

PRELIMINARY FAULT INVESTIGATION
COTTONWOOD COMMONS
CITY OF SAN JACINTO
RIVERSIDE COUNTY, CALIFORNIA

Prepared For:

PACIFIC CENTURY HOMES, INC.

40980 County Center Drive, Suite 110
Temecula, California 92591

Project No. 601977-001

October 10, 2007



Leighton Consulting, Inc.

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October 11, 2007

Project No. 601977-001

To: Pacific Century Homes, Inc.
40980 County Center Drive, Suite 110
Temecula, California 92591

Attention: Mr. Steve King

Subject: Preliminary Fault Investigation, Cottonwood Commons, Assessor Parcel Number 431-110-008, NWC of Sanderson and Cottonwood Avenue, San Jacinto, California

In accordance with your request and authorization, Leighton Consulting, Inc. (Leighton) has completed a preliminary fault investigation for the proposed 38-acre "Cottonwood Commons" development located west of Sanderson Avenue and north of Cottonwood Avenue, City of San Jacinto, Riverside County, California (see Figure 1). The purpose of this investigation was to evaluate the potential for surface fault rupture in the existing onsite Earthquake Fault Hazard Zone. An active fault zone was encountered and a restricted use building setback zone is recommended. Our fault investigation was coordinated and reviewed with the County of Riverside Engineering Geologist, Mr. David Gaddie. This report summarizes our findings, conclusions, and recommendations regarding the fault conditions on the subject site.

We appreciate this opportunity to be of service to Pacific Century Homes. If you have any questions regarding this report, please contact the undersigned.

Respectfully submitted,
LEIGHTON AND ASSOCIATES, INC.

THIS DOCUMENT WAS ISSUED PREVIOUSLY AND MAY NOT REFLECT CURRENT SITE CONDITIONS AND/OR STANDARDS OF GEOTECHNICAL PRACTICE. THE CONTENTS OF THE DOCUMENT SHOULD NOT BE USED OR RELIED UPON WITHOUT A REVIEW BY QUALIFIED PROFESSIONALS.

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MSB/RFR/dlm/ew
601977-001/FINAL/Fault Invest

Distribution: (4) Addressee
(3) Riverside County Planning Department; Attention: Mr. David Jones

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1.0 INTRODUCTION

This report presents the findings of our earthquake fault investigation for the “Cottonwood Commons” property in San Jacinto, California.

As depicted on Plate 1 and Figure 3, an Alquist-Priolo Earthquake Fault Zone (A-P Zone) transects the northeast portion of the property. Earthquake Fault Zones are believed to contain “active faults”, unless proven otherwise by a detailed investigation. The California Geologic Survey (CGS) defines an “active fault” as one that has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). Accordingly, the primary purpose of this investigation was to determine the suitability of the site for commercial development from the standpoint of potential surface fault rupture. Additional geotechnical studies are recommended to properly evaluate engineering characteristics of the subsurface soils for foundation support.

1.1 Scope of Services

Our scope of services for this investigation included the following items:

- A detailed analysis and review of sequential pairs of aerial photographs of the project area and adjacent areas.
- Site reconnaissance to observe and document the current surface conditions and geomorphology of the subject site and adjacent areas.
- Geotechnical review of the results of the fault trenching performed by others in the local area.
- Excavation of one exploratory fault trench (± 330 feet in total length) through out the A-P Zone portion of the subject site to characterize the suspected faulting as described by the California Geologic Survey.
- Detailed logging of the trench excavation was performed by our geologist and reviewed by our Engineering Geologist.
- Analysis and review of encountered geologic conditions including, faulting; lateral earth spreading and fissuring features; and the determination of potential for ground rupture.
- Coordination and site visit with reviewing County of Riverside Engineering Geologist, Mr. David Gaddie.
- Preparation of this report, presenting our findings, conclusions and recommendations regarding faulting and proposed structural setback(s).



1.2 Subsurface Field Investigation

An exploratory fault trench was excavated over several days in August (2007) utilizing a Hitachi 300LC Trackhoe Excavator. The location of the fault trench is indicated on the accompanying geotechnical map (Plate 1).

The earth materials encountered, and faults exposed within the trench are described and illustrated on the Fault Trench Logs contained in Appendix B. The approximately 330 foot long trench was excavated to an average depth of 16 to 18 feet with a minimum width of five feet at the bottom, and benched symmetrically upwards in general accordance with current OSHA guidelines. The depth of the exploratory fault trench was based, in part, upon the depths recorded during previous investigations in the nearby area (Appendix A, Converse 2006, 2004, Leighton, 2005, 2004, 1989, GeoSoils Inc., 1990 and Schaefer Dixon, 1993), necessary, to expose previously identified suspected fault features. Field review of the fault trench was conducted by the Riverside County Geologist, Mr. David Gaddie, and a Certified Engineering Geologist from this firm. The trench was subsequently backfilled under Leighton's observation and testing. The lower 10 feet of the excavation was backfilled and compacted to minimum 90 percent relative compaction based on the laboratory maximum dry density as determined by ASTM D1557. Laboratory and density test results are included in Appendix C. The remaining upper 6-8 feet of the excavation was backfilled with uncompacted soils.

1.3 Previous Site Investigations

Previous investigations completed on near-by sites by Leighton (1989, 2004, 2005), Schaefer Dixon Associates (1993), and by Converse (2004) were reviewed. Each of these investigations utilized a standardized methodology of investigating previously identified fault splays of the San Jacinto Fault Zone (Hart, 1997). These investigations aided in the determination as to the needed depth of excavation, and the general morphology of faulting in the vicinity of the site.

1.4 Aerial Photographs

A detailed review of aerial photographs (Appendix A) was performed utilizing a stereoscope to enhance the resolution of suspected fault splays. Several photo-lineaments were observed transecting the site. These photo-lineaments were identified entering the subject site near the northwest corner of the site, trending southeast, across the site. The northeastern-most photo-lineament generally coincides with the mapped trace of the San Jacinto-San Jacinto Valley Fault (known locally as the Casa Loma Fault). This photo-lineament consists of alignment of both topographic breaks and tonal contrasts. We also observed a tonal lineament coincident with lineament 6 or 7 in the previous Converse (2006) analysis. We concur with the previous findings that this is most likely a fluvial feature and not related to faulting. Of interesting note, a 2002 USGS aerial image shows a



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tonal contrast feature that is indicative of a “trench scar” in the location of the trench excavated for our investigation. However, our trench did not expose any backfill from previous excavation. It is possible that this current excavation work completely removed this prior trench.



2.0 SUMMARY OF GEOTECHNICAL FINDINGS

2.1 Proposed Development and Site Description

The subject site is 38-acre(s) of vacant land located at the northwest corner of Sanderson Avenue and Cottonwood Avenue in the City of San Jacinto, California. We understand that commercial development of the site is being considered. Open space areas, associated utilities and street and parking improvements are also anticipated. Conceptual site plans were not provided at the time of our investigation. Conventional cut and fill grading is anticipated.

Topographically, the site can be characterized as a relatively flat, gently northwest sloping surface. There is a relatively subtle break in slope that transects the northeastern portion of the site trending northwest/southeast which continues off site. This break in slope was measured in the field to have approximately 1 to 2 feet of relative elevation difference. Based on review of the provided topographic map (Unland, 2007), site elevations vary from approximately 1504 feet above mean sea level (msl) along the northwestern boundary, to an elevation of approximately 1,508 feet (msl) near the southeast corner. See Plate 1 for current topographic details. The property is currently vacant, unused agricultural land under fallow conditions.

A portion of the San Diego Aqueduct and associated easement are present within the property. The buried aqueduct line trends from northeast to southwest across the central portion of the site (see Plate 1).

2.2 Regional Geology

The proposed development site is located in the San Jacinto Valley southwest of the San Jacinto River. The San Jacinto Valley is a relatively flat-lying depositional surface surrounded by hills and mountains. The valley is divided on the east by an alluvial filled, down dropped, fault bounded graben (trough), and on the west by a broad, gently sloping (to the east) alluvial mesa (bajada). The northwest trending trough is bounded on the east by the main trace of the San Jacinto Fault (which forms the east margin of the valley), and on the west by the onsite Casa-Loma segment of the San Jacinto Fault. Each fault is a portion of the San Jacinto Fault Zone Complex.

Sediments derived from the San Jacinto River and Bautista Creek have been deposited across the valley. The sediment thickness is thought to be highly variable with a minimum thickness of 500± feet in the southwest portion of the valley. Paleo-eustuarine silts and sands, Quaternary-aged terrace deposits, and conglomerates flank major abandoned drainage channels and the base of mountain slopes. Near the town of San Jacinto, a boring excavated northeast of the Casa-Loma Fault segment did not encounter basement rocks to the total depth explored of 1,430 feet (Bean and others, 1959).



Overall, seismic and gravity surveys indicate that approximately 6,500 feet to 7,900 feet of alluvial sediment overlie the basement bedrock in portions of the valley (Lofgren and Rubin, 1975).

2.3 Site Geologic Units

The earth materials encountered consisted of topsoil and alluvium. These units are discussed in the following sections in order of increasing age.

2.3.1 Topsoil

Topsoil was encountered mantling the site where we excavated our exploratory trench. Composition and thickness of the topsoil is generally uniform, and limited to the upper 3 to 5-feet of the existing ground surface. As encountered, topsoil generally consists of light brown to grey, dry, loose, silty sand. There are abundant in-filled animal burrows (Krotovina) containing finer silt and sands. Topsoil includes recently tilled soil.

2.3.2 Alluvium

Alluvial soil was encountered in all fault trenches excavated at the subject site. The alluvial soils were deposited as part of a fluvial/channel depositional environment and include interbedded sands and silts. This alluvium generally consisted of yellow-brown to light gray, dry to damp, silty, fine sand, with interbedded layers of silt. Channel deposits of homogeneous, friable, dry, medium sand with interbedded lenses and laminations of loose to medium dense, dry to damp, fine sand were also observed. The sediments vary from moderately thick continuous beds and locally discontinuous stream channel deposits. The thick beds were found to be continuous and correlatable the length of the trench.

The estimated age of the alluvium exposed within this trench are based on previous adjacent studies (Schaefer Dixon Associates, 1993) that determined by radio carbon dating methods that the alluvial sediments at about 8 feet below ground surface to be mid- to early Holocene-aged (8,300 years before present). Sediments closely below this depth may not be Pleistocene in age but are likely early- Holocene at least.

2.4 Regional Faulting and Fault Activity

The subject site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional fault systems such as the San Andreas, San Jacinto and



Elsinore fault zones. Currently, these fault systems accommodate up to approximately 55 millimeters per year of slip between the plates. The San Jacinto Fault Zone is estimated to accommodate slip of approximately 12 millimeters per year (mm/yr.) (WGCEP, 1995). However, geodetic measurements between 1973 and 1981 show that the San Jacinto and San Andreas Faults currently have comparable strain rates (King and Savage, 1983), and *Morton and Matti* (1993) have estimated an average slip rate of as much as 20 mm/yr for the San Jacinto Fault. An increased strain rate, in theory, could contribute to an overall higher Maximum Capable Earthquake moment of magnitude than what has been previously considered for the San Jacinto Valley by local governmental agencies and the 1997 Uniform Building Code. The San Jacinto Fault zone presents an appreciable seismic hazard in Southern California.

The nearest zoned “active faults”, (other than the on-site Casa Loma Fault) are the San Jacinto Fault, located approximately 2.3 miles (3.7 km) northeast of the site, the San Jacinto-Anza Fault located 6.5 miles (10.5 km) to the southeast, and the San Andreas Fault, 17.9 miles (28.8 km) east of the site (Blake, 2000c).

2.5 Faulting and Seismicity

As defined by the CGS, an active fault is one that has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). This definition is used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazard Zones Act of 1972 and as subsequently revised in 1994, 1997, and 1999 (Hart, 1999), as the Alquist-Priolo Earthquake Fault Zoning Act and Earthquake Fault Zones. The intent of the act is to require fault investigations on sites located within Earthquake Fault Zones to preclude new construction of certain inhabited structures across the trace of active faults. The subject property contains portions of the mapped Alquist-Priolo Earthquake Fault Zones (Hart, 1999). The limits of the Earthquake Fault Zone are also depicted on the accompanying geotechnical map (Plate 1) and the Earthquake Fault Zone Map (Figure 3).

2.5.1 Fault and Seismic History

Historically, the San Jacinto Fault Complex has produced earthquakes in the magnitude range of 6.2Mw to 7.2Mw (‘Mw’ is the Moment Magnitude). The San Jacinto Fault and San Andreas Fault Complexes are among the most active in California. Since the recording of seismic events in the mid 18th century, at least 6 major earthquakes have occurred along the San Jacinto Fault Zone (U.S.G.S, California Earthquake History, 1997). These major quakes have been estimated to be in the range of 6.2Mw to 7.2Mw. Each of these major quakes have produced moderate to severe damage to buildings and roads, and have resulted in several fatalities over this time-period (Von Hake, 1971).

Hundreds of minor earthquakes (magnitude 1.0 to 2.9) occur annually in San Jacinto Valley (U.S.G.S, 2004). The majority of these earthquakes occur in the bedrock underlying the alluvium unit typically at depths of 3 to 5 miles (5-8 km).

2.5.2 On-Site Fault Activity

The on-site San Jacinto-Casa Loma fault, as documented during this investigation and other reports, is considered to be an **active** fault which shows evidence of displacement of Holocene-age soils. The subject site is included within an Earthquake Fault Zone as created by the Alquist-Priolo Earthquake Fault Zoning Act (Hart, 1999). A splay of the San Jacinto-Casa Loma fault, which traverses the subject study area is an active fault as defined by the State of California (fault has had surface displacement during the past 11,000 years). The on-site location of the fault splay was inferred from its location exposed in a previous investigation of the adjacent property (Converse, 2004). The fault trench excavated as part of our investigation (FT-1) confirmed the onsite location of the fault splay and is indicated on Plate 1. The evaluation of photo-lineaments and the determination of fault activity, evidenced by surface displacement, has been established onsite during our recent site-specific fault investigation.

2.5.3 Fault Trenching

A total of approximately 330 lineal feet of exploratory fault trench was excavated, cleaned, observed, and logged in detail by a geologist from our firm. Field review of these fault trenches was conducted by a Riverside County Engineering Geologist, Mr. David Gaddie, and a Certified Engineering Geologist from this firm. The location of the trench and the staked locations of the fault traces were surveyed by the project civil engineer (Hunsaker & Associates). The Hunsaker survey data is included in Appendix C. The location of the fault trench is shown on the accompanying geotechnical map, (Plates 1). The materials and faults encountered are discussed below and depicted on the trench logs (Appendix B). Letter or number identifiers are used on the trench logs to discern subsurface layers, and do not infer stratigraphic superposition; but rather, correlate unit descriptions with observed layers.

Fault Trench 1 (Map Symbol FT-1) - Fault Trench FT-1 was excavated to a maximum depth of 16-18 feet below ground surface (bgs), and a length of approximately 330 feet. FT-1 was excavated across the on-site portion of the state mapped Alquist-Priolo Earthquake Fault Zone (A-P Zone) at that location (see Plate 1). FT-1 trends N45E and the southeast wall was logged. Evidence of past seismic activity is identified between Station 1+00 through Station 1+20, as depicted on the trench logs. Several faults, with variable offsets, were identified within a 20-foot wide fracture zone. The majority of the faults can be traced



upward to within 5-7 feet of the existing ground surface. Fractures that were infilled with fine silts and silty clays were identified along the down warped bedding within a zone of folding immediately adjacent to the faults.

The main fault strikes 45 degrees northwest and dips approximately 70 to the northeast. No evidence of faulting was observed outside of the area identified on the log of trench FT-1.

2.6 Secondary Seismic Hazards

Secondary hazards generally associated with severe ground shaking during an earthquake are ground rupture, liquefaction, seiches or tsunamis, flooding (dam or levee failure), landsliding, rock falls, and seismically-induced settlement. Some of these hazards are discussed in the following sections. Groundwater, Liquefaction potential, ground shaking, seismic design parameters and dynamic settlement potential are beyond the scope of this investigation and should be addressed in the preliminary geotechnical investigation for this site.

2.6.1 Ground Rupture

Ground rupture is generally considered most likely to occur along pre-existing active faults. Our review of previous investigations and data gathered during our current fault investigation has identified on-site, recent (Holocene) fault activity. As such, the potential for site ground rupture during a seismic event on the Casa Loma Fault is considered moderate to high. Ground rupture could potentially affect existing and future facilities (including gas, electrical, water mains and aqueducts) crossing the site due sympathetic movement associated with onsite active faults.

2.6.2 Tsunamis, Seiches and Flooding

Hazard from tsunamis is not present as the site is located away from the immediate coastal area. No ponds, lakes or other large man-made open water retention features are known to exist on, or immediately adjacent to the site and the possibility of seiches is considered nil. Hazards from dam inundation do not exist on this site. The site is not located with a mapped 100 yr flood zone.

2.6.3 Landsliding

No previous landslides have been mapped by others or identified by us during our field investigation. The major earth materials observed, both topsoil and the Quaternary-aged alluvium, are generally not prone to landsliding due to the flat-



lying nature of the site in its existing condition and the anticipated grades. Landsliding due to seismic activity is not anticipated.

2.6.4 Rock Falls

Due to the lack of boulders and/or elevated rock out-croppings on this site and adjacent properties, the possibility of rock falls to impact the proposed development is considered nil.



3.0 CONCLUSIONS

Based on the results of this investigation, active faulting exists onsite and accordingly, the potential for surface rupture exists onsite. The following recommendations should be incorporated into the design and grading plan.

- Based upon our current investigation, it is our opinion that these faults have likely experienced movement within the last 300-500 years, and have displaced Holocene-aged soils. Therefore, active faults, (as defined by the California Geologic Survey and the UBC) exist onsite.
- Specific structural setback provisions have been prepared. The limits of the recommended preliminary structural setbacks are presented on the accompanying Fault Location Map (Plate 1). These limits may vary pending the design cut or fill thickness over the fault zone.
- Strong ground shaking, and/or possible ground rupture may occur at this site due to on-site or local earthquake fault activity.
- Secondary seismic effects due to strong ground shaking, ground rupture, liquefaction and seismically induced settlement are considered the most significant. A separate geotechnical report is recommended to address settlement and liquefaction as well as remedial grading recommendations.
- The lower 10 feet of trench backfill was compacted to minimum 90 percent relative compaction. The upper 6 to 8 feet of trench backfill is not compacted.
- Evaluation of environmental conditions onsite (Phase 1 assessment) was beyond the scope of this study.

4.0 PRELIMINARY RECOMMENDATIONS

4.1 Structural Setback/Fault Area Restrictions

The location of the surface projection of the onsite active fault exposed in our exploratory trenches was surveyed by the project civil engineer and is shown on the accompanying Fault Location Map (Plate 1). A structural setback zone of 50 feet on the “up-block”/southwest side of the surveyed fault zone, and 70 feet on the “down-block” northeast side, for structures intended for human occupancy (2000 hours/year) is recommended. This fault setback is depicted on the 100-scale Fault Location Map (Plate 1).

This preliminary setback zone should be refined as the grading concept is developed and the scale of plan is increased (i.e. 100-scale minimum). The final setback limits should be determined during grading as the fault trace is exposed, identified and surveyed for lateral and vertical location.

All loosely placed trench backfill (upper 6-8 feet of trench backfill) should be removed and recompactd during future site grading in accordance with project geotechnical guidelines. An engineering geologist should be present to observe all excavations to confirm limits of faulting. If exposures differ from anticipated conditions, further investigations and/or additional structural restrictions may be required.



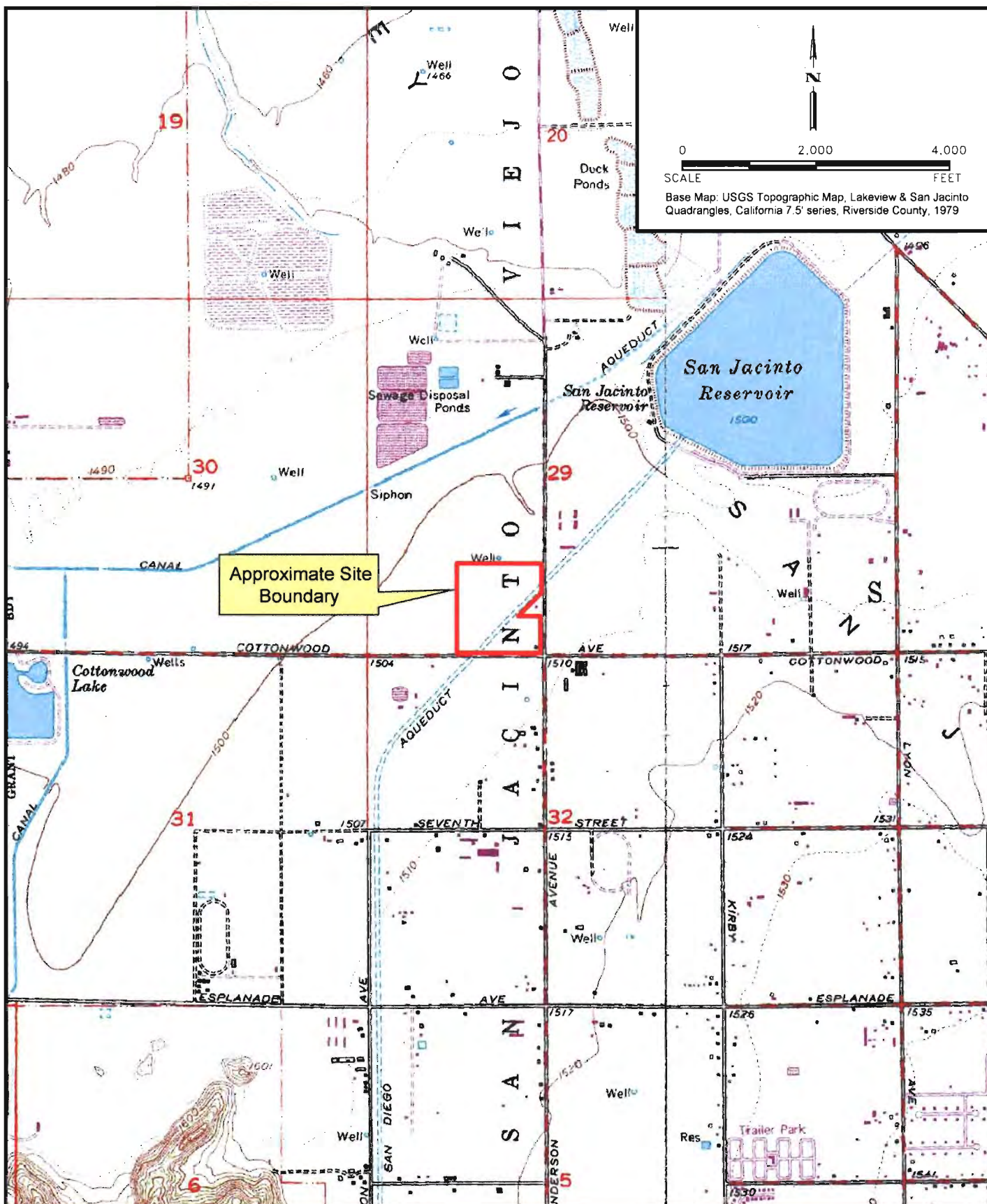
5.0 LIMITATIONS

This report was necessarily based in part upon data obtained from a limited number of observances, site visits, analyses, histories of occurrences, spaced subsurface explorations and limited information on historical events and observations. Such information is necessarily incomplete. The nature of many sites is such that differing characteristics can be experienced within small distances and under various climatic conditions. Changes in subsurface conditions can and do occur over time. This report does not meet the State of California Uniform Building Code requirements for California Public Schools, Hospitals, or Essential Services Buildings.

This report was prepared for Pacific Century Homes based on Pacific Century Homes needs, directions, and requirements. This report is not authorized for use by, and is not to be relied upon by any party except Pacific Century Homes and its successors and assigns as owner of the property, with whom Leighton has contracted for the work. Use of or reliance on this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton Consulting from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton Consulting.



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**Cottonwood Commons
San Jacinto
Riverside County, California**

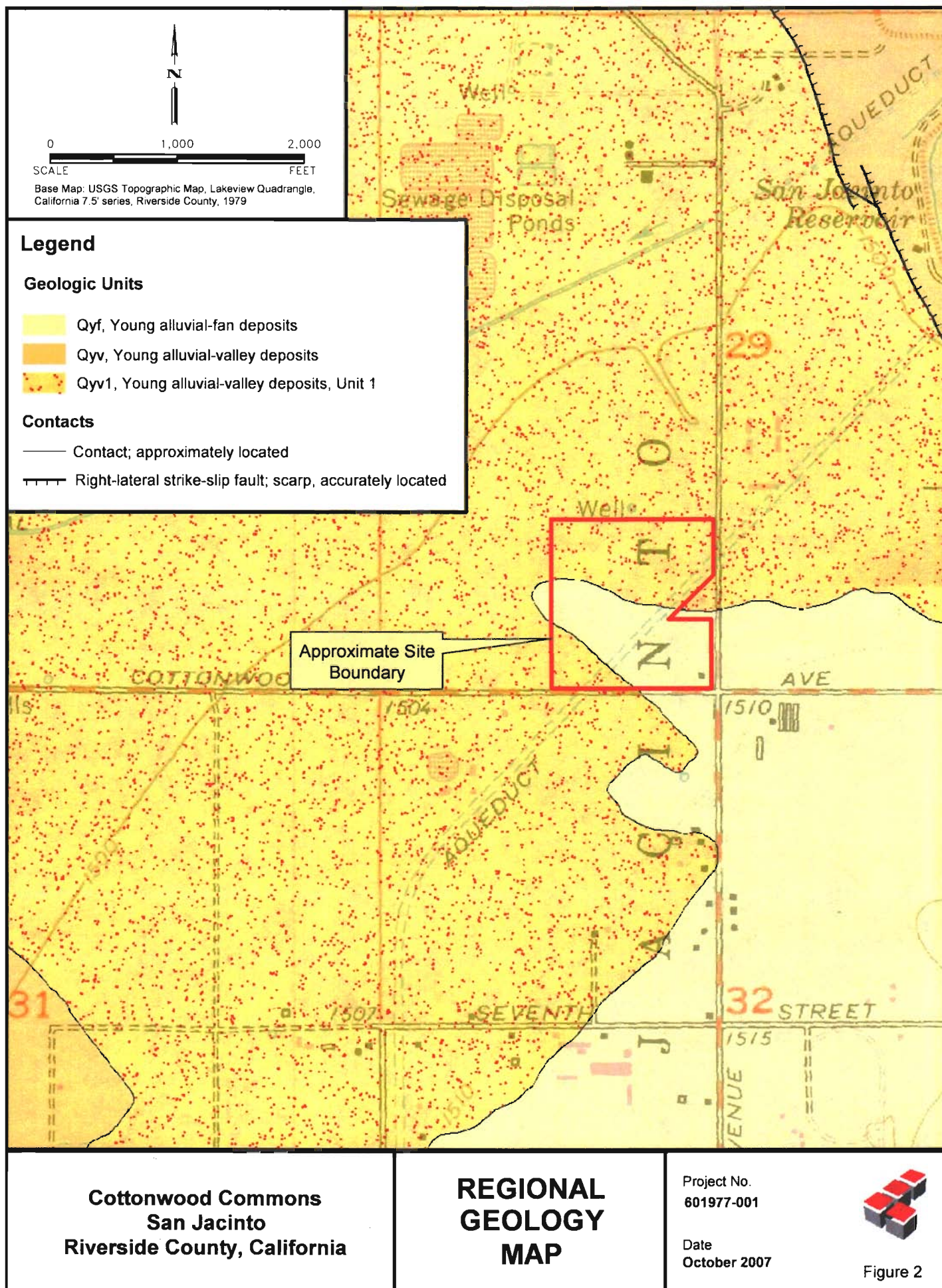
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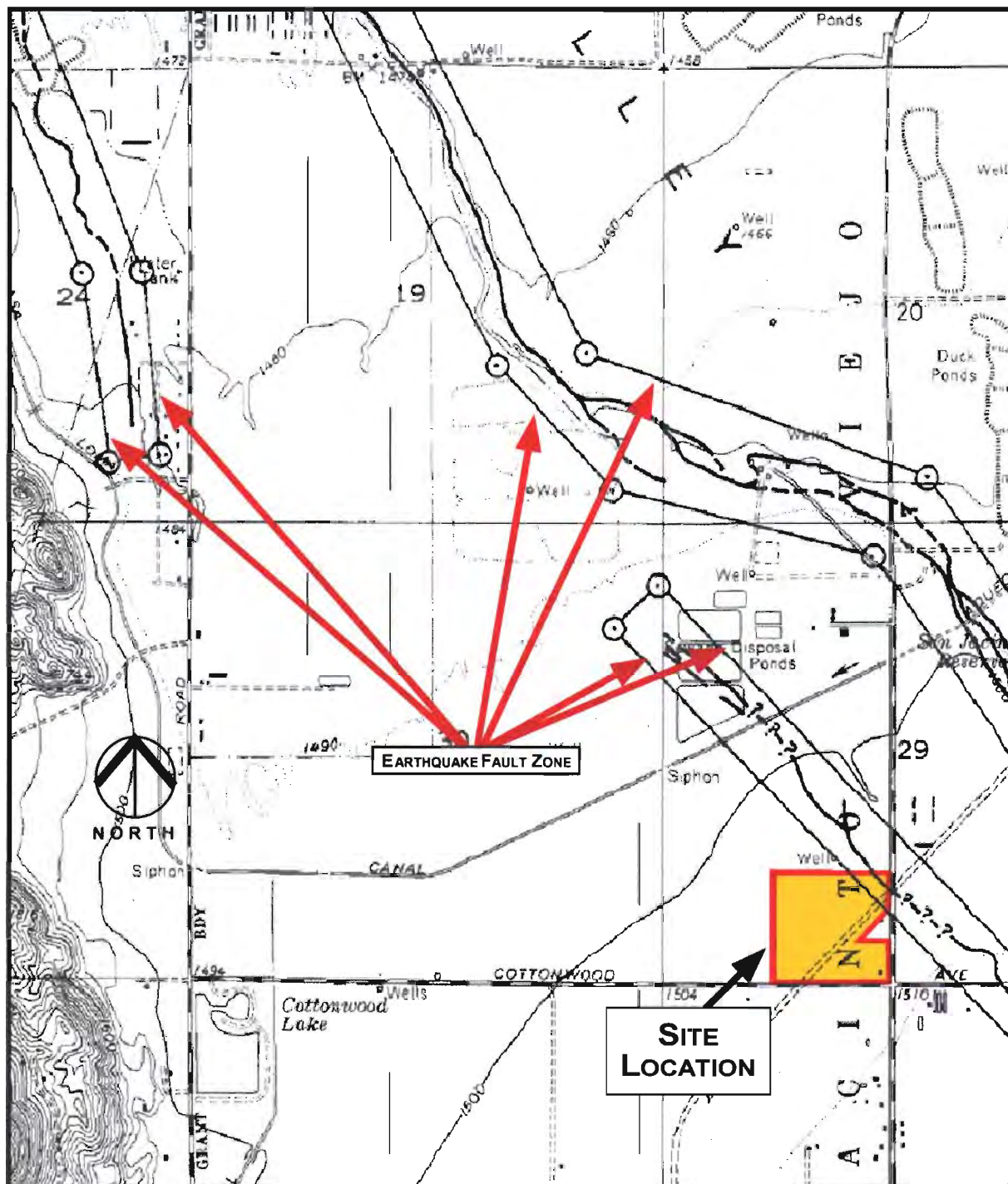
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Figure 1





Base Map: Alquist-Priolo Earthquake Fault Zone Map, Lakeview 7.5 Minute Quadrangle, Not To Scale

**Cottonwood Commons
San Jacinto**

Riverside County, California

EARTHQUAKE FAULT ZONE MAP

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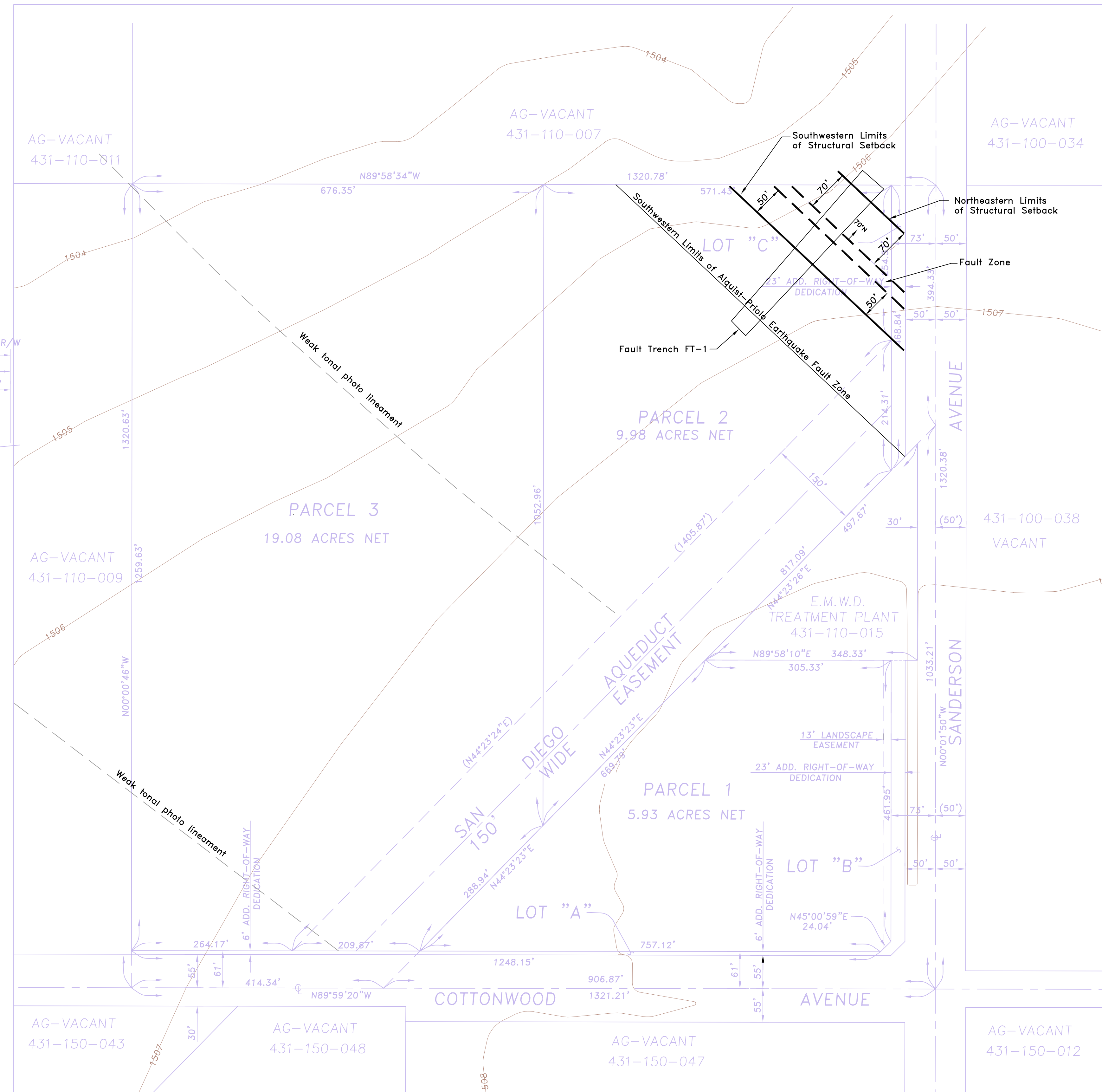
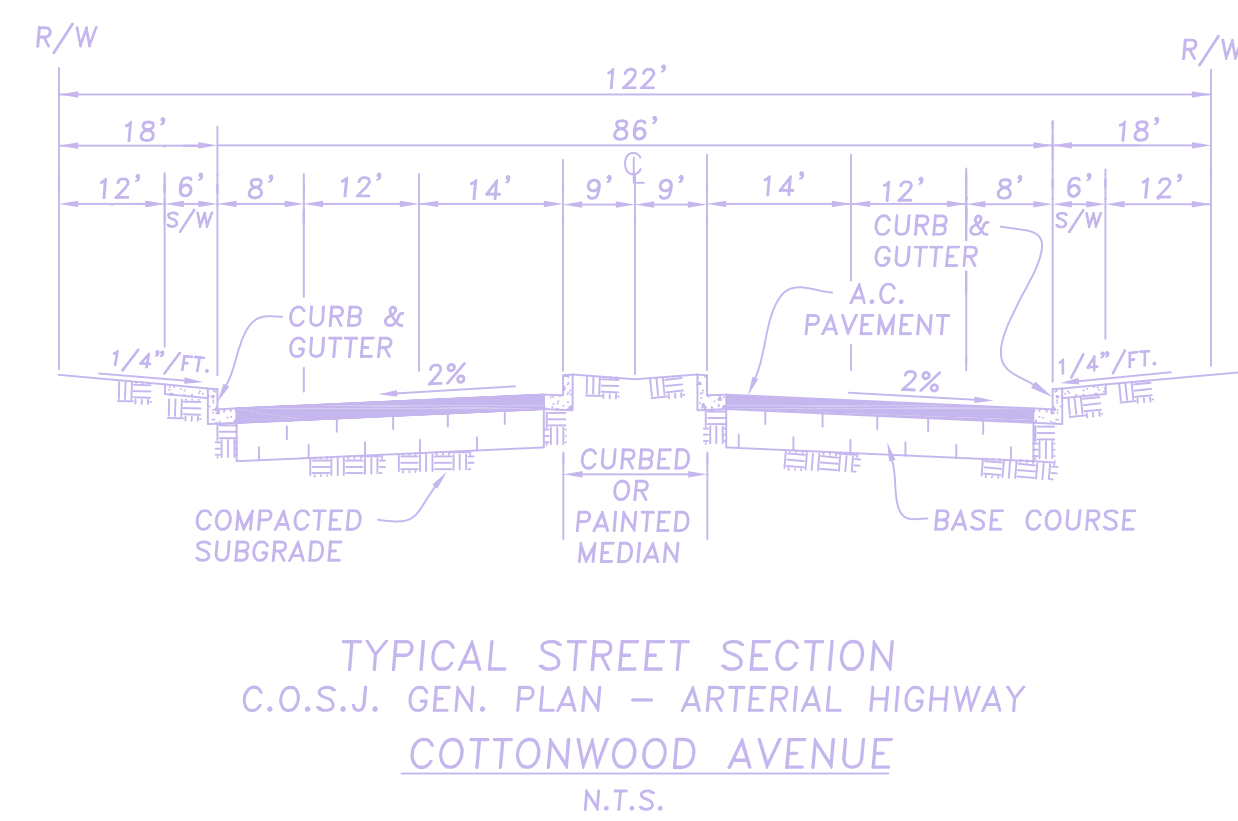
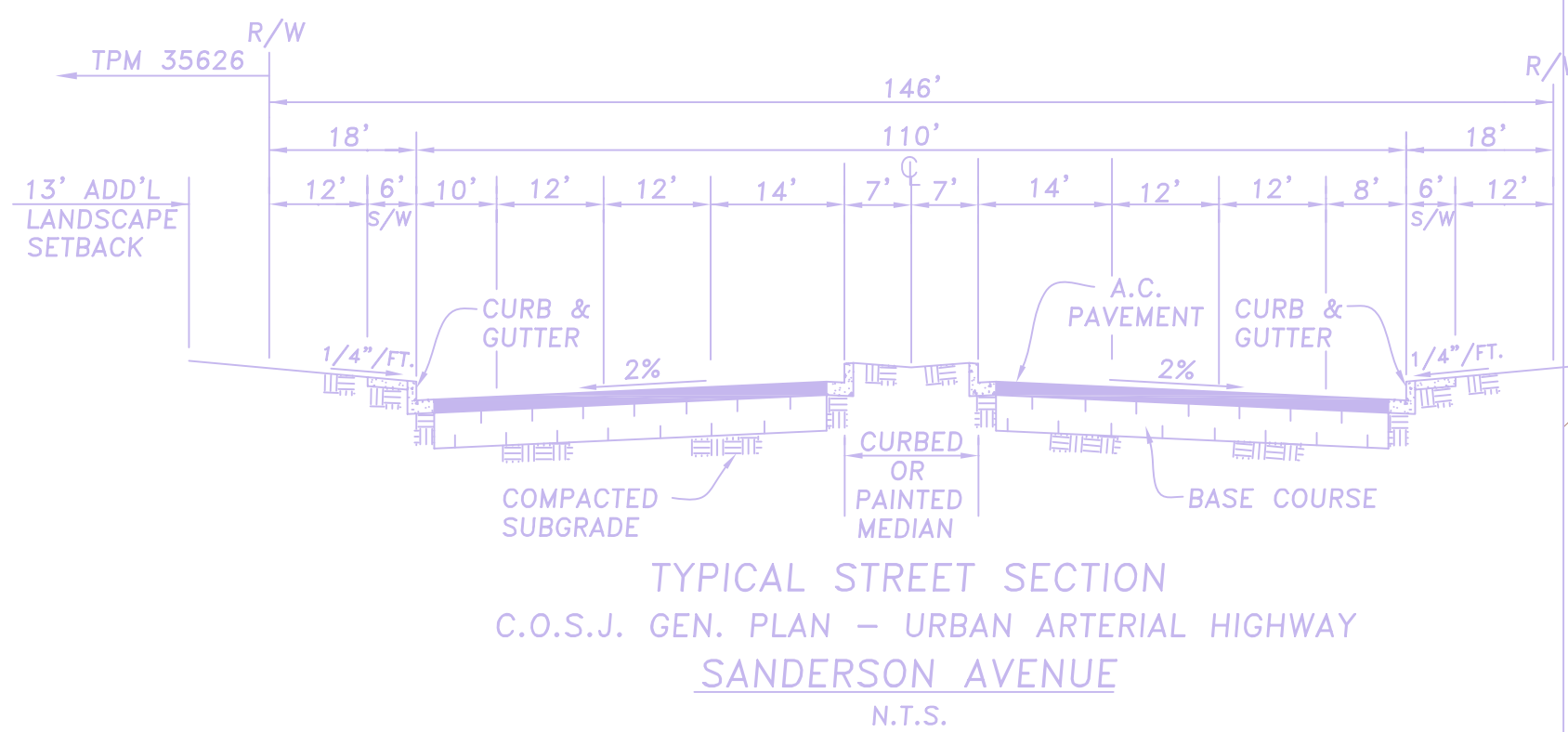
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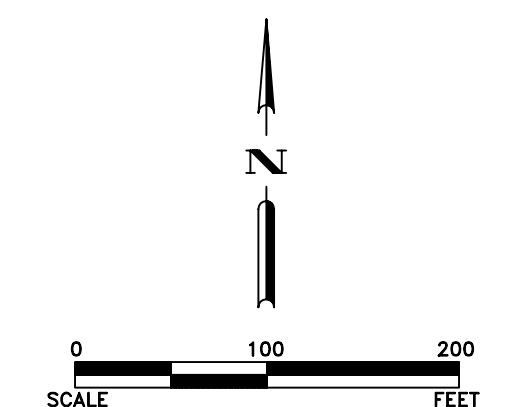
Figure No. 3

Map of the project site location in San Jose, California. The map shows the intersection of Ramona Avenue and Cottonwood Avenue. The project site is located at the intersection of Ramona Avenue and Cottonwood Avenue. Other streets shown include Warren Avenue, Esplanade Avenue, Menlo Avenue, Florida Avenue, State Avenue, San Jacinto Street, Main Street, and Dr. Brinton Street. A north arrow is located in the top right corner.

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APPENDIX A

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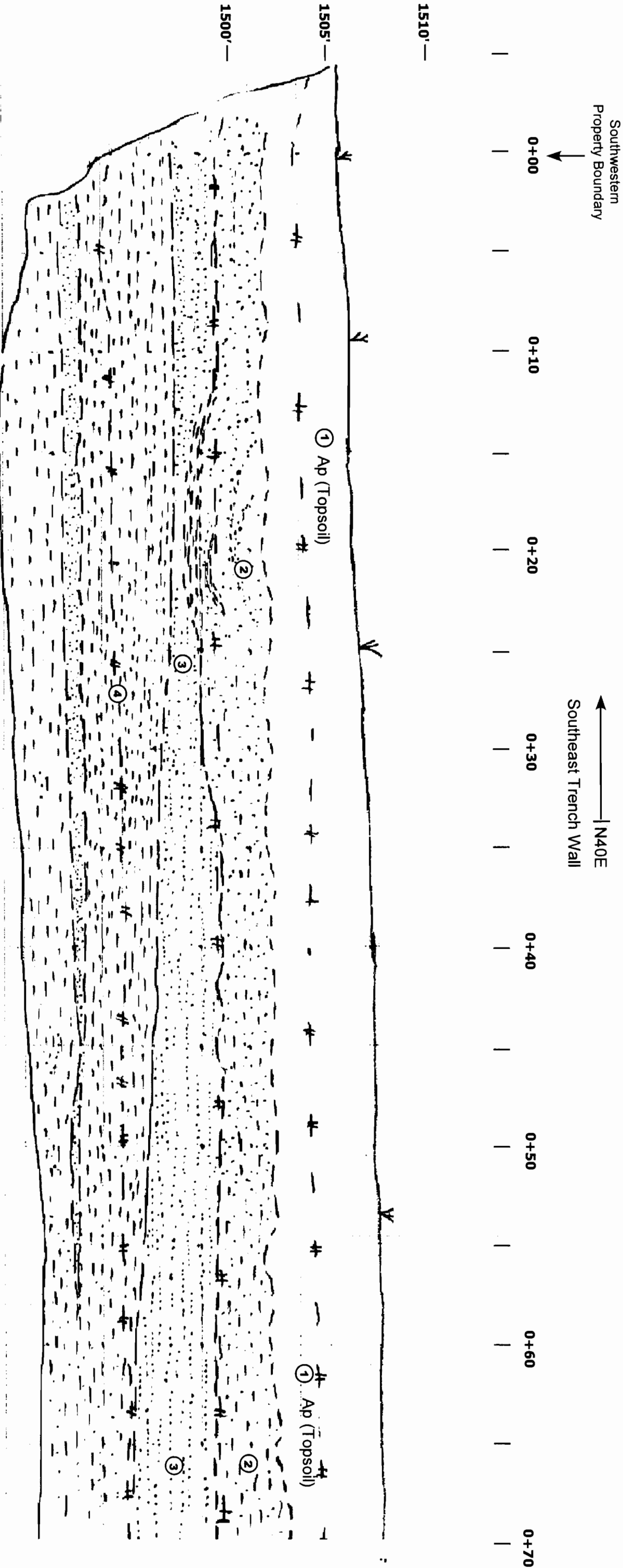
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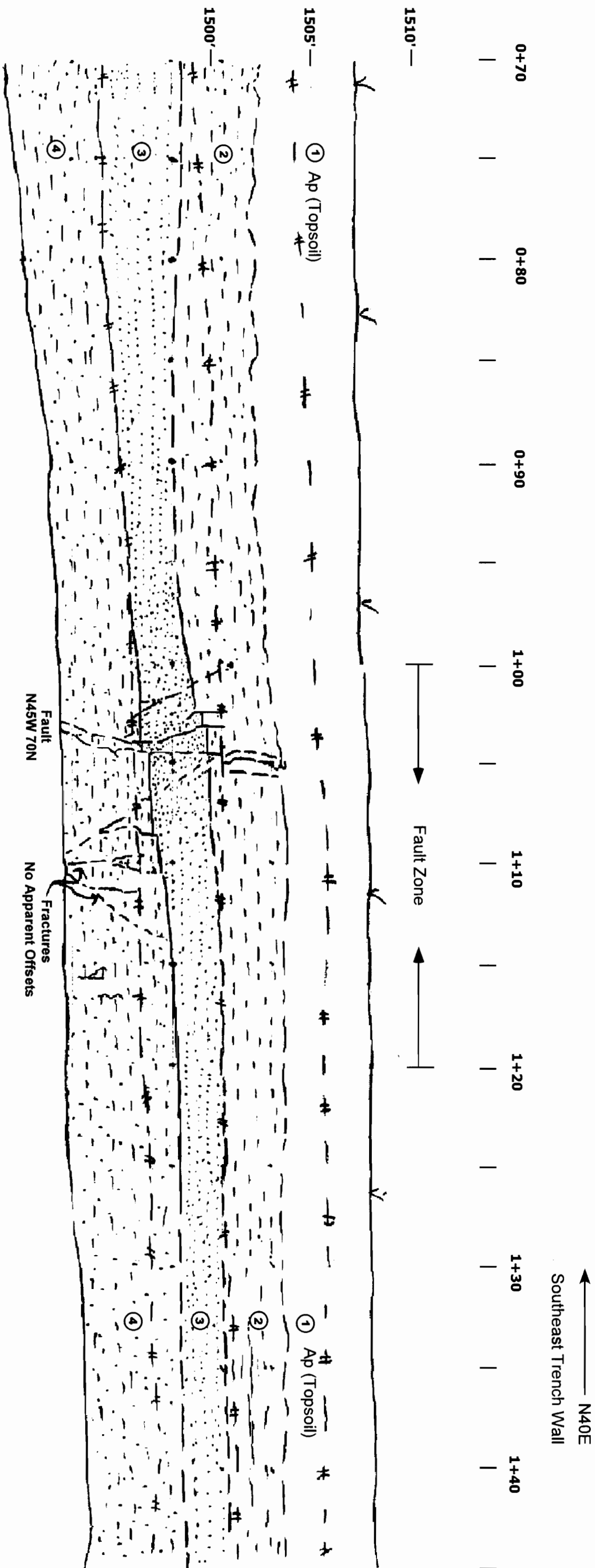




Geologic Unit Descriptions

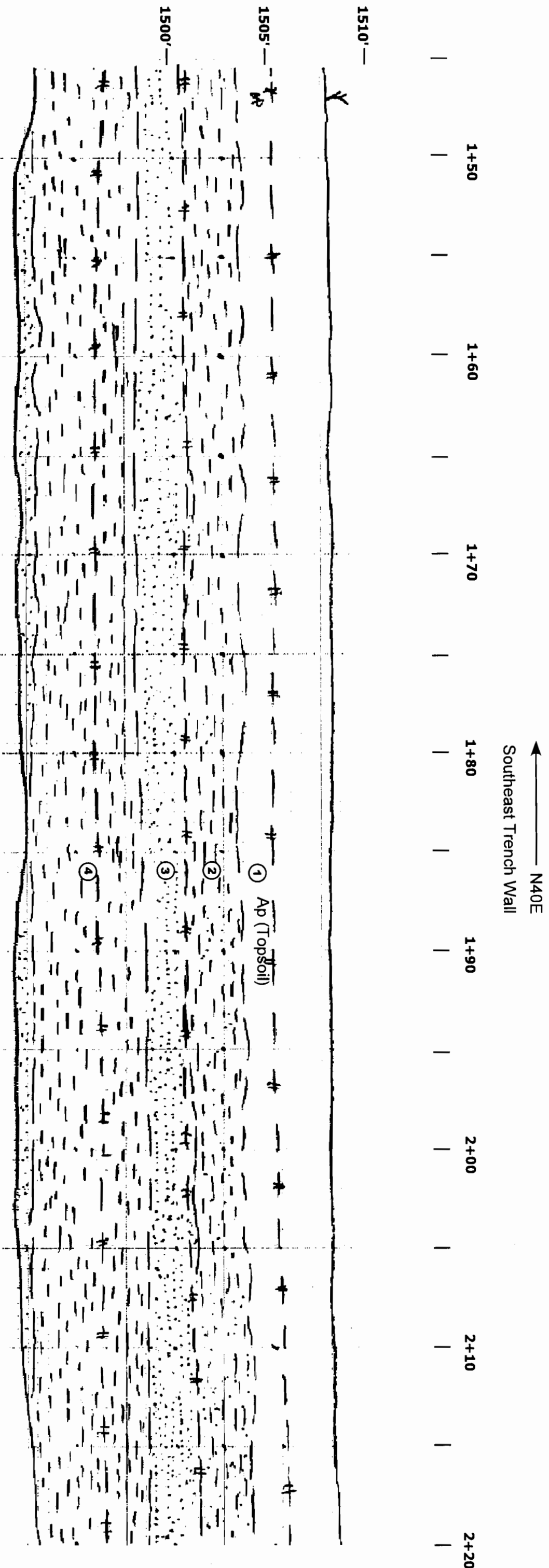
- 1) Modern Topsoil (Ap), light brownish gray (10YR6/2d), Silty SAND, dry, loose to medium dense, massive, common pinhole pores and rootlets, included tilled zone
- 2) Quaternary-age Alluvium, gray to light gray (10YR 6-7/1d), Silty SAND, dry loose, massive with localized crossbedded channel fill.
- 3) Quaternary-age Alluvium, light gray (10YR7/1d), medium SAND, dry, loose, laminated.
- 4) Quaternary-age Alluvium, gray (10YR6/1d), fine sandy SILT and Silty SAND, dry to damp, medium dense, local sandy interbeds and clayey silt zones.

Log of Trench FT-1
Cottonwood Commons Fault Investigation
Riverside County, California



See Sheet 1 for Unit Descriptions

Log of Trench FT-1
Cottonwood Commons Fault Investigation
Riverside County, California



See Sheet 1 for Unit Descriptions

Log of Trench FT-1
Cottonwood Commons Fault Investigation
Riverside County, California

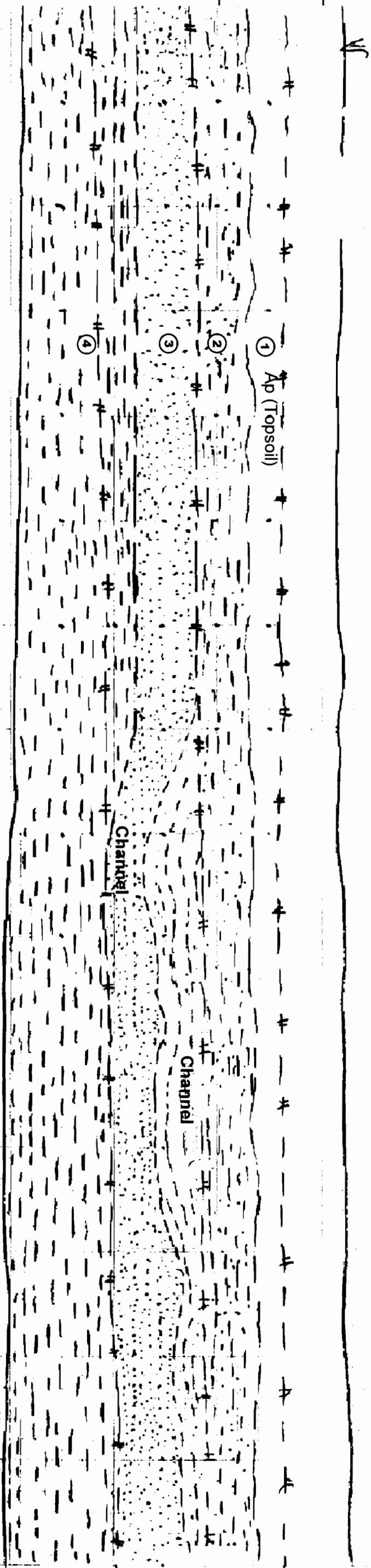
Project No. 601977-001
Scale 1"=5' Drafted By MSB
Engr./Geol. MSB Date October, 2007



2+20 2+30 2+40 2+50 2+60 2+70 2+80 2+90

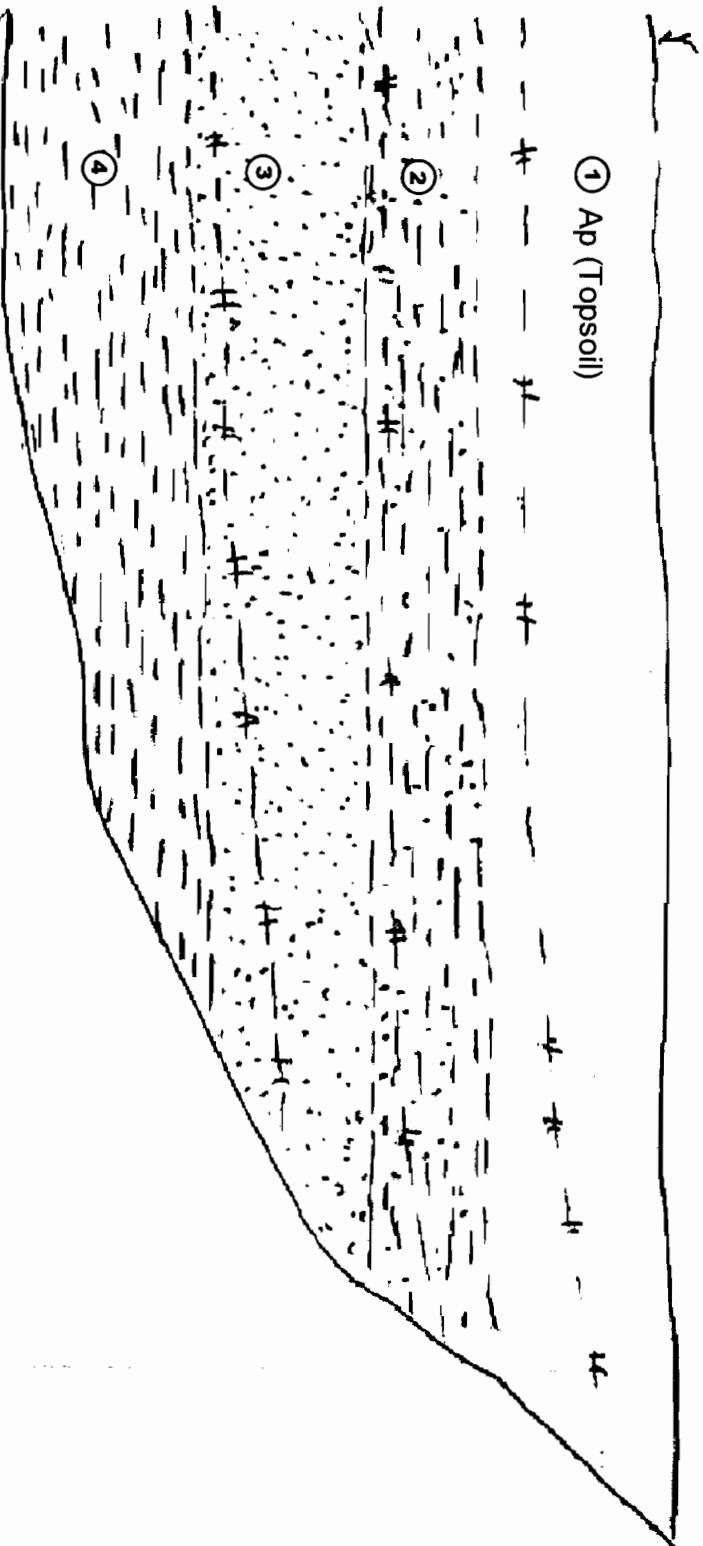
1505'—

1500'—



→ N40E
Southeast Trench Wall

3+00 3+10 3+20 3+30



See Sheet 1 for Unit Descriptions

Log of Trench FT-1
Cottonwood Commons Fault Investigation
Riverside County, California

Project No. 601977-001
Scale 1"=5' Drafted By MSB
Engr./Geol. MSB Date October, 2007



SUMMARY OF FIELD DENSITY TESTS

Test No.	Test Date	Test Of	Location	Lot #	Test Elev (ft)	Soil Type	Dry Density		Moisture (%)		Relative (%)		Remarks
							Field	Max	Field	Opt.	Compaction	Compaction	
1	8/23/07	CF	FT-1										
2	8/23/07	CF	FT-1	STA 3+15	-12.0	MD1	110.9	122.0	12.5	11.0		91	
3	8/23/07	CF	FT-1	STA 2+80	-14.0	MD1	111.5	122.0	13.0	11.0		91	
4	8/23/07	CF	FT-1	STA 2+50	-18.0	MD1	109.6	122.0	11.5	11.0		90	
5	8/23/07	CF	FT-1	STA 1+60	-16.0	MD1	112.6	122.0	11.9	11.0		92	
6	8/23/07	CF	FT-1	STA 3+00	-10.0	MD1	109.9	122.0	11.3	11.0		90	
7	8/23/07	CF	FT-1	STA 2+00	-10.0	MD1	111.7	122.0	12.1	11.0		92	
8	8/24/07	CF	FT-1	STA 1+40	-12.0	MD1	109.8	122.0	11.6	11.0		90	
9	8/24/07	CF	FT-1	STA 0+80	-14.0	MD1	110.4	122.0	11.4	11.0		90	
10	8/24/07	CF	FT-1	STA 0+25	-16.0	MD1	112.3	122.0	12.1	11.0		92	
	8/24/07	CF	FT-1	STA 0+50	-10.0	MD1	110.7	122.0	11.1	11.0		91	



Project Number: 601977-001
 Project Name: COTTONWOOD
 Project Location: SAN JACINTO
 Client: PAC CENT HOMES



Leighton

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name: PCH COTTONWOOD Tested By : JAP Date: 8/22/07
 Project No.: 601977-001 Input By : JMB Date: 8/22/07
 Boring No.: FT-1 Depth (ft.) 10.0
 Sample No. : BULK-1
 Soil Identification: (SP-SM), BROWN POORLY GRADED SAND WITH SILT.

Preparation Method:



Moist



Dry



Mechanical Ram



Manual Ram

Mold Volume (ft³) 0.03340

Ram Weight = 10 lb.; Drop = 18 in.

Moisture Added (ml)	100	150	200	250		
TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	6135	6259	6323	6283		
Weight of Mold (g)	4265	4265	4265	4265		
Net Weight of Soil (g)	1870	1994	2058	2018		
Wet Weight of Soil + Cont. (g)	135.8	158.4	147.5	161.2		
Dry Weight of Soil + Cont. (g)	128.0	146.4	134.2	144.3		
Weight of Container (g)	22.0	22.0	22.0	22.0		
Moisture Content (%)	7.4	9.6	11.9	13.8		
Wet Density (pcf)	123.4	131.6	135.8	133.2		
Dry Density (pcf)	115.0	120.0	121.4	117.0		

Maximum Dry Density (pcf) 122.0 Optimum Moisture Content (%) 11.0

PROCEDURE USED



Procedure A

Soil Passing No. 4 (4.75 mm) Sieve
 Mold : 4 in. (101.6 mm) diameter
 Layers : 5 (Five)
 Blows per layer : 25 (twenty-five)
 May be used if + #4 is 20% or less



Procedure B

Soil Passing 3/8 in. (9.5 mm) Sieve
 Mold : 4 in. (101.6 mm) diameter
 Layers : 5 (Five)
 Blows per layer : 25 (twenty-five)
 Use if + #4 is >20% and +3/8 in. is 20% or less



Procedure C

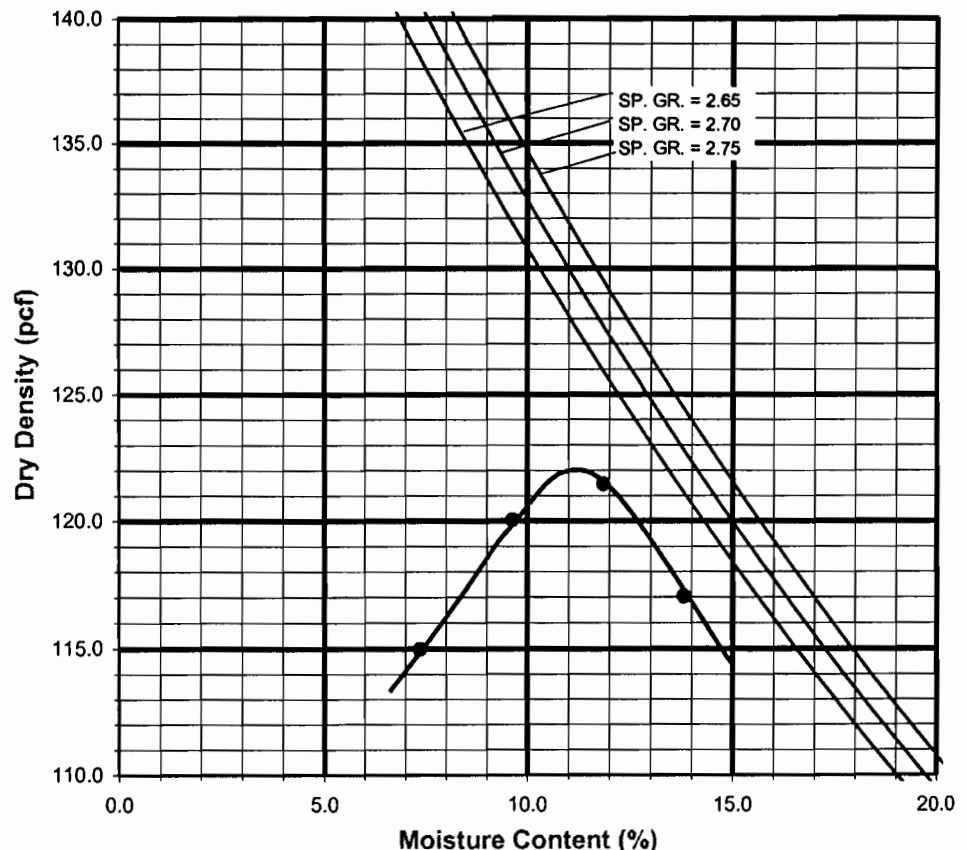
Soil Passing 3/4 in. (19.0 mm) Sieve
 Mold : 6 in. (152.4 mm) diameter
 Layers : 5 (Five)
 Blows per layer : 56 (fifty-six)
 Use if +3/8 in. is >20% and +3/4 in. is <30%

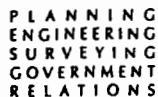
Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI





2900 Adams Street
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Riverside, CA 92504
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(951) 352-8269 FX

**HUNSAKER
& ASSOCIATES**
IRVINE, INC.
INLAND EMPIRE REGION

PROJECT: COTTONWOOD COMMONS SHEET

TRACT: TEL. PARCEL # 35626

JOB FILE#: 070917.DCA

P/D # 00345

W.O.#

SHEET 1 OF 1

DATE 9-17-07

PC RINALDOCH WRIGHT

CH

SURVEY OF:

ASBUILT GEOTECH (LEIGHTON) ASSOC

LATH MARKINGS FRONT LINE: GRADING LIMITS

U'ly TR BOM J

#10069

PPH 1976047E

SET TACKED 1"X2" NUB W/ WIRE FLAG
N 591853.308

E 1770276.264

LA 1505.311

SURVEY NOTES

A hand-drawn geological cross-section diagram. A dashed line labeled "EXCAVATION LIMITS" runs diagonally from the upper left to the lower right. To the left of this line, there are two points labeled "110005" and "110004". To the right of the line, there are several points labeled "110006", "110007", "110001", "110002", "110003", and "110000". A dashed line labeled "FAULT LINE" runs diagonally from the lower left to the upper right, intersecting the excavation limits line. At the bottom right, there is a horizontal line labeled "ENLWD" with an arrow pointing to the right.

8000
FD 1 1/2" x 3" WTHC
BCE #1211C PU 1784
N 591364 953
E 1770260.178
GAL. 1507.121

VAULT

SET SCRIBED "X" @ S/E
FOR CONC VAULT STRG.
UP. UP 1 = FLOOR.

N 591348.095 E 1770262.63
ALEV=1508.865

LAT 33-47-22.83334N

TREATMENT PLANT - LONK 117-00-25.03620W

$$EUP_{WT} = 1392.721$$

ECOTTONWOOD AVE

PER TRANSMISSION SET
2725-2
DAY/INSTRUMENT
SNA FACULTO TRACT.

H:\00345\Survey\In\Topo

070917.DCA

9-17-07

TR.Cottonwood

Commons

Asbuilt Fault Line

NAD 83

	1927 STATE PLANE N.	E.	NAVD 29 ELEV.		LAT.	LONG.
802CHK	589160.94	1778233.69	1520.09	462 Aerial Target		
10000	591700.43	1770158.77	1505.72	99 Note #	N 33-47-26.23082	W 117-00-26.32326
10001	591714.54	1770145.36	1506.20	99 Note #	N 33-47-26.36944	W 117-00-26.48336
10002	591728.97	1770158.01	1505.59	99 Note #	N 33-47-26.51310	W 117-00-26.33472
10003	591713.93	1770172.43	1505.55	99 Note #	N 33-47-26.36535	W 117-00-26.16257
10004	591555.75	1769990.84	1506.26	99 Note #	N 33-47-24.78750	W 117-00-26.30051
10005	591579.58	1769967.60	1507.09	99 Note #	N 33-47-25.02157	W 117-00-28.57793
10006	591839.69	1770194.20	1504.19	99 Note #	N 33-47-27.61101	W 117-00-25.91545
10007	591808.91	1770229.04	1504.90	99 Note #	N 33-47-27.30902	W 117-00-25.50000
VAULT	591348.09	1770267.63	1508.87	461 Control Pt		
10008	591364.95	1770260.20	1507.12	460 Mon		
10009	591853.31	1770276.26	1505.31	461 Control Pt		

PER RIVERSIDE COUNTY RAMP MAP 4S, 1W, SW