Bentonite through hopper.

E. Do not allow mud weight to build up with drilled solids as this will result in reduced penetration rates and higher mud costs. Solids build-up will also cause the deterioration of the low solids system and if not controlled may force the chemical dispersion of the solids.

F. To reduce yield value, gel strengths, and fluid loss, add 0.1 ppb increments of WL100 and dilute with water until desired properties are regained.

4. Surface Casing: 13 3/8" 48# K55 ST & C to 500'. Run guide shoe, 2 shoe joints and float collar. Thread lock bottom two joints of casing and float equipment. Run 6 centralizers, one every joint. Cement as follows: Cement with 350 sx 50-50 poz w/2% CaCl. Bump plug release pressure if floats hold.

5. Wait on cement 24 hrs. After 12 hrs., WOC. Cut off csg and weld on 13 3/8" x 13 5/8" S.O.W. casing head. Install 13 5/8" BOP stack and choke manifold. Test BOP stack casing head casing and manifold to 1000 psi.

500'-4,400' (Drill approximately 100' through Vaqueros Sand)

1. 12¼" hole with 1-8" Monel DC, 4-8" DCS & 12-6½" DCS & HWDP.

2. Deviation:

   A. Drill to 1,800' with BHA as outlined above.

   B. At 1,800' trip out and pick up dyna drill. Begin build at 2°/100' S29E to 16°. Hold 16° angle and direction to target at 6440 TVD.

   C. When kick is started BHA will be; bit, stab, short 6' DC, stab, Monel, stab, 1-30' x 8" DC, stab, 3-8" DCS, 12-6½" DCS & HWDP.

3. Mud:

   A. Pretreat mud with ½ ppb sodium bicarbonate prior to drilling out cement.

   B. Drill out with the same mud system used in the 17½" hole.

C. Begin bringing up gel content as hole conditions dictate.

D. Begin adding cypan at 2500' for shale encapsulation and to reduce water loss.

E. It may be necessary to add soda ash to the makup water to keep the calcium below 80 ppm.

F. All solids equipment should be rigged up and working at all times.

G. The expected mud properties in this section of the well should be as follows:

Mud Weight:	8.8 to 9 ppg
Funnel Viscosity:	35 to 40 sec.
Fluid Loss:	10 to 20 cc
YP:	3 to 6
PV:	3 to 10
MBT:	6 to 12 ppb

4. Samples: ~~10'~~ 30' intervals surface casing to TD. No paleo on tap hole. Save samples + store in warehouse
2 man mud logging unit on location from surface casing to TD.

5. Geologist: Howard Stark from surface casing to TD. 10' later.

6. DST: ~~1 possible in the Vaqueros Sand~~. To be cased + test later?

7. Coring: No conventional coring planned. Side wall cores possible.

8. Logging: DIL SFL surface casing to TD
Acoustic BHC surface casing to TD
Density/neutron surface casing to TD
Dipmeter surface casing to TD
Run velocity surveys at TD

9. Casing: 9 5/8" casing design attached. Run differential fill float shoe, 2 (two) shoe joints and differential fill float collar. Run centralizers through the Vaqueros Sand. Thread lock bottom 2 joints and float equipment. Cement as follows, cement volumes to be calculated from logs:
4500' ±

Lead Slurry: Vol of lite cement to circ cmt to surface.
Tail Slurry: Vol of cmt to cover bottom 500' of casing.

Bump plug, release pressure if floats hold.

10. Wait on cmt. 24 hrs. after 12 hrs. hang casing and nipple up 11" x 9 5/8" 3000 psi spool and BOPS. Test BOPS manifold and casing to 1500 psi.

4,400'-TD

1. 8 3/4" hole w/12-6½" DCS and HWDP.

2. Deviation: At casing point well should be on course to target. Bottom hole assembly may need corrections as drilling proceeds.

3. Mud:

   A. Pretreat mud with ½ ppb sodium bicarbonate prior to drilling out cement.

   B. Continue w/the cypan/benex system and drop water loss to 8 to 10 cc.

   C. As the well gets deeper additions of drispac may be necessary for water loss.

   D. Again: keep the mud weight as low as possible and keep all solids removal equipment running.

   E. The mud properties in this section of the well should be as follows:

Mud Weight:	8.8 to 9.2 ppg
Funnel Vis:	35 to 45 sec.
Fluid loss:	8 to 10 cc
YP:	8 to 10
PV:	4 to 8
MBT:	10 to 12 ppb

4. Samples: 10' to TD.

5. DST: Possible tests in Sespe Sands.

6. Coring: Side wall cores possible.

7. Logging: Same as above.

8. Casing: 7" casing design attached.

9. All delivery tickets to be signed at the rig and sent every other day to:

   Energetics, Inc.
   116 Inverness Drive East
   Englewood, Colorado 80112

   Attention: Operations Department

10. Distribution sheet must be followed on all logs, DST reports, core reports, gas and sample analysis and any and all other services.

11. Morning Reports to be called in 6 days a week to:

Kyle Swingle (303) 694-7773
Randy Smith (303) 694-7774

Sunday - Kyle Swingle (303) 741-1155
Randy Smith (303) 752-0310

KWS/les
3-4-83

CASING PROGRAM

DEL MAR 43-35

Conductor

60'-20"

Surface Casing

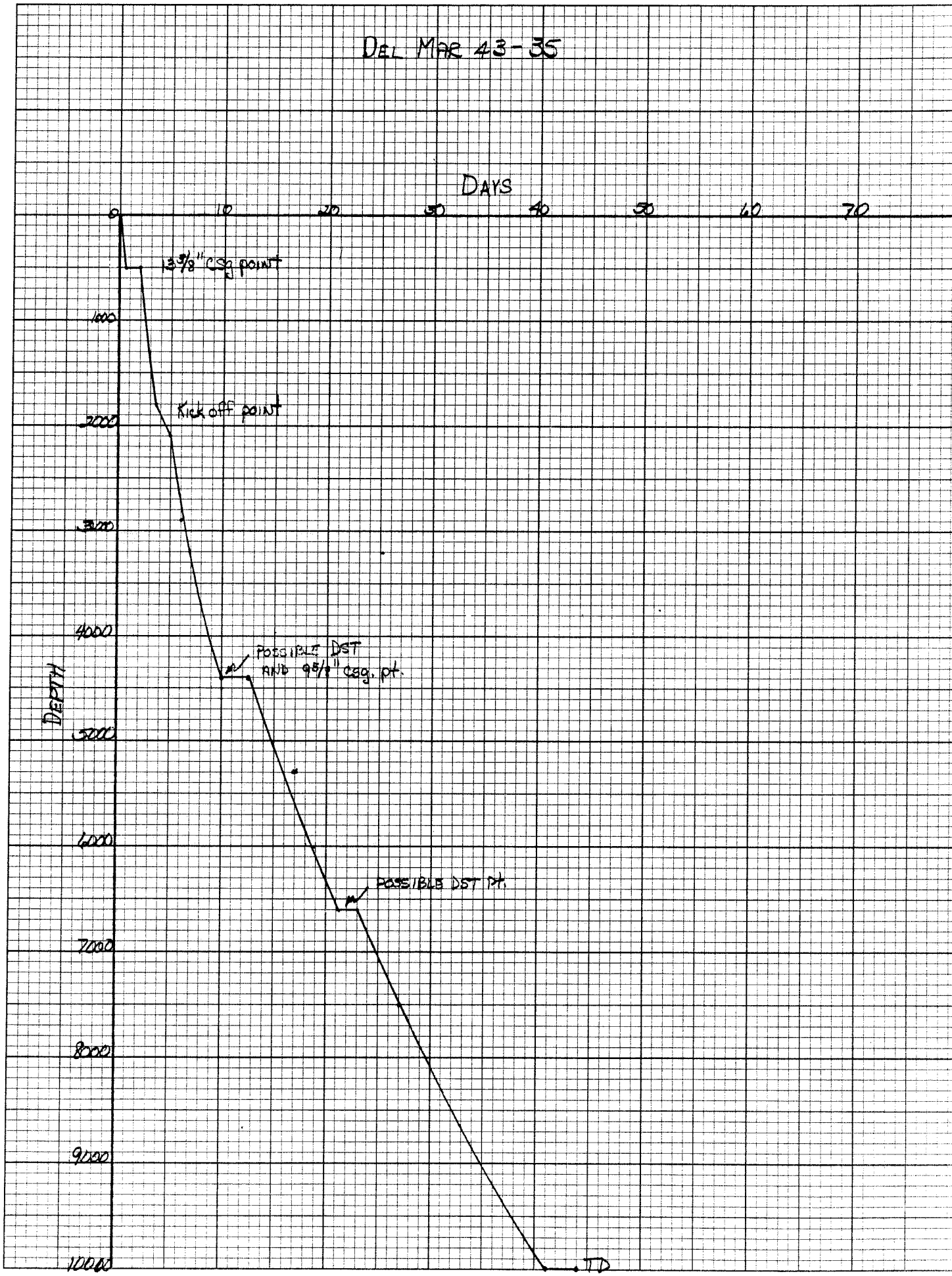
500'-13 3/8" 48# K55 ST & C

Intermediate Casing

3200'-9 5/8" 36# K55 ST & C
1300'-9 5/8" 36# S80 ST & C
Mud Wt. 9.4 ppg
Design Criteria
J.S. 1.8 safety factor in air
Collapse 1.25 S.F. 2150 x 1.25 = 2688
Burst 1 S.F.

Production Casing

7" casing planned. Design will depend on depth run.



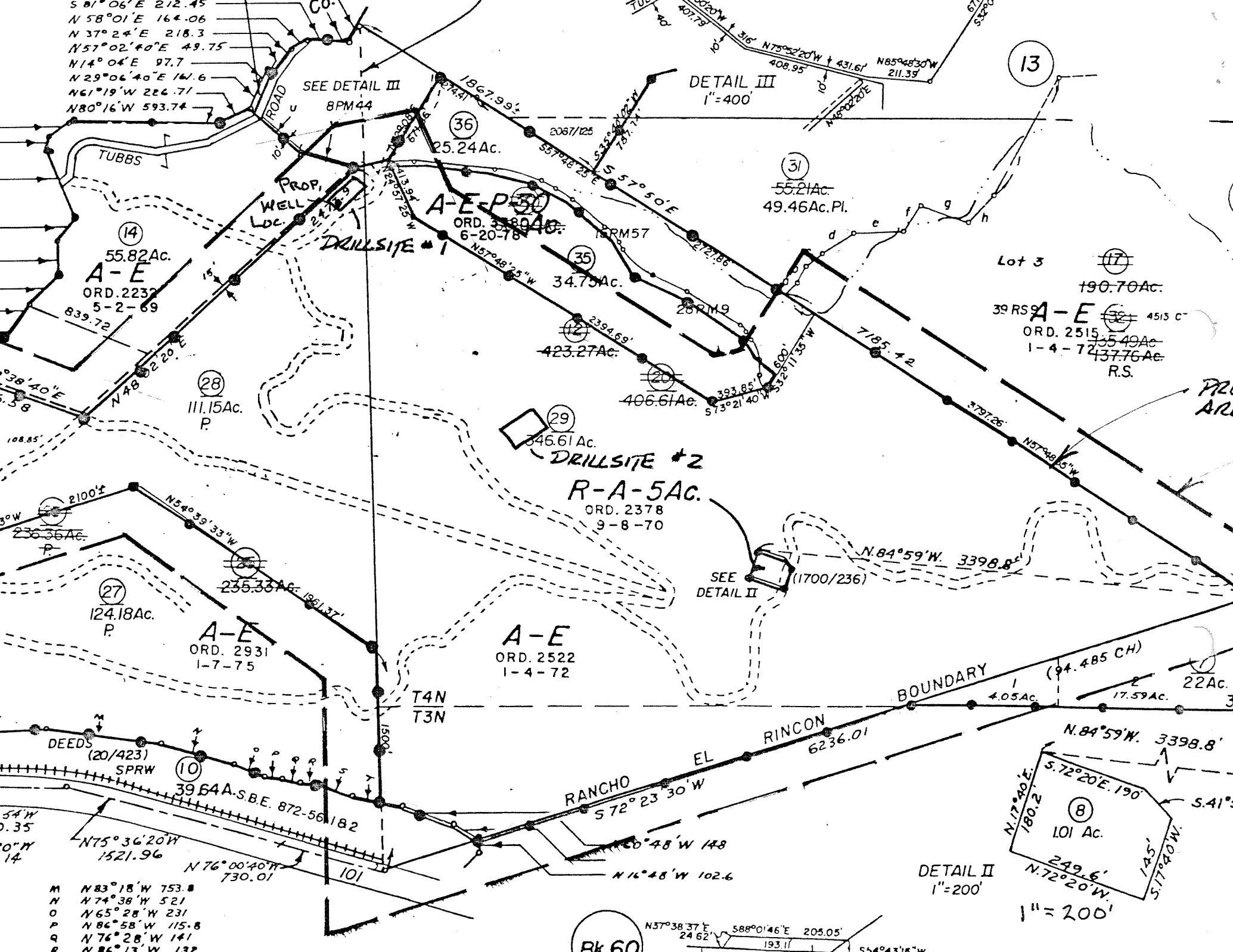
46 1020
KE 10 X 10 TO 5/6 INCH • 7 1/2 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

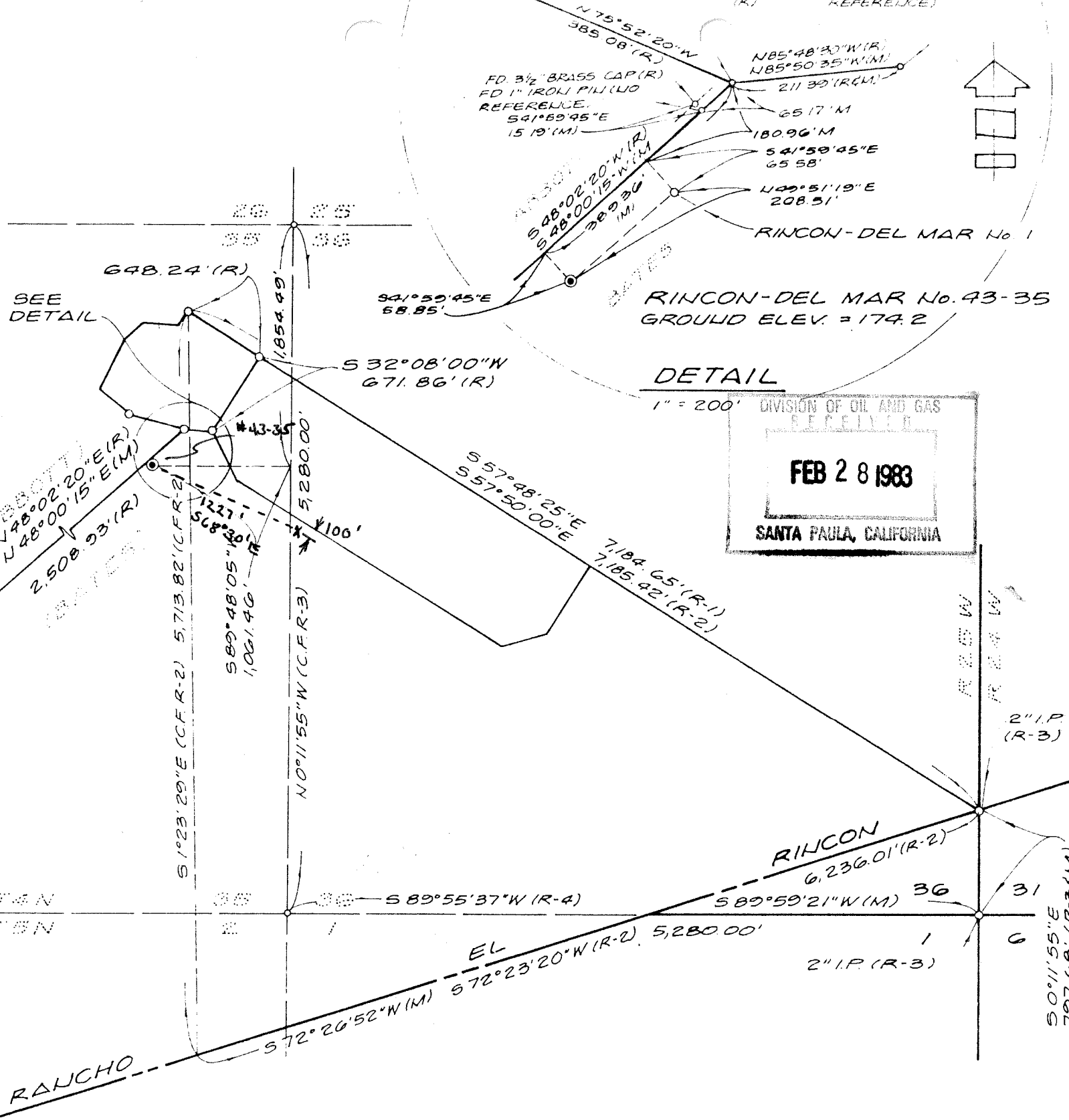
VENDOR'S LIST

1. Drilling Contractor	CAL PACIFIC
2. Bits	Hughes, SECURITY, Reed, SMITH, etc USE (STRATA Bit - PDI)
3. Reamers & Stablizers	
4. Wellhead	ERC 834-7373
5. Casing	Surface: Production:
6. Directional	GLENN BOLLER 647-6037
7. Supply Company	ANY.
8. Drilling Fluid	PROFCO
9. Mud Logger	BURNS GX
10. Monel Drill Collar	SERVCO
11. SWS Analysis	
12. ~~WSO~~ DST	HALIBURTON test tools; ALLISON testing for Sep
13. Cement	Surface: BJ 643-6196 Production: BJ
14. Floating Equipment & Centralizers	Surface: HALCO 682-2811 Production: HALCO
15. Location Work	
16. Surveyor	LEWIS & LEWIS, INC
17. Electric Logger	
18. ~~Rental Tools/DP/DC~~ CENTRIFUGE.	BRANT Solids CONTROL.
19. Trucking	
20. Automatic Choke	NONE
21. Fishing Tools	TRIPLE A
22. Well-Site Geologist	HOWARD STARK
23. Vacuum Truck	

Repair frac Shale pit

WELL NAME: DEL MAR 43-35


S 81°06'E 212.45
N 58°01'E 164.06
N 37°24'E 218.3
N57°02'40"E 49.75
N14°04'E 97.7
N 29°06'40"E 161.6
N61°19'W 226.71
N80°16'W 593.74
ROAD
SEE DETAIL III
8PM44
TUBBS
PROP. WELL LOC.
DRILLSITE #1
36
25.24Ac.
1867.99'
S37°48'25"E
2067/125
S 57°50'E
DETAIL III
1"=400'
31
55.21Ac.
49.46Ac.Pl.
A-E-P-50
ORD. 3580-A
6-20-78
18PM57
35
34.75Ac.
28PM9
14
55.82Ac.
A-E
ORD.2232
5-2-69
839.72
N48°22'20"E
28
111.15Ac.
P.
12
423.27Ac.
2394.69'
N57°48'25"W
20
406.61Ac.
393.85'
S73°21'40"W
S32°11'33"W
600'
7185.42
Lot 3
17
190.70Ac.
39 RS
A-E
ORD. 2515
1-4-72
35.49Ac
137.76Ac.
R.S.
4513 C
29
346.61 Ac.
DRILLSITE #2
R-A-5Ac.
ORD. 2378
9-8-70
3797.26
N57°49'35"W
N.84°59'W. 3398.8'
SEE DETAIL II
(1700/236)
2100'±
N54°39'33"W
236.36Ac.
P.
235.33Ac.
1861.37'
27
124.18Ac.
P.
A-E
ORD. 2931
1-7-75
A-E
ORD. 2522
1-4-72
T4N
T3N
1500'
BOUNDARY
(94.485 CH)
4.05Ac.
17.59Ac.
22Ac.
DEEDS
(20/423)
SPRW
10
39.64A.
S.B.E. 872-56
182
N75°36'20"W
1521.96
N 76°00'40"W
730.01
101
RANCHO EL RINCON
6236.01
S 72°23'30"W
N 16°48'W 102.6
M N 83°18'W 753.8
N N 74°38'W 521
O N 65°28'W 231
P N 86°58'W 115.8
Q N 76°28'W 141
R N 86°13'W 132
DETAIL II
1"=200'
8
1.01 Ac.
S.72°20'E. 190'
N.17°40'E.
180.2'
249.6'
N.72°20'W.
145'
S17°40'W.
1"=200'
Bk 60
N37°38'37"E
24.62'
S88°01'46"E 205.05'
193.11'



R = 8 P.M. 44
R-1 = 15 P.M. 57
R-2 = ASSESSOR'S
R-3 = 25 P.M. 74
R-4 = RECORDS ON FILE AT LEWIS & LEWIS

PROJECTED SECTIONS PER R-1 & R-2

LEWIS & LEWIS, INC.
surveyors
1600 Cabens Road P. O. Box 870

ENERGETICS, INC.

SKETCH SHOWING
RINCON-DELMAR
WELL No. 43-35
PROJECTED SECTION 35
T.4N., R. 25 W.
RANCHO EL RINCON
(1A M.R. 12)
VENTURA COUNTY CALIFORNIA
FEBRUARY 1983 SCALE: 1"=1000'

CLAW[illegible]N PETROLEUM CONSULTAN[illegible] INC.
2977 SEXTON CANYON ROAD
VENTURA, CALIFORNIA 93003
805 644-9575

DIVISION OF OIL AND GAS
RECEIVED
FEB 22 1983
SANTA PAULA, CALIFORNIA

February 9, 1983
CUP 4075 Mod 3
Drill Well Del Mar 43-35

Dear Resident:

About March 1st, Energetics proposes to commence drilling a well within 1600' of your residence on the Rincon Del Mar Ranch acreage, identified as Assessors Parcels 8-16-28 and 8-16-29. Noise levels during the 40± day drilling period will exceed those normally experienced in the area. Therefore, a noise waiver is required in accordance with Condition 38 on the permit.

Your signature is requested indicating your agreeing to the proposed drilling operations. Signing this waiver does not waive your right to protest the drilling activity should the noise levels inconvenience you or your family.

Please return a signed copy of this letter to Energetics, Inc. in care of Clawson Petroleum Consultants and keep one copy for your records. The phone number on the letter may be used to contact us should any problems arise.

Sincerely yours,

F Floyd L. Clawson

Floyd L. Clawson
Consultant/Agent for
Energetics, Inc.

Name [illegible]

Address 9468 Rincon Rd.
Carp Ca 93013

CLAWSON PETROLEUM CONSULTANTS, INC.
2977 SEXTON CANYON ROAD
VENTURA, CALIFORNIA 93003
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Sincerely yours,

Floyd L. Clawson

Floyd L. Clawson
Consultant/Agent for
Energetics, Inc.

Name Ramon Ledesma
Address 9468 Rincon Rd
Carpinteria