SOILS ENGINEERING, INC.

GEOLOGICAL HAZARD REPORT

For

PROPOSED SCHOOL SITE

Portion of Section 17, T29S, R29E
Southwest of Paladino Drive and Masterson Street
Bakersfield, California

Prepared For:

Bakersfield City School District
1501 Feliz Drive
Bakersfield, CA
Attention: Robert Van Tassel

File No. 19-17179

Prepared By:

Soils Engineering, Inc.
4400 Yeager Way
Bakersfield, CA. 93313

October 2019

SOILS ENGINEERING, INC.

October 31, 2019

File No. 19-17222

Bakersfield City School District
1501 Feliz Drive
Bakersfield, CA 93307

Attention: Mr. Robert Van Tassel

Subject: Geological Hazard Study for
Proposed School Site
Southwest of Paladino Drive and Masterson Street
Bakersfield, California

Dear Mr. Van Tassel:

In accordance with your request and authorization, Soils Engineering, Inc. (SEI) has performed a Geological Hazards Study for the above described subject property in Bakersfield, California (site). This study was conducted in compliance with the California Code of Regulations, Title 24, and Chapters 16, 18 and 33 of the 2019 California Building Code.

Our Geological Hazards Assessment indicates that there is a low probability for liquefaction to occur during a major earthquake at the site. The maximum peak ground acceleration at the site would be 0.608g with a 2% chance of exceedance every 50 years. The computer-modeling program Eqsearchwin estimated that a ground motion of 0.391g occurred at this site from a 6.1 magnitude earthquake (aftershock) on the White Wolf Fault in 1952. The site-specific design acceleration values to be utilized for the proposed improvements should be 0.696g for short periods (S_{Ds}) and 0.431g for the 1 second period (S_{D1}). The seismic design category is a D for both short and 1-second periods per the new 2019 CBC.

No active faults have been identified on this site in multiple fault trenches, but an AP Zone (Earthquake Fault Zone) is present in the far eastern portion of the site as shown on Plate 2A.

In the event of a major earthquake, there is a very low potential for rock falls or landslides to impact the site. The site is located outside of the potential flood zone of an upstream disaster (dam failure). The estimated amount of total dynamic settlement that would occur at this site during a major earthquake is estimated at 0.27" to 0.35" and the differential settlement is 0.137" to 0.173" which appears to be acceptable. Expansion potential appears to be moderate at this site. Hydrocollapse potential appears to be low to moderate and the regional subsidence potential should not be an issue at this site requiring any special mitigation or requirements.

SEI recommends that the school buildings be located outside of the AP Zone as an additional precaution.

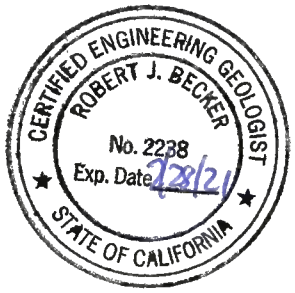
No additional geological assessment or remedial action is recommended.

The accompanying report is an instrument of service of ***Soils Engineering, Inc.*** The report summarizes our findings and relates our opinions with respect to the potential for geological hazards to affect the site. Note that our findings and opinions are based on information that we obtained on given dates, through records review, site review, and related activities. It is possible that other information exists or subsequently has become known, just as it is possible for conditions we observed to have changed after our observation. No other warranty expressed or implied is made.

Please contact Soils Engineering, Inc. at (661) 831-5100 if you have any questions concerning this report.

Sincerely,
SOILS ENGINEERING, INC.

Robert J. Becker
P.G. 5076, CEG 2238, Expires 2/28/21



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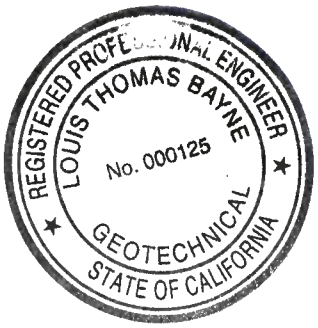

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SOILS ENGINEERING, INC.

GEOLOGICAL HAZARD STUDY

For

Proposed School Site

Southwest of Paladino Drive and Masterson Street

Bakersfield, California

October 2019

1.0 Introduction

Soils Engineering, Inc. (SEI) has conducted a Geological Hazards Study of a proposed Bakersfield City School District school site located southwest of the intersection of Paladino Drive and Masterson Street (Site) in Bakersfield, California (see Location Map, Plate 1). The central site location coordinates are approximately 35.4109° north latitude and -118.8818° west longitude. The following is an Executive Summary of the investigation conducted between August 19 and October 31, 2019.

A site reconnaissance was conducted on August 19, 2019 by SEI personnel consisting of walking the property and evaluating the surrounding geological features. The site area is partially graded land with dirt street areas and moderate weed growth (see Plate 2 for a Plot Plan). The proposed improvements to the Site will consist of a proposed elementary school with multiple buildings, play fields and parking areas. Paladino Drive is the northern border, Masterson Street is the eastern border, Panorama Drive is the southern border and residential is present to the west

2.0 Geology and Hydrology

2.1.1 Geologic Setting

The site is relatively flat with a gentle slope to the south-southwest with surface elevations similar to adjacent properties and road surfaces. The project site rests on mainly Older Alluvium non-marine terrace sediments (Qoa) on geologic maps within the southern portion of the San Joaquin Valley. In the northeastern corner of the site is a small area of the Kern River formation (TQkr) consisting of semi-consolidated sand, silt, gravels and cobbles. See attached Geologic Map (Plate 2A) as interpreted from on-site soil boring logs and fault trenches along with the Bakersfield Sheet of the Geologic Map of California (Smith, Department of Conservation Division of Mines and Geology (CDMG), 1964).

The far eastern portion of the site area is located within an Alquist-Priolo (AP) Special Studies Earthquake Fault Zone with one (1) surface fault splay shown on the Oil Center Quadrangle AP Map within the site area (see Plates 2, 2A and 3A). This inferred fault trace was mapped by Bartow & Doukas in 1976 on the site as cutting "Pleistocene Alluvium". Other surface faults were mapped in the adjacent Sections 16 to the east and Section 9 to the northeast following the July 21, 1952 Arvin-Tehachapi earthquake (magnitude 7.5), which was attributed to the northeast-southwest

trending White Wolf fault approximately 16.2 miles southeast of the site area. This major earthquake in July 1952 caused surface ruptures along multiple northwest-southeast trending faults. Other active faults within 50 miles include: the Edison Fault which is located approximately 7 kilometers southeast of the site; the Kern Front Fault, approximately 14.5 kilometers to the northwest; the White Wolf Fault, approximately 26.1 kilometers to the southeast; Pleito Trust, approximately 47.4 kilometers to the southwest; the Garlock (West) Fault, approximately 56.7 kilometers to the southeast; the San Andreas Fault (various segments) approximately 65.7 kilometers to the west, southwest; the Big Pine Fault, approximately 66.5 to the southwest, the San Gabriel Fault approximately 77.5 kilometers away and the Garlock Fault (East) approximately 79 kilometers to the east. The Seismic Hazard Atlas maps of the Rio Bravo Ranch and the Oil Center Quadrangles show the local faults and geology in the area (Plate 3). Nearby active faults are shown on the 2010 Fault Activity Map of California (CDMG, 2010) within the general area of the site (Plate 5A) and on the EQFault California Fault Map (Plate 5).

2.1.2 Regional Faults

A brief description of the major regional faults within 50 miles of the site is included below:

White Wolf Fault

The White Wolf fault is located about 16.2 miles southeast of the site. It traverses the southeastern end of the San Joaquin Valley from Wheeler Ridge to just northeast of Caliente (over 33 miles long). The White Wolf fault is generally believed to be a high angle reverse fault with a left-lateral component. It is possible that the White Wolf fault might be part of a larger right-lateral fault system which includes the Breckenridge and Kern Canyon faults (Ross, 1986). Data from oil wells in the North Tejon area indicate total vertical displacement to be approximately 10,000 feet. The average slip rate of the fault is estimated to be between 3 and 8.5 mm/yr. The average recurrence interval between major ruptures is unknown (Southern California Earthquake Data Center, 2002). On July 21, 1952, the well-known Kern County earthquake occurred as a result of movement along the White Wolf fault. The initial shock was a 7.7 magnitude event with the epicenter near Wheeler Ridge, about 29 miles south of the site. The ground ruptured discontinuously along most of the length of the fault with a maximum vertical displacement of about 3 feet. Following the initial earthquake, 19 aftershocks of magnitude 5.0 or greater occurred from July 21, 1952 through August 22, 1952. Surface ruptures associated with these events appear to have occurred in the adjacent Sections 16 to the east and Section 9 to the northeast.

San Andreas Fault

The San Andreas fault, located about 40.8 miles southwest of the property, extends from the Gulf of California to at least as far north as Cape Mendocino. It has a northwest-southeast trend parallel to the crest of the Coast Ranges. This fault has been active in Historic time along this entire length. Movement along this fault is right-lateral, with the western block (Pacific Plate) being displaced northerly in relation to the eastern block (Continental Plate). The average slip rate of the fault is estimated to be between 20 and 35 millimeters per year (mm/yr) and the average recurrence interval between major ruptures is estimated at 140 years (Southern California Earthquake Data Center, 2002). In 1857 the historic "Fort Tejon" earthquake occurred along the San Andreas fault

with an estimated magnitude of at least 7.9. Ground rupture occurred along the fault over a distance at least 200 miles with the maximum right-lateral displacement of approximately 30 feet. Destruction was total in the Fort Tejon area approximately 5 miles north of the fault.

Pond-Poso Creek Fault

The Pond-Poso Creek fault extends in a northwesterly direction from the Sierra Nevada foothills east of Bakersfield to north of the Kern-Tulare County line. It is an active fault which trends to within about 8 miles to the north of the site. It has a length of approximately 45 miles. Work in the Pond area by Fugro, Inc. (1974) indicates 9 inches of displacement along its trace at a depth of 10 feet, 35 feet at a depth of 250 feet, and approximately 1,000 feet at the top of the Acoustic Basement. It is a normal fault, downthrown to the southwest, and dips at about 70 degrees. Repairs to county roads crossing the trace of the fault indicate that creep movement is occurring on the fault.

Kern Front Fault

The Kern Front fault extends in a northerly direction starting approximately 1-mile northeast of the old Kern County Airport (Meadows Field) in northern Bakersfield, extending north near Poso Creek. It is an active fault, which lies about 9 miles northwest of the site. It has a length of approximately 6 miles. It is a normal fault, downthrown to the west. Repairs to county roads crossing the trace of the fault indicate that creep movement is occurring on the fault, likely from oil withdrawal in the area.

Breckenridge-Kern Canyon Fault System

The Breckenridge-Kern Canyon fault system is located in the southern Sierra Nevada mountains about 17 miles east of the site. It trends northerly from the south end of Walker Basin to north of Mount Whitney, a distance of almost 100 miles. It is a high angle fault system with a total vertical displacement of probably as much as 4,000 feet. Basement rock correlations indicate right-lateral offset of up to 15 kilometers (Ross, 1986). Latest surface movement on the Kern Canyon segment was more than 3.5 million years ago (Norris and Webb, 1976). However, historic seismic activity attributed to this system suggests that it may be active at depth. A publication of the California Division of Mines and Geology (Jennings, 1994a) shows a band of accurately located earthquake epicenters associated with the fault system. Fault investigations in the area of the Lake Isabella Dam has verified that this fault is active.

Sierra Nevada Fault

The Sierra Nevada fault is located about 51 miles east of the site. It intersects the Garlock fault near the southern end of the Sierra Nevada Mountains and shows a vertical displacement of more than 10,000 feet (Norris and Webb, 1976). It trends northerly along the eastern face of the mountain range. Evidence for active fault movement consists of recent escarpments in alluvium and damage in an abandoned aqueduct tunnel along the trace of the fault. The average slip rate of the fault is estimated to be less than 1 mm/yr. The average recurrence interval between major ruptures is uncertain (Southern California Earthquake Data Center, 2002).

Garlock Fault
The Garlock fault is situated about 35 miles southeast of the site. The Garlock fault extends for a distance of about 150 miles to the northeast from its intersection with the San Andreas fault by the town of Lebec. An apparent offset of dike swarms along the zone indicates left-lateral displacement of as much as 40 miles (Smith, 1962). The average slip rate of the fault is estimated to be between 2 to 11 mm/yr. and the average recurrence interval between major ruptures is estimated to be between 200 and 3000 years (Southern California Earthquake Data Center, 2002).

Big Pine Fault
The Big Pine fault is located about 41.3 miles south of the site. It joins the San Andreas just east of Cuddy Valley and has been mapped for a distance of approximately 50 miles in a southwesterly direction. Poyner (1960) suggests left-lateral displacement of approximately 12 to 15 miles. Surface rupture in 1852 was attributed to movement at the eastern end of the Big Pine fault. However, more recent data indicate that the rupture reported in 1852 was probably caused by landslides (Southern California Earthquake Data Center, 2002). The average slip rate of the fault is estimated to be between 1 to 4 mm/yr. (Southern California Earthquake Data Center, 2002). Stream offsets of up to 3,000 feet during Quaternary time have been estimated (Norris and Webb, 1976).

Pleito Fault
The Pleito thrust fault, located about 29.5 miles south of the site, delineates the northern base of the San Emigdio Range at the south edge of the San Joaquin Valley. It extends from Live Oak Canyon east of Interstate Route 5 to two miles west of Pleito Creek, a distance of approximately 18 miles. It dips at a low angle to the south beneath the San Emigdio Range. The Pleito fault was recognized as a south dipping thrust fault of probable low angle dip by Hoots (1930), who also postulated displacement of 10,000+ feet along the fault. South of Wheeler Ridge, the average recurrence interval for moderate to large earthquakes has been estimated to be about 500 years (Hall, 1987). Hall (1984) estimated an average uplift rate of 0.5 mm/yr.

San Gabriel Fault
The San Gabriel fault, located about 48.2 miles south of the site, is unconformably overlapped by the Pliocene age Hungry Valley formation. The fault may extend to the northwest at depth. From the point of surface exposure, it can be traced for about 90 miles to the southeast. It is a right-lateral fault with a displacement of 21 miles since Miocene time. Vertical displacement is as much as 14,000 feet (Norris and Webb, 1976). The San Gabriel fault shows evidence of Quaternary displacement (Jennings, 1975), but apparently has not been active in Holocene time (Norris and Webb, 1976). The average slip rate of the fault is estimated to be between 1 and 5 mm/yr. The average recurrence interval between major ruptures is unknown (Southern California Earthquake Data Center, 2002).

2.2 Surface Lithology
Earth materials identified in multiple onsite soil borings conducted by SEI in 2003 and recently in 2019, and fault trenches conducted by SEI in 2004 and 2019, consisted generally of intervals of Silty Sand (SM), Sandy Silt (ML), Clayey Sand (SC) and semi-consolidated Poorly- and Well-

Graded Sands (SP & SW) with intervals of abundant cobbles (conglomerates, GW) in the top 50 feet below ground surface (bgs). These soils are classified as SM, ML, SP, SW and GW, respectively, in the Unified Soils Classification System. Top soil and fill material were encountered in the top 1' to 2' in the trenches and borings. Older alluvium as Silty Sand (SM)/Sandy Silt (ML) and Clayey Sand (SC) with some cobbles was encountered beneath the top soil zone. In the northeastern portion of the site (borings B-20 and B-21, and portions of fault Trench FT1) a semi-consolidated Clayey Sand (SC) or Sand (SP) with cobbles were encountered near the surface which is believed to be part of the Kern River formation (QTkr). See Plate 2B for Geologic Cross-sections from SEI borings conducted across the site. See attached boring logs and trench logs in Appendix B for more subsurface detail.

2.3.1 Previous On-Site Fault Investigation

SEI previously conducted a study to determine the presence of active faulting that included the site area in 2004 for the future "City in the Hills" development. In SEI's report titled "Preliminary Geological Hazard Study for the City in the Hills Project", dated June 28, 2004 (Prelim Geohaz Report) and Addendum #1 to the Prelim Geohaz Report dated April 5, 2005, it is stated that SEI conducted 15 exploratory trenches (T1 to T15) across the eastern portion of the City in the Hills development area. Eight (8) of these trenches (T1, T3, T4, T5, T10, T11, T12 and T13) were located within the eastern portion of the subject site to evaluate the AP Zone on-site. SEI also reviewed available pertinent published and unpublished data and did a geological analysis of the assembled data to produce the Prelim Geohaz Report.

SEI's findings from the Prelim Geohaz Report and Addendum #1 are stated below:

"Our preliminary Geological Hazards Assessment indicates that there is a low probability for liquefaction to occur during a major earthquake at the site and that the maximum peak ground acceleration at the site would be 0.250g for a 7.2 magnitude earthquake on the White Wolf Fault approximately 25.6 kilometers away. The Design-Basis Earthquake ground-motion for this site is estimated at 0.325g for alluvium with a 10 percent chance of exceedance every 50 years and a statistical return period of 475 years. The computer-modeling program Eqsearchwin estimated that a ground motion of 0.393g occurred at the site from a 6.1 magnitude earthquake on the White Wolf Fault in July 1952. The proposed structures should be built to withstand this magnitude of an earthquake. The northeastern corner of the site is within an Alquist-Priolo Earthquake Fault Zone. No areas of potential surface faulting were confirmed in the 15 fault trenches conducted at the site and no setbacks within this AP zone are recommended."

See Plates 2A and 6B for the location of the fault trenches conducted by SEI in 2004.

See Appendix B for the main portions (text & plates) of the Preliminary Geohazard Report and Addendum #1 to this report.

2.3.2 Current On-Site Fault Investigation

To further investigate the inferred fault traces on and directly adjacent to the site area, SEI conducted two (2) additional Fault Investigation trenches (FT1 and FT2) just east of the proposed building locations as shown on Plate 2A. Fault Trench FT1 was located in the northeastern portion of the site beginning approximately 80' south and 270' west of the northeast corner of the site. Trench FT1 proceeded approximately 640' in a South 32° West trend from a former dirt pile area to within 50' of some of the proposed school buildings as shown on Plate 2A. The depth of trench FT1 ranged from 7' to 8' deep and cut through top soil and fill (former dirt pile areas) in the top 1' to 2' and then older alluvium and into the Kern River formation (QTkr). The older alluvium consisted of silty sand (SM)/sandy silt (SM) with some gravel and cobbles present. The Kern River formation consists of semi-consolidated silty sand (SM) and sand (SW) with common cobbles grading to conglomerate in some areas. Some zones of white caliche were present within this trench. No obvious signs of faulting were observed along the course of this trench. See attached Trench FT1 profile in Appendix B for more detail.

Fault trench FT2 was located in the southeastern portion of the site beginning approximately 200' north and 280' west of the southeast corner of the site. Trench FT2 proceeded approximately 320' in a South 40° West trend from within a field area to within 50' of some of the proposed school buildings as shown on Plate 2A. The depth of trench FT2 ranged from 7' to 8' deep and cut through top soil in the top 1' to 2' and then older alluvium to the depth of the trench. The older alluvium consisted of silty sand (SM)/sandy silt (SM) with some gravel and cobbles present. Some zones of white caliche were present within this trench. No obvious signs of faulting were observed along the course of this trench. See attached Trench FT2 profile in Appendix B for more detail.

2.3.3 Other Nearby Historical Geologic Investigations

The following are summaries of geological investigations conducted by others in the vicinity of the site.

Investigation by Bruer and Others

Surface ruptures were mapped by Bruer and others (1952) after the 1952 Kern County earthquake. Some of these ruptures, trend northwest-southeast within adjacent Sections 9 and 16, but were not mapped within Section 17. Bruer and others (1952) mapped "Group A" fissure which Bruer (1952) defined as "fissures which apparently cannot be explained by simple slumping, surface settling, or fracturing by 'ground roll' alone at boundaries of different types of ground surfaces; probably closely related to subsurface movement." The map by Bruer and others (1952) is at a scale of 1:62,500. Bruer (1952) notes that the detail and accuracy of the field investigation varied depending on land access, work by road crews and farmers that obliterated evidence of some of the ruptures, available time, etc. Therefore, the accuracy of the mapped location of the surface ruptures is uncertain. Bruer (1952) discussed many of the individual ruptures and also included 31 photographs of ruptures. According to Bruer (1952) some of the areas had been recently plowed obscuring surface features including Section 17.

Investigation by Bartow & Doukas
Bartow & Doukas (1976) and Bartow (1981) prepared a geologic map of the "Geology of the Lamont, Edison, Oil Center and Rio Bravo Ranch Quadrangles". On this map potential faults were identified traversing across portions of the site within Section 17 that "cuts Kern River Formation" or "cuts Pleistocene Alluvium".

Investigation by T.C. Smith
Smith (1984) prepared a Fault Evaluation Report (FER-145) of the "Faults East of Bakersfield, Kern County" that had previously been zoned as AP Earthquake Fault Zones (EFZs), including the surface ruptures mapped by Bruer and others (1952) and the potential faults identified by Bartow & Doukas (1976), Bartow (1981) and Wood and Dale (1964). Smith (1984) noted that the ruptures in the vicinity of the site were first observed after the initial earthquake of July 21, 1952 and before the large aftershock of July 29, 1952. Smith (1984) indicated that the ruptures may have been associated with more than one earthquake.

Multiple scarps and tonal lineaments were mapped by Smith (1984) within portions of Section 16 just east of the site area as shown on Plate 6A. In Figure 2B of FER-145 Smith (1984) has a note that the potential faults of Bartow and Doukas (1976) within the site area "Cuts Pleistocene Alluvium". Most of these off-site fault locations are similar to what Bruer mapped in 1952. See Plate 6A for some of these historical geologic maps which include the site area.

No other site-specific investigations were found on file with the State Geologist at the time of this investigation. Multiple geologic investigations within Section 16 to the east of the site were reviewed as part of this investigation (Park & Smith, and Smith and Gutcher 1975 to 2004).

2.4 Hydrology

Unconfined Aquifer - The depth to the unconfined aquifer as shown on maps prepared by the Kern Water Agency, and dated Summer 2012, is interpreted as >200 feet below the ground surface (see Plate 4). Due to lack of data in the area a more accurate depth to water is not possible.

Perched Water, Ground Water or Seepage - No perched water levels beneath the site are shown on groundwater maps dated Summer 2011 (Kern County Water Agency). Subsurface layers of clay comprise a partial aquiclude to the penetration of seepage from surface sources.

Groundwater Quality - Maps prepared by the Kern County Water Agency, dated March 1997 do not have any data for the site area.

3.0 Seismic and Fault Hazards

3.1 Seismic History

There have been a number of historic earthquakes that may have affected the Bakersfield area. The following is a short summary of the major known events:

- 1/9/1857 - Fort Tejon Earthquake- San Andreas Fault, Estimated Magnitude 8.2+, 30 feet of slippage over a 200 mile area, widespread damage.

- 7/21/1952 - Arvin/Tehachapi - White Wolf Fault, Magnitude 7.7, Extensive damage to buildings and highways.

- 8/22/1952 - Bakersfield Quake (Aftershock of Arvin/Tehachapi) - 6 miles ESE of Bakersfield, Magnitude 5.8. Closest aftershock to Bakersfield causing extensive damage to already weakened buildings.

The State Alquist-Priolo Map for the Oil Center Quadrangle shows one (1) inferred surface fault on-site (Plate 3A). The Kern County Seismic Hazard Zone Atlas Map of the Oil Center Quadrangle does not show any faults within the site area (Plate 3).

SEI utilized the software program EQSEARCHWIN version 3.0 (Thomas F. Blake) to evaluate historical earthquakes in the area of the site over the last 200 years. The Earthquake Epicenter Map (Plate 3B) shows earthquake magnitudes and the epicentral distance from the site. The majority of the seismic activity in the area of the site has been along the White Wolf Fault and the San Andreas Fault. The closest earthquake of at least 5.0 magnitude to the site was 4.2 kilometers away, at a magnitude of 6.1 in July 1952. The largest magnitude earthquake within 100 miles was 7.9 on the San Andreas Fault in 1857. The largest estimated site acceleration is 0.391g from the 6.1 magnitude earthquake (aftershock) on the White Wolf Fault in 1952. The EQSEARCHWIN estimation of Peak Acceleration from California Earthquake Catalogs Table, Earthquake Recurrence Curve, Earthquake Epicenter Map and a graph of the Number of Earthquakes (N) above Magnitude (M) are presented in Attachment A.

3.2 Seismic Evaluation

The site is located in the Oil Center Quadrangle within the Northeastern ¼ of Section 17, Township 29 South, Range 29 East and the far eastern portion is within an Alquist-Priolo special study zone (see Plate 3A, AP Fault Map). Local faults and general geology are shown on the Rio Bravo Ranch & Oil Center Quadrangles Seismic Hazard Atlas Maps prepared for the Kern County Council of Governments (Plate 3).

According to the Kern County Seismic Atlas maps the Edison Fault is located approximately 7 kilometers southeast of the site. The nearest major active fault, as indicated by the computer-modeling program EQFault version 3.0, is the Kern Front Fault, approximately 14.5 kilometers to the northwest. Other major faults include: the White Wolf Fault, approximately 26.1 kilometers to the southeast; the Pleito Trust, approximately 47.4 kilometers to the southwest; the Garlock (West) Fault, approximately 56.7 kilometers to the southeast; the San Andreas Fault (various segments) approximately 65.7 kilometers to the west, southwest; the Big Pine Fault, approximately 66.5 to the southwest, and the San Gabriel Fault approximately 77.5 kilometers away. Regional

faults in relation to the site location are presented on Plate 5A and are from the 2010 Fault Activity Map of California (CDMG, 2010).

3.2.1 Historical Aerial Photo Review

SEI has reviewed historical aerial photos for the site area to interpret geological features. This included aerial photos for the years 1952, 1956, 1975, 1981, and 1990. A few potential lineaments trending to the north-northwest were identified near the eastern portion of the site in some of the older aerial photos. These potential fault lineaments on or near the site area correspond to some of the geologic features identified historically by Bartow & Doukas (1976), Bartow (1981), Smith (1984) and Bruer (1952). Interpretation of aerial photos and surface reconnaissance by others historically in the vicinity of the site are shown on Plate 6A. Unmarked copies of the 1952, 1956, 1975, 1981 and 1990 aerials are included in Appendix B.

3.3 Seismic Design Values

In accordance with the 2019 California Building Code (CBC) the Site Class for the site is a D (Stiff Soil). Based on this information the following seismic design data has been determined for the site location utilizing the latest Seismic Design Mapping program (OSHPD) and interpolation of values.

The seismic design values tabulated below are based on the new 2019 California Building Code (CBC). The Site Class for the proposed project was determined using standard penetration test data obtained at the site and documented in the attached Logs of Borings. The eastern portion of the site is located within an Alquist-Priolo (earthquake fault) Special Study Zone.

SEISMIC DESIGN CRITERIA		VALUE	SOURCE
Risk Category		III	2019 CBC Table 1604.5 or 1604*A*.5
Site Class		D	2019 CBC § 1613.2.2 or 1613*A*.2.2; ASCE 7-16 Table. 20.3-1; Site Specific Soils Report
Mapped MCE_R Spectral Response Acceleration, short period	S_S	0.923g	SEAOC-OSHPD software; 2019 CBC Figure 1613.2.1(1)
Mapped MCE_R Spectral Response Acceleration, at 1-sec. Period	S_1	0.328g	SEAOC-OSHPD software; 2019 CBC Figure 1613.2.1(2)
Site Coefficient	F_a	1.131	SEAOC- OSHPD software; 2019 CBC Table 1613.2.3(1) or 1613*A*.2.3(1)
Site Coefficient	F_v*	1.97*	2019 CBC Table 1613.2.3(2) or 1613*A*.2.3(2)
Adjusted MCE_R Spectral Response Acceleration, short period, $F_a * S_s$	S_{MS}	1.044g	SEAOC- OSHPD software; 2019 CBC § 1613.2.3 or 1613*A*.2.3
Adjusted MCE_R Spectral Response Acceleration, 1-sec. period, $F_v * S_1$	S_{M1}*	0.646*	2019 CBC § 1613.2.3 or 1613*A*.2.3
Design Spectral Response Acceleration, short period, 2/3 * S_{MS}	S_{DS}	0.696g	SEAOC- OSHPD software; 2019 CBC § 1613.2.4 or 1613*A*.2.4
Design Spectral Response Acceleration, 1-sec. period, 2/3 * S_{MI}	S_{D1}*	0.431*	2019 CBC § 1613.2.4 or 1613*A*.2.4

SEISMIC DESIGN CRITERIA		VALUE	SOURCE
Peak Ground Acceleration for Max. Considered Earthquake (MCE_G)	PGA	0.398g	SEAOC- OSHPD software; ASCE 7-16 Fig 22-9
Site Coefficient, F_{PGA} = 1.202, F_{PGA}* PGA	PGA_M	0.478g	SEAOC- OSHPD software; ASCE 7-16 § 11.8.3.2
Mapped Risk Coefficient at 0.2 second Spectral Response Period	C_{RS}	0.925	SEAOC- OSHPD software; ASCE 7-16 Figure 22-18A
Mapped Risk Coefficient at 1 second Spectral Response Period	C_{R1}	0.923	SEAOC- OSHPD software; ASCE 7-16 Figure 22-19A
Seismic Design Category, short period		D	2019 CBC § 1613.2.5
Seismic Design Category, 1second period *		D*	2019 CBC § 1613.2.5
* *The project Structural Engineer shall confirm that a ground motion hazard analysis is not required in accordance with ASCE 7-16 § 11.4.8-Exception 2. The values tabulated above for S_{M1}, S_{D1}, and the Seismic Design Category/1-second period are based on the site coefficient, F_v, interpolated from 2019 CBC Table 1613.2.3(2) or 1613A.2.3(2). The use of that table is predicated on the above referenced Exception 2 being applicable for the site and the structure(s). The project Structural Engineer or designer shall confirm that the above referenced Exception 2 is applicable. Where the above referenced Exception 2 does not apply, the values for F_v, S_{M1}, S_{D1}, and for the Seismic Design Category/1-second period may not be applicable for the site and structure(s).*			
MCE_R = Maximum Considered Earthquake (risk targeted) MCE_G = Maximum Considered Earthquake (geometric mean)			

These values are in accordance with the new 2019 California Building Code (CBC). See OSHPD Seismic Design Results in Attachment A.

3.4 Possible Earthquake Effects

A number of active faults are located within a 50-mile radius of the subject site. To evaluate the affect a major earthquake might have on the site, the computer modeling program EQFaultwin vers. 3.0 (Thomas Blake) was utilized. Site-specific parameters were inputted, and the program computed the maximum peak site ground accelerations resulting from an earthquake. Because ground accelerations are based largely on fault distance and magnitude, we have focused our analysis on those faults which are close to the site, or that have large maximum credible magnitudes, or a combination of the two. The result of this analysis is presented below in Table A.

This analysis estimates that a maximum peak ground acceleration of 0.260g would be felt at the site as a result of a maximum earthquake of magnitude 7.3 on the White Wolf Fault approximately 26.1 kilometers away. A maximum probable earthquake of magnitude 6.3 on the Kern Front Fault would create a peak site ground acceleration of 0.233g at the site. A maximum probable earthquake of magnitude 8.0 on the San Andreas Fault would create a peak site ground acceleration of 0.153g at the site. See attached Deterministic Site Parameters for a full listing of computed

values for faults within a 100-mile radius of the site in Appendix A. Also attached is a California Fault Map showing nearby faults in relationship to the site (Plate 5).

TABLE A

FAULT	Approximate Distance (Km)	Maximum Earthquake Magnitude (Mw)	Maximum Peak Ground Acceleration (g)	Estimated Site Intensity (MM)
Edison Fault	7	<6.5	Unknown	Unknown
Kern Front	14.5	6.3	0.233	**IX**
White Wolf	26.1	7.3	**0.260**	**IX**
Pleito Thrust	47.4	7.0	0.141	VIII
Garlock (West)	56.7	7.3	0.118	VII
San Andreas (1857 Rupture and other segments)	65.7	7.4 to **8.0**	0.111 to 0.153	VII to VIII
Big Pine	66.5	6.9	0.085	VII
San Gabriel	77.5	7.2	0.088	VII

Deaggregated seismic source parameters were evaluated utilizing the USGS program Unified Hazard Tool. This resulted in a maximum considered earthquake (MCE) value of 0.608g and a 6.25 mean magnitude earthquake 19.06 kilometers away from the site based on 2% chance of exceedance every 50 years (see attached Plot results in Attachment A).

3.5 *Potential For Ground Rupture, Ground Shaking, Ground Failure*

Ground rupture may occur along an active fault trace in a major earthquake. Based on previous and current fault investigations no active fault traces have been confirmed on the site. Some ground shaking is likely at this site in the event of a major earthquake on one of the nearby faults. Based on the predicted maximum horizontal accelerations at the site and the soil types identified in this investigation significant ground failure is not likely to occur at this site.

3.6 *Potential for Earthquake-Induced Flooding*

The site is located in an area of limited surface waters and it is highly unlikely that flooding would occur at this site during a major earthquake. The Flood Insurance Rate Map indicates that this area of Bakersfield is in Flood Zone X, with minimal flooding expected in the site area. The site is located outside of the Lake Isabella Dam Failure Inundation area as shown on maps prepared by the US Army Corp of Engineers and included within Appendix B.

3.7 *Liquefaction Potential*

No shallow groundwater was encountered in any of the previous soil borings conducted to a maximum depth of 51' below ground surface. SEI reviewed historical groundwater conditions in this part of Bakersfield and it appears that the historic high groundwater data for the site would be >50' bgs. Based on this information and the dense subsurface material identified on-site liquefaction potential at this site is minimal.

3.8 *Slope Stability*

The site is located in an area with <0.5 percent slopes across the site. No bedrock outcrops are present within 1/2 mile of the site. No evidence of historic landslides or creep was observed in this area. There is a very low potential for rockfalls or landslides to impact the site in the event of a major earthquake. Overall the site appears to be stable.

3.9 *Settlement*

The estimated amount of dynamic settlement that would occur at this site during a major earthquake (7.9 magnitude) is approximately 0.27" (B-1) to 0.35" (B-6) based on the lithology encountered, the SPT blow counts recorded during sampling and the settlement analysis conducted on the deepest borings B-1 and B-6 sample data utilizing the program LiquefyPro. The estimated amount of differential settlement is 0.137" (B-1) to .173" (B-6) according to the program LiquefyPro. This amount of dynamic and differential settlement appears to be acceptable for the proposed site improvements. See attached Liquefaction Analysis Calculation Sheets and graphs for more detail in Appendix B.

3.10 Expansive Soil and Hydrocollapse Potential

Based on the lithology encountered in the top 10 feet in the soil borings it appears that moderately to highly expansive surface soils is present at this site. Five (5) expansion index tests were conducted on the top 6' of soil at the site with the results ranging from 37 to 59, indicating a moderate expansive potential. Consolidation tests were conducted on 5 soil samples with results ranging from -0.6% to 4% (B-8@3'). See Lab result Table in Attachment B for more detail.

3.11 Regional Land Subsidence Potential

The City of Bakersfield Safety Element includes a discussion on land subsidence potential in the Bakersfield area. The main causes of land subsidence are Tectonic Subsidence, Oil & Gas Fluid Extraction, Groundwater Withdrawal and Hydrocompaction of Moisture Deficient Alluvial Deposits. Figure 15 in the Safety Element shows the areas of significant subsidence within the

Bakersfield area. The project site is located outside of the area where the lowest amount of historic land subsidence has occurred and outside of the area of hydrocompaction as shown on attached Plate 7. In addition, the site is in an area where oil & gas activity is minor, agricultural use is not present and no public water wells are present nearby, so groundwater withdrawal appears to be limited. Based on this information it appears that regional subsidence should not be an issue at this site requiring any special mitigation or requirements.

4.0 High-Pressure Pipelines & Hazardous Materials

4.1 High-Pressure Pipelines

Based on the Oil Center and Rio Bravo Ranch Quadrangles topographic map, a visual survey of the surrounding area and interviews with local utility companies, no active high-pressure gas or crude oil, or water line pipelines appear to be present within 1500' of the site.

4.2 Hazardous Materials

Records were researched for the period circa 1940 to the present. No oil wells have been drilled directly adjacent to or on the site, itself. The Kern Bluff Oil Field is present approximately 2000' to the west and the Ant Hill Oil Field is present approximately 3200' to the southeast of the site borders. It appears unlikely that subsurface gases (methane, H_2S) from these nearby oil fields would impact the site area. See Plate 6 for the nearest oil wells. No potentially hazardous materials are suspected at this site.

5.0 Conclusions & Recommendations

Our Geological Hazards Assessment indicates that there is a low probability for liquefaction to occur during a major earthquake at the site. The maximum peak ground acceleration at the site would be 0.608g with a 2% chance of exceedance every 50 years. The computer-modeling program Eqsearchwin estimated that a ground motion of 0.391g occurred at this site from a 6.1 magnitude earthquake (aftershock) on the White Wolf Fault in 1952. The site-specific design acceleration values to be utilized for the proposed improvements should be 0.696g for short periods (S_{Ds}) and 0.431g for the 1 second period (S_{D1}). The seismic design category is a D for both short and 1-second periods per the new 2019 CBC.

No active faults have been identified on this site in multiple fault trenches conducted, but an AP Zone (Earthquake Fault Zone) is present in the far eastern portion of the site as shown on Plate 2A.

In the event of a major earthquake, there is a very low potential for rock falls or landslides to impact the site. The site is located outside of the potential flood zone of an upstream disaster (dam failure). The estimated amount of total dynamic settlement that would occur at this site during a major earthquake is estimated at 0.27" to 0.35" and the differential settlement is 0.137" to 0.173" which appears to be acceptable. Expansion potential appears to be moderate at this site. Hydrocollapse potential appears to be low to moderate and the regional subsidence potential should not be an issue at this site requiring any special mitigation or requirements.

SEI recommends that the school buildings be located outside of the AP Zone as an additional precaution.

No additional geological assessment or remedial action is recommended.

6.0 *Attachments*

6.1 Location Map- Plate 1, "Location Map" shows the location of the site with relationship to roads and land features.

6.2.1 Plot Plan - Plate 2, "PLOT PLAN" shows the location and lot configuration of the property.

6.2.2 Plate 2A, Geologic Map shows the site geology related to local topography, streets and nearby surficial features. Also includes the location of soil borings, fault trenches, and pits conducted at the site along with the active fault traces observed on-site.

6.2.3 Plate 2B, Geologic Cross-sections – Presents a cross-sections representing the surface and subsurface geology based on the soil borings and fault trenching conducted by SEI.

6.3.1 Seismic Atlas Map- Plate 3, Shows local geology and faults within the Rio Bravo Ranch & Oil Center Quadrangles near the site.

6.3.2 Plate 3A, Shows the site location in relation to the Alquist-Priolo Earthquake Faults in the area.

6.3.3 Plate 3B, Shows an Earthquake Epicenter Map produced by EQSEARCHWIN presenting the site location and magnitude and distance of earthquake epicenters.

6.4 Depth To Water Map - Plate 4, Shows depth to the unconfined aquifer in the area of the site.

6.5.1 Fault Location Map- Plate 5, Shows the site in relation to the nearest active faults within 100 miles based on the EQFault program.

6.5.2 Plate 5A shows the Regional Faults based on the 2010 Fault Activity Map of California, CDMG, 2010.

6.6.1 DOGGR Oil Well Map - Plate 6, shows the site in relation to the nearest oil wells.

6.6.2 Historical Geologic Maps – Plate 6A, shows geologic maps in the site area from historical geologic investigations.

6.6.3 Fault Investigation Trenches, City in the Hills - Plate 6B shows the location of the fault trenches conducted on-site in 2004 for the City in the Hills Project.

6.7 Regional Land Subsidence Map, Plate 7, shows the site in relation to areas with significant land subsidence and hydrocompaction.

6.8 Appendix A - Deterministic Site Parameters - EQFAULTWIN data determined for the site for faults within 100 miles. EQSEARCHWIN data concerning the distance and magnitude of earthquakes within 100 miles of the site is attached. OSHPD Seismic Design Summary Report is attached. USGS Unified Hazard Tool results are attached.

6.9 Appendix B – Fault Trench Logs FT1 and FT2, Boring Logs, the Lake Isabella Dam Inundation Map, the Flood Insurance Rate Map, LiquefyPro Results, Main Portions (text & plates) of the Preliminary Geohazard Report for the City in the Hills Project and Addendum #1 to this Report. Unmarked Aerial Photos are also attached.

7.0 *References*

- Water Supply Reports, Kern County Water Agency, Bakersfield, California, 1983 to 2017.
- USGS Quadrangle Maps, Lamont
- Smith, Arthur, California Division of Mines and Geology - Geologic Map of California-Bakersfield Sheet, 1964, Olaf P. Jennings Edition.
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- EQFaultwin, ver. 3.0, Thomas F. Blake;
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- EQSEARCHWIN, ver. 3.0, Thomas F. Blake
- LiquefyPro (version 5.9b), CivilTech Software.
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- Geolabs - West Lake Village, Grading Plan Review and Updated Seismic, Foundation, and Retaining Wall Design Criteria, Lot 38, Tract 6137-1, City of Bakersfield, California, dated April 4, 2008.
- Bruer, W.G., Earthquake Fissures in Central and Southwestern Kern County, California, 1952.
- Bartow J.A., & Doukas, M.P. (1976), USGS Open File Map 76-592, Geology of the Lamont, Edison, Oil Center and Rio Bravo Ranch Quadrangles.
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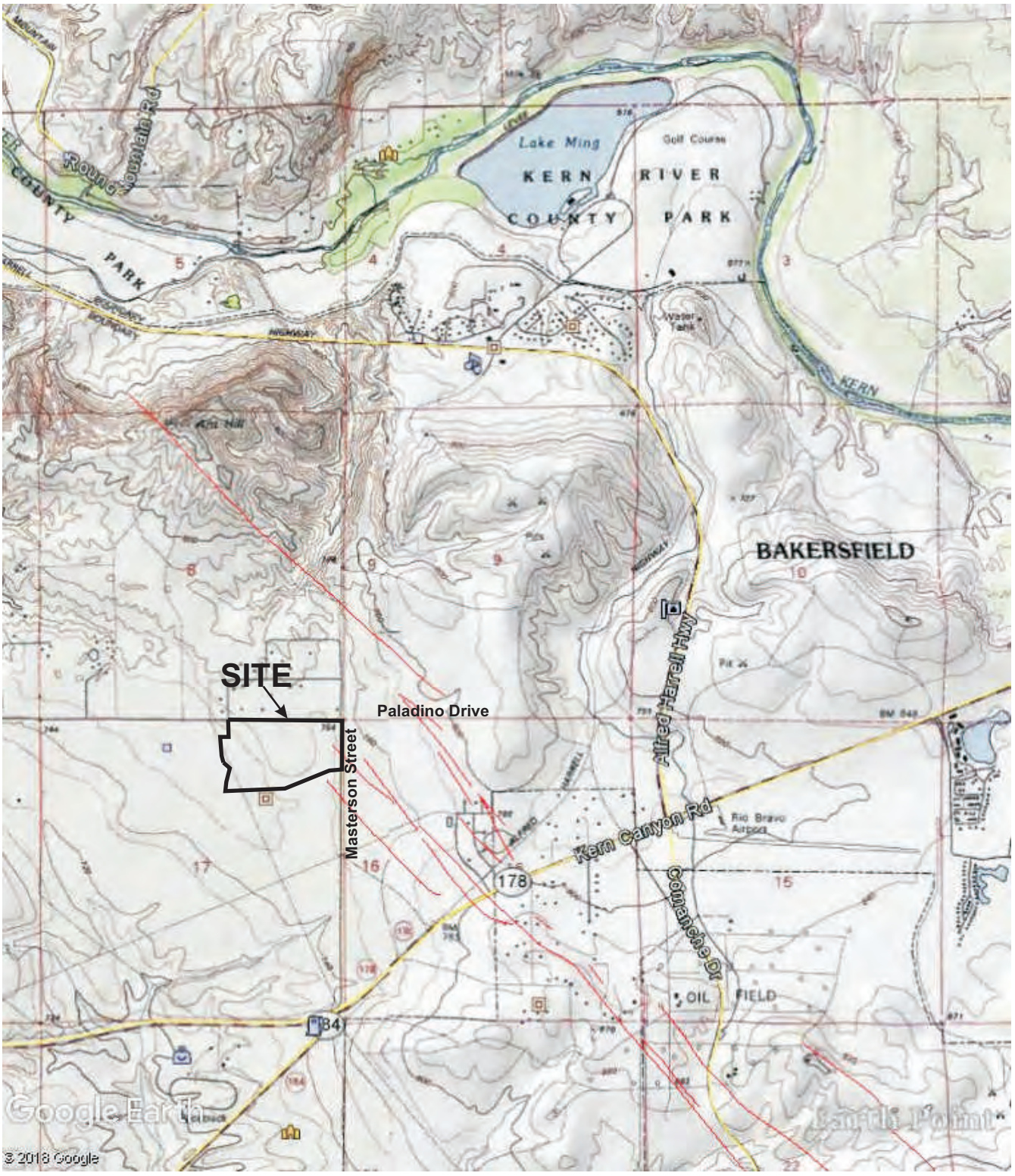
- Park and Smith, and Smith and Gutcher, Various fault investigation in the vicinity of the site, 1975 to 2004.
- Soils Engineering Inc., Preliminary Geologic Hazard Report, The City in the Hills Project, Portions of Sections 18 and 19 and all of Section 17, T29S, R29E, Bakersfield, CA, dated June 28, 2004.
- Soils Engineering Inc., Addendum #1 to Preliminary Geologic Hazard Report, The City in the Hills Project, Portions of Sections 18 and 19 and all of Section 17, T29S, R29E, Bakersfield, CA, dated April 5, 2005.



SOILS ENGINEERING, INC. **4400 Yeager Way** **Bakersfield, CA 93313** **(661) 831 - 5100** DATE: 10/19 PROJECT: #17179	**Proposed BCSD School Site** **SW of Paladino Drive and Masterson Street** **Bakersfield, CA** **LOCATION MAP**	**PLATE** **1**

SOILS ENGINEERING, INC.
4400 Yeager Way
Bakersfield, CA 93313
(661) 831 - 5100

DATE: 10/19
PROJECT: #17179

Proposed BCSD School Site
SW of Paladino Drive and Masterson Street
Bakersfield, CA

PLOT PLAN

PLATE
2

0 200’ 400’ 600’

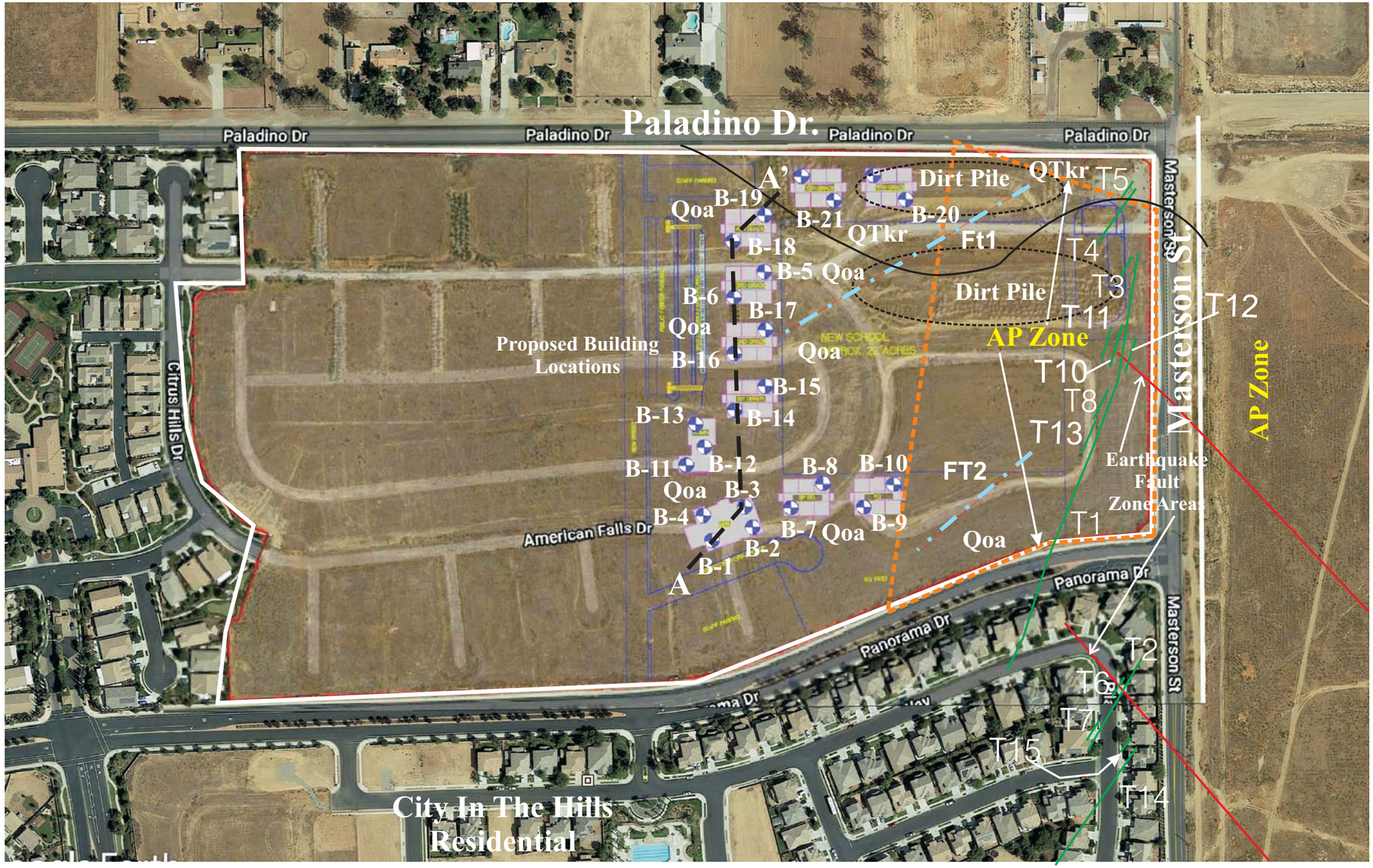
Scale

Qoa - Older Alluvium - Silty Sand, Clayey Sand, Sand with Gravel

QTkr - Kern River Formation - Silty Sand, Clayey Sand, Sand with Cobbles

A– – – – – – A’ Cross-Section Line (see Plate 2B)

N



SOILS ENGINEERING, INC. 4400 Yeager Way Bakersfield, CA 93313 (661) 831 - 5100 DATE: 10/19 PROJECT: #17179	Proposed BCSD School Site SW of Paladino Drive and Masterson Street Bakersfield, CA Geologic Map/Borings & Trenches	PLATE 2A

Legend

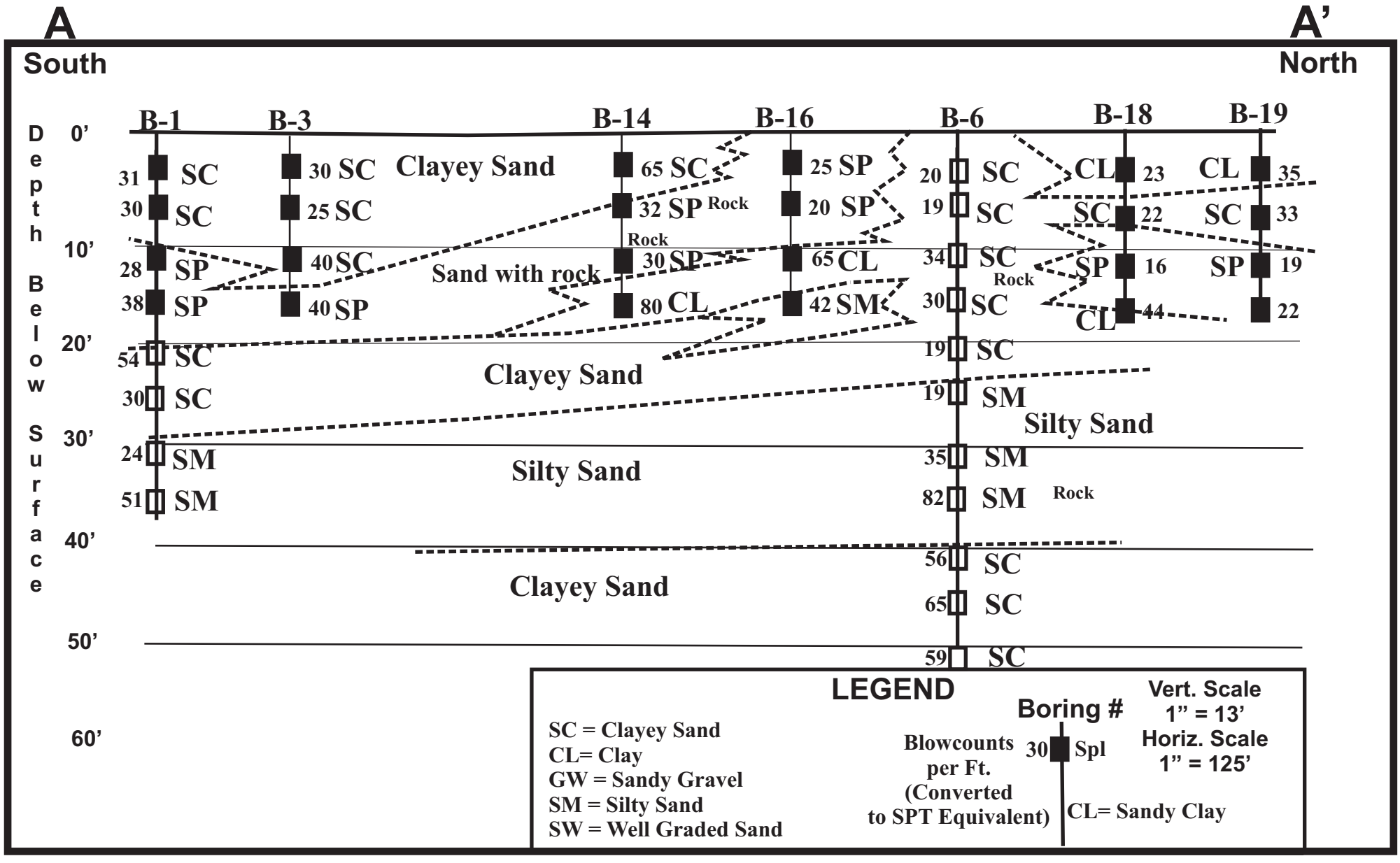
2019 FT# — Fault Invest. Trench

2005 T# — Fault Invest. Trench

Soil Boring

Approx. Location of AP Zone Border

Mapped AP Fault Traces



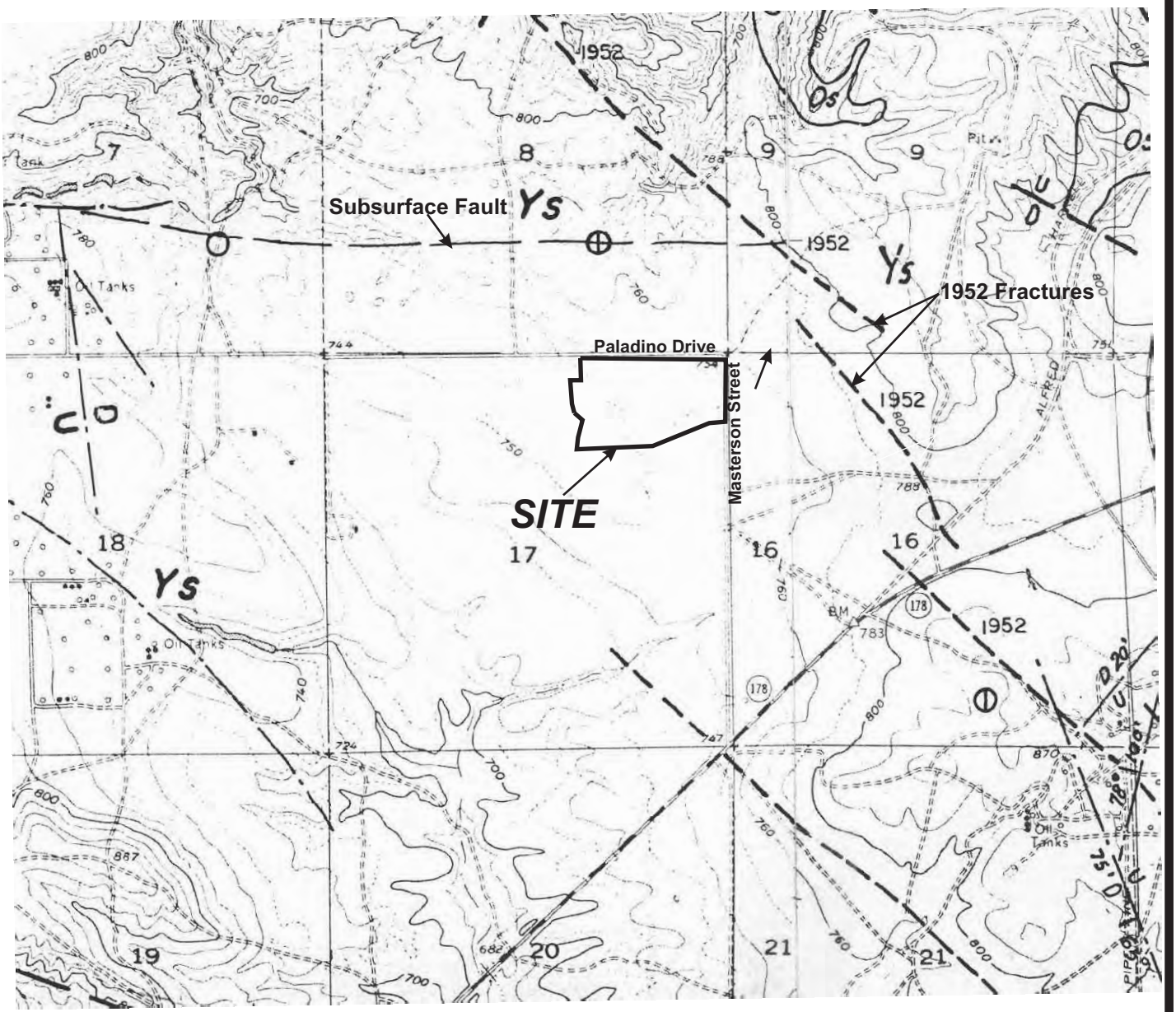
SOILS ENGINEERING
4400 Yeager Way
Bakersfield, CA 93313

File No. 19-17179
Date: 10/19

Proposed BCSD School Site
SW of Paladino Drive & Masterson Street
Bakersfield, CA

Geologic Cross-section A to A'

PLATE
2B



Ys = Young Sediments (Pleistocene and younger) *Os = Older Sediments (Pliocene and Older)*

Earthquake Epicenters (richter magnitude)
- 2.9 or less
- <3.0-3.9
- 4.0-4.9

Faults
- Surface Faulting (dashed when inferred)
- Subsurface Faulting

Shallow Water Zone (<20')

SOURCE: Rio Brvo Ranch & Oil Center Quadrangles, Seismic Hazard Atlas Map, Kern County Council of Govt.

SOILS ENGINEERING, INC.
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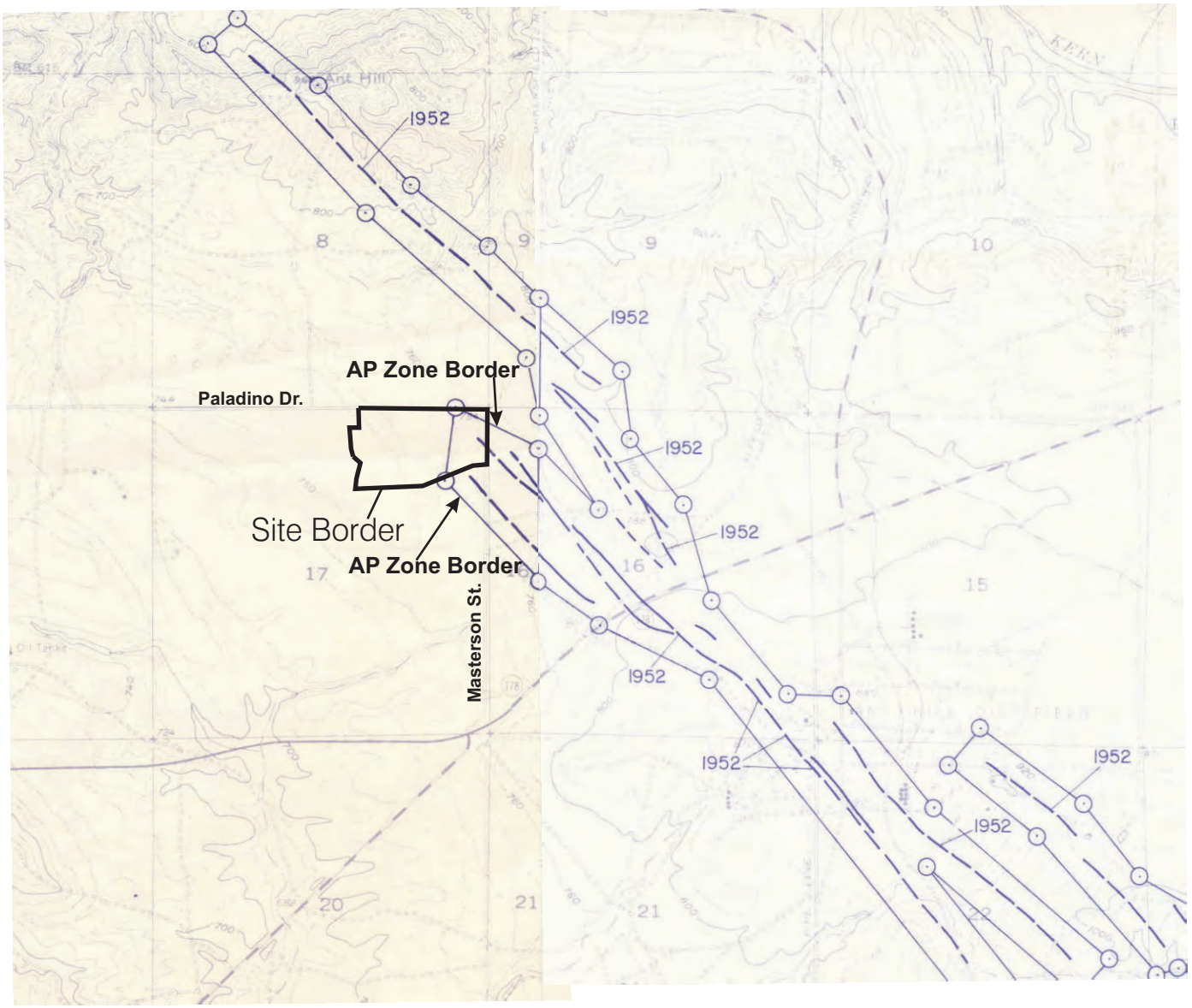
BAKERSFIELD, CA 93313

Proposed BCSD School Site
SW of Paladino Drive and Masterson Street
Bakersfield, CA

DATE: 10/19
PROJECT: #17179

Seismic Hazard Zone Atlas Map

PLATE
3



From: State of California Special Studies Zones, Rio Bravo Ranch Quadrangle & Oil Center Quadrangle, 1985

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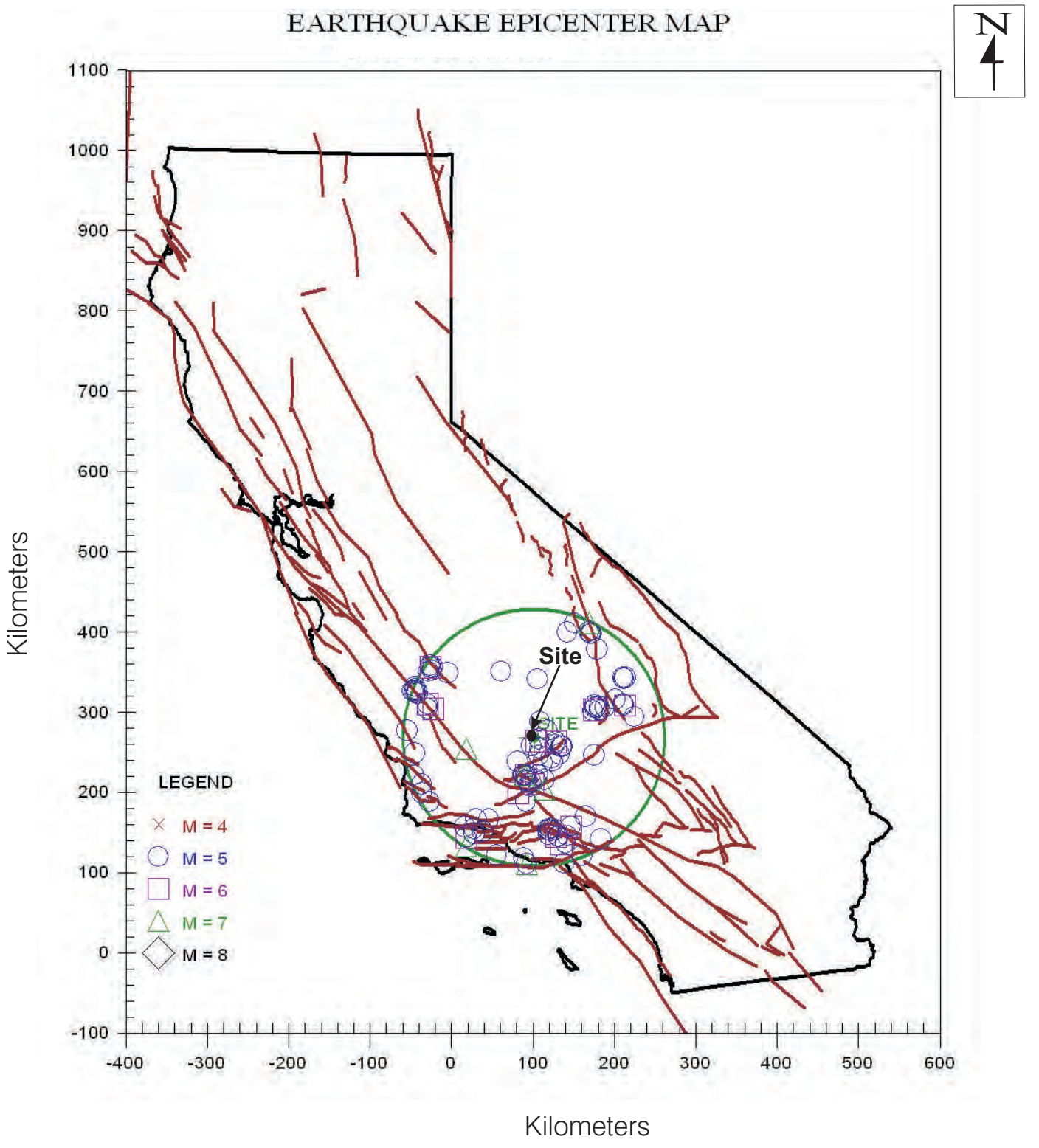
DATE: 10/19
PROJECT: #17179

Proposed BCSD School Site
SW of Paladino Drive and Masterson Street
Bakersfield, CA

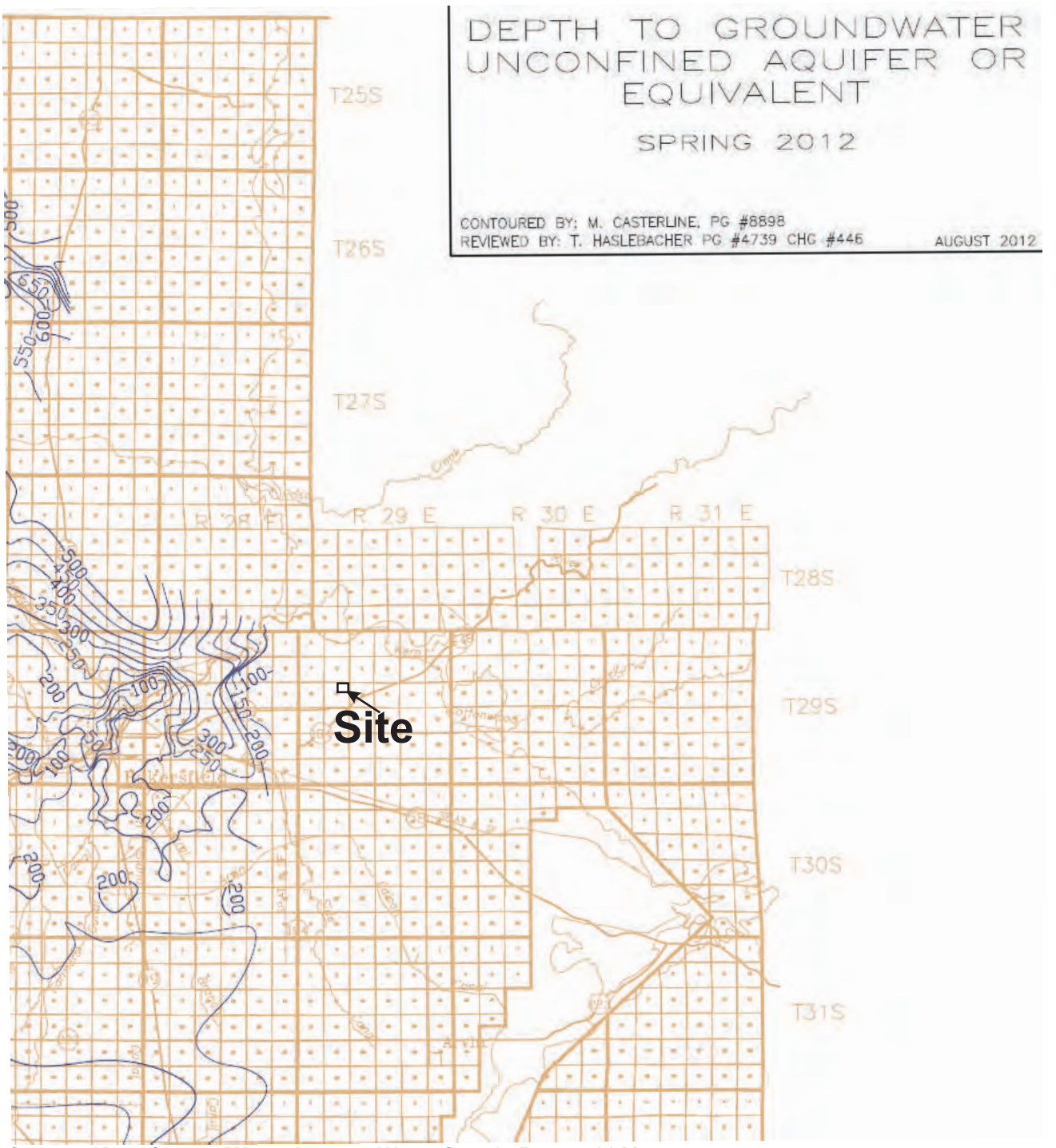
Alquist-Priolo Special Studies Zone

PLATE
3A

EARTHQUAKE EPICENTER MAP



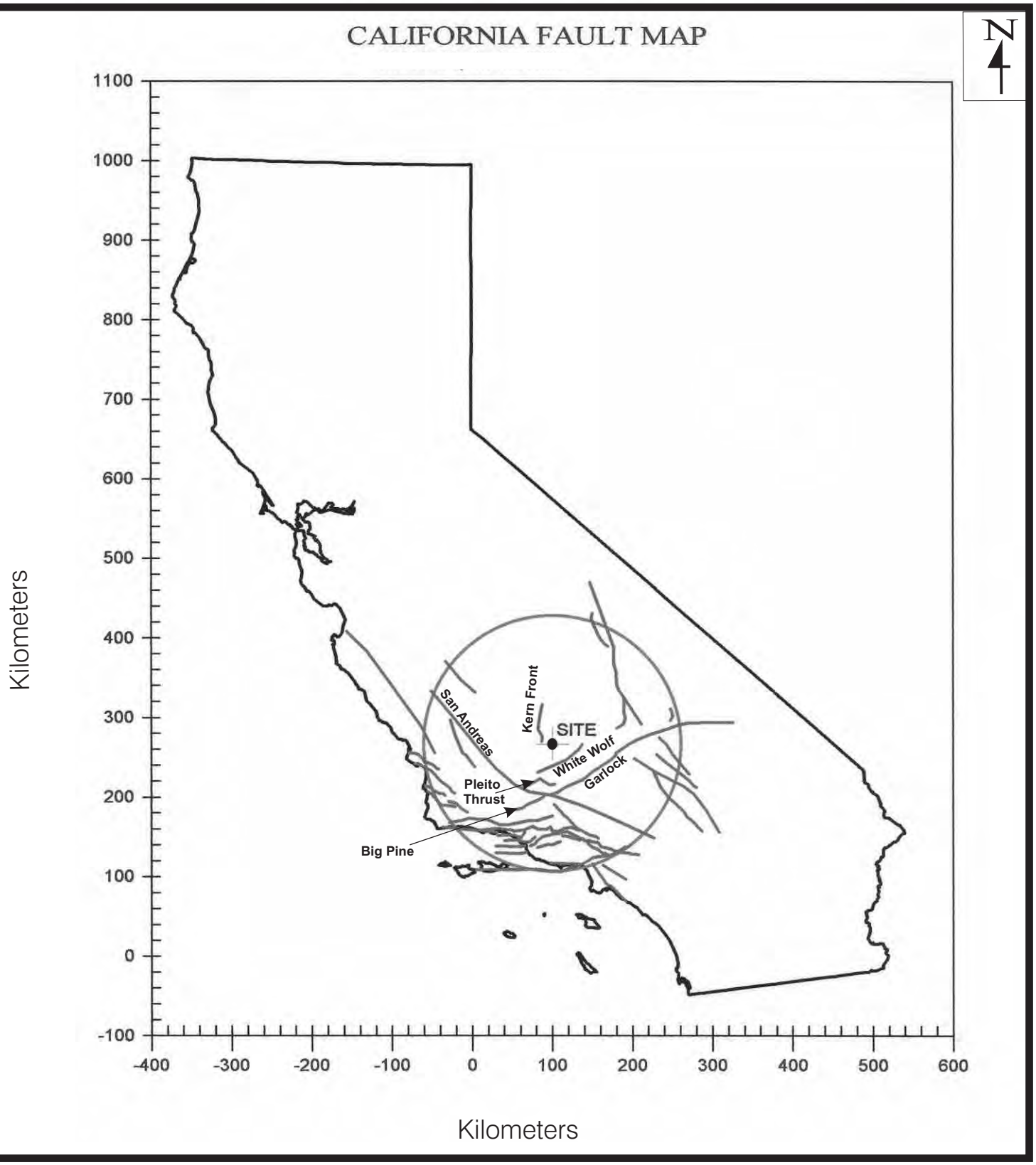
SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 DATE: 10/19 PROJECT: #17179	**Proposed BCSD School Site** **SW of Paladino Drive and Masterson Street** **Bakersfield, CA** Earthquake Epicenter Map	PLATE 3B



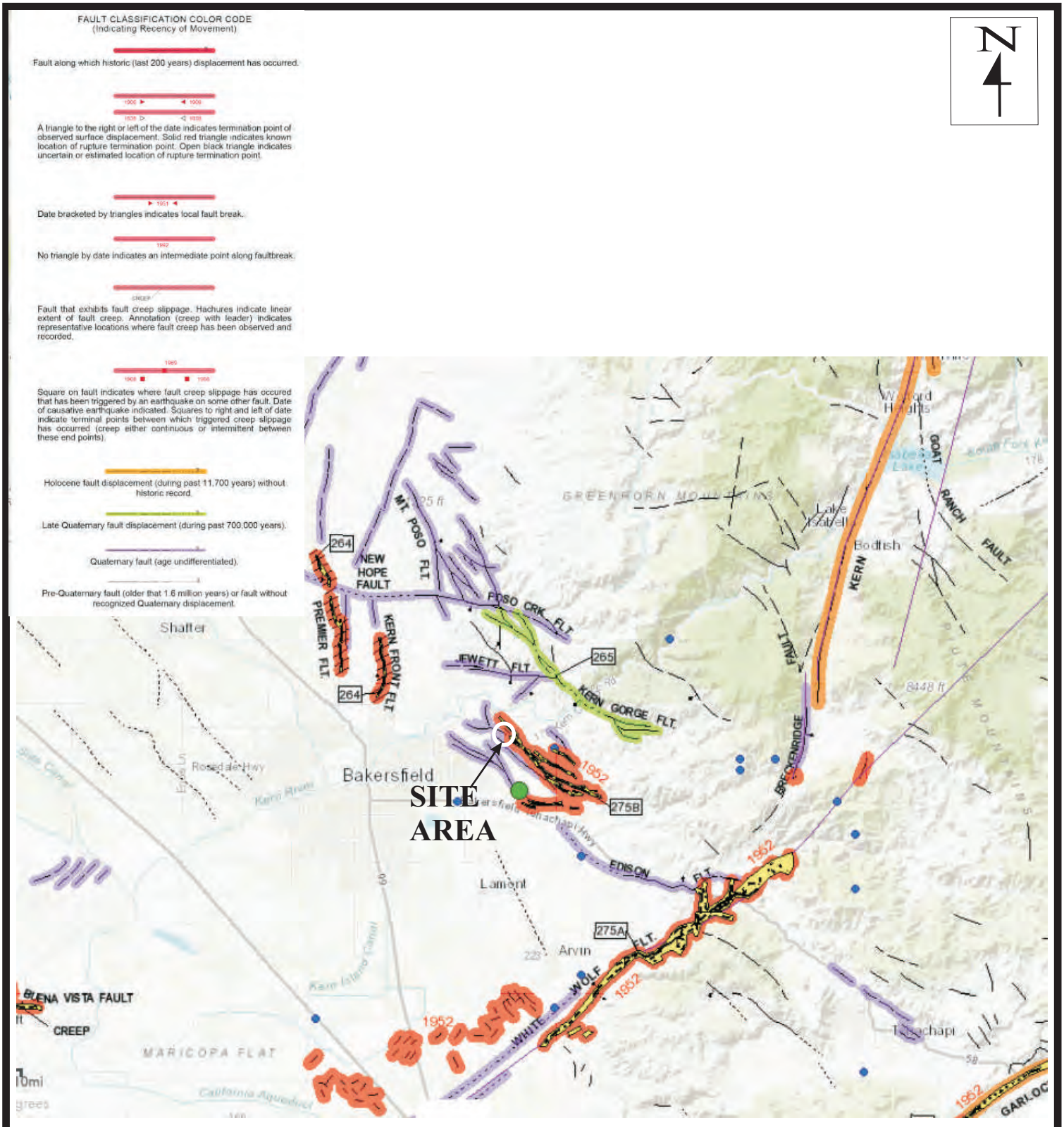
Source: Kern County Water Agency, Water Supply Report 2011

SOILS ENGINEERING, INC. **4400 Yeager Way** **Bakersfield, CA 93313** **(661) 831 - 5100** DATE: 10/19 PROJECT: #17179	**Proposed BCSD School Site** **SW of Paladino Drive and Masterson Street** **Bakersfield, CA** Depth to Water Map	**PLATE** **4**

CALIFORNIA FAULT MAP



SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 DATE: 10/19 PROJECT: #17179	**Proposed BCSD School Site** **SW of Paladino Drive and Masterson Street** **Bakersfield, CA** Fault Location Map	PLATE 5



SOURCE: Fault Activity Map of California 2010, CDMG

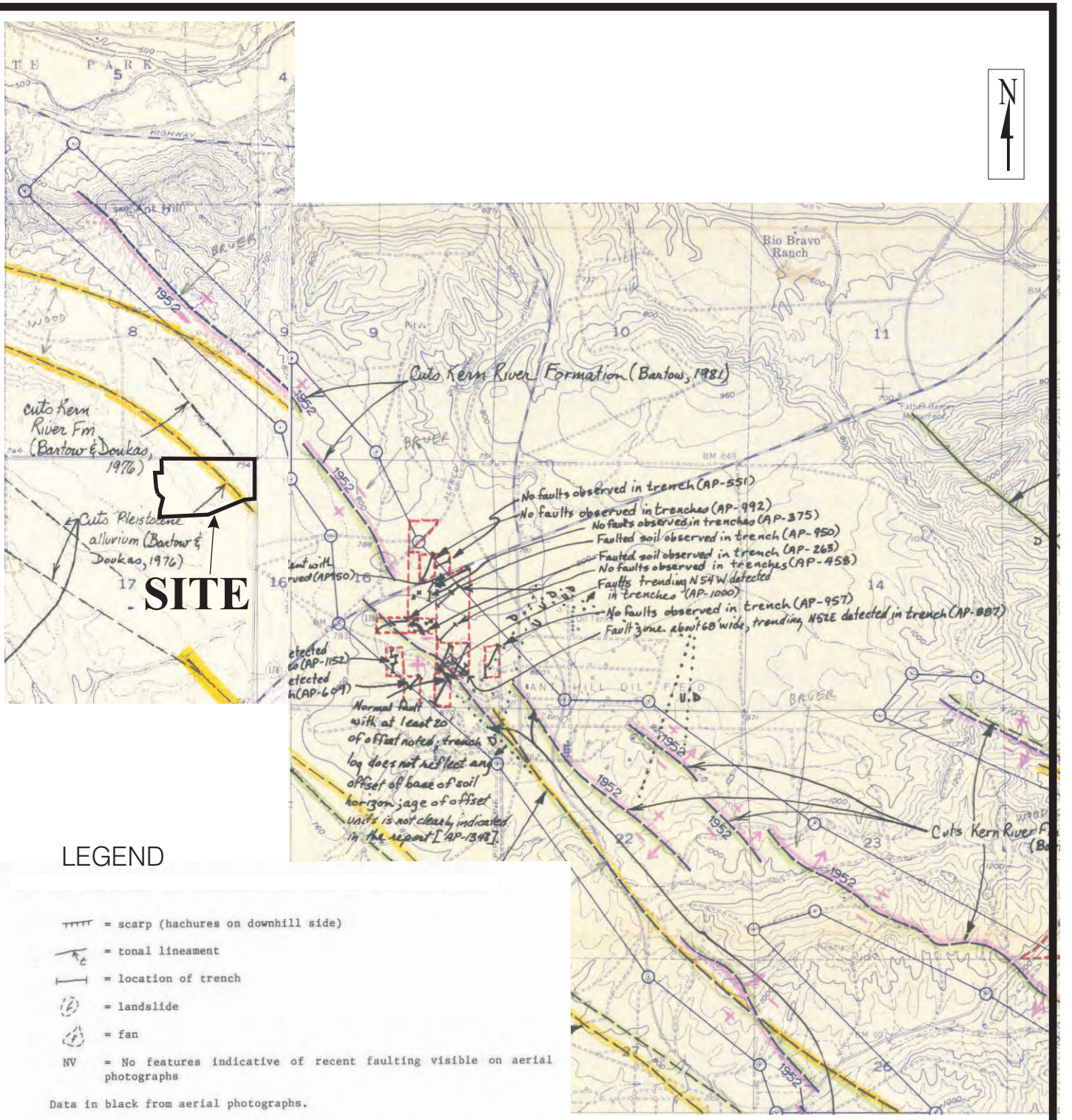
SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 DATE: 10/19 PROJECT: #17179	**Proposed BCSD School Site** **SW of Paladino Drive and Masterson Street** **Bakersfield, CA** **REGIONAL FAULT MAP**	PLATE 5A

N

Legend

- Active Oil Well
- Abandoned Oil Well
- Idle Oil Well
- Dry Hole

SOILS ENGINEERING, INC. **4400 Yeager Way** **Bakersfield, CA 93313** **(661) 831 - 5100** DATE: 10/19 PROJECT: 19-17179	**Proposed BCSD School Site** **SW of Paladino Drive and Masterson Street** **Bakersfield, CA** **DOGGR Map**	**PLATE** **6**



LEGEND

= scarp (hachures on downhill side)

= tonal lineament

= location of trench

= landslide

= fan

NV = No features indicative of recent faulting visible on aerial photographs

Data in black from aerial photographs.

Data in red from field observations.

Yellow highlight indicates those features which were probably produced by recent fault movement.

From FER-145, Smith (1984)

Figures 2A & 2B, FER-145, Aerial Photo & Field Data.
Oil Center & Rio Bravo Ranch Quadrangles

SOILS ENGINEERING, INC.
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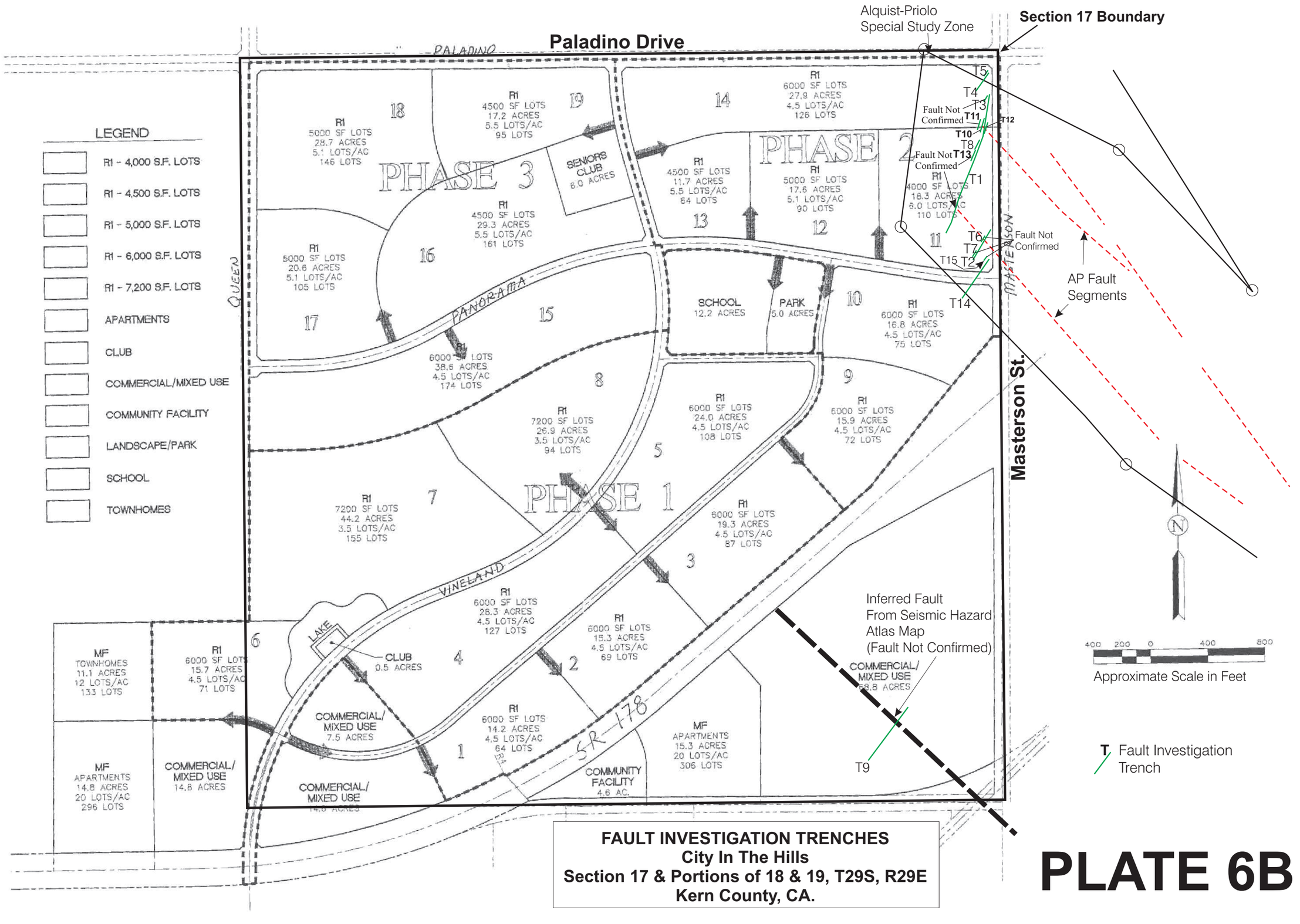
Proposed BCSD School Site
SW of Paladino Drive and Masterson Street
Bakersfield, CA

DATE: 10/19
PROJECT: #17179

Historical Geologic Maps

PLATE
6A



FAULT INVESTIGATION TRENCHES
City In The Hills
Section 17 & Portions of 18 & 19, T29S, R29E
Kern County, CA.

PLATE 6B

APPENDIX A

**Deterministic Site Parameters-EQFault data, EQSEARCHWIN data,
OSHPD Seismic Design Summary Report and
USGS Unified Hazard Tool results.**

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**********************
*                    *
*    E Q F A U L T   *
*                    *
*    Version 3.00    *
*                    *
**********************
```

DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 17179

DATE: 09-10-2019

JOB NAME: 17179 New City School

CALCULATION NAME: 17179 New City School

FAULT-DATA-FILE NAME: CGSFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 35.4109
SITE LONGITUDE: 118.8818

SEARCH RADIUS: 100 mi

ATTENUATION RELATION: 3) Boore et al. (1997) Horiz. - NEHRP D (250)
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: cd_2drp
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: CGSFLTE.DAT

MINIMUM DEPTH VALUE (km): 0.0

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	ESTIMATED MAX. EARTHQUAKE EVENT: PEAK SITE ACCEL. g	ESTIMATED MAX. EARTHQUAKE EVENT: EST. SITE INTENSITY MOD.MERC.
Kern Front	9.0(14.5)	6.3	0.233	IX
WHITE WOLF	16.2(26.1)	7.3	0.260	IX
PLEITO THRUST	29.5(47.4)	7.0	0.141	VIII
GARLOCK (West)	35.2(56.7)	7.3	0.118	VII
SAN ANDREAS - Whole M-1a	40.8(65.7)	8.0	0.153	VIII
SAN ANDREAS - Carrizo M-1c-2	40.8(65.7)	7.4	0.111	VII
SAN ANDREAS - 1857 Rupture M-2a	40.8(65.7)	7.8	0.137	VIII
SAN ANDREAS - Cho-Moj M-1b-1	40.8(65.7)	7.8	0.137	VIII
BIG PINE	41.3(66.5)	6.9	0.085	VII
SAN GABRIEL	48.2(77.5)	7.2	0.088	VII
GARLOCK (East)	49.1(79.0)	7.5	0.102	VII
So. SIERRA NEVADA	51.1(82.3)	7.3	0.108	VII
SAN ANDREAS - Mojave M-1c-3	53.5(86.1)	7.4	0.090	VII
SAN ANDREAS - Cholame M-1c-1	55.8(89.8)	7.3	0.083	VII
SANTA YNEZ (East)	56.9(91.6)	7.1	0.073	VII
SAN CAYETANO	61.5(98.9)	7.0	0.080	VII
SAN JUAN	63.4(102.1)	7.1	0.068	VI
M.RIDGE-ARROYO PARIDA-SANTA ANA	63.9(102.9)	7.2	0.086	VII
LENWOOD-LOCKHART-OLD WOMAN SPRGS	64.4(103.7)	7.5	0.082	VII
LITTLE LAKE	66.1(106.4)	6.9	0.059	VI
HOLSER	67.4(108.5)	6.5	0.057	VI
SANTA SUSANA	67.5(108.6)	6.7	0.063	VI
OAK RIDGE (Onshore)	70.0(112.7)	7.0	0.072	VI
NORTHRIDGE (E. Oak Ridge)	70.2(112.9)	7.0	0.072	VI
NORTH CHANNEL SLOPE	71.3(114.8)	7.4	0.088	VII
RED MOUNTAIN	71.9(115.7)	7.0	0.071	VI
SIERRA MADRE (San Fernando)	72.1(116.0)	6.7	0.060	VI
SIMI-SANTA ROSA	72.3(116.4)	7.0	0.070	VI
GREAT VALLEY 14	72.6(116.9)	6.4	0.051	VI
VENTURA - PITAS POINT	73.8(118.7)	6.9	0.066	VI
OWENS VALLEY	73.9(118.9)	7.6	0.078	VII
SANTA YNEZ (West)	74.7(120.2)	7.1	0.059	VI
OAK RIDGE MID-CHANNEL STRUCTURE	78.0(125.6)	6.6	0.054	VI
VERDUGO	79.0(127.2)	6.9	0.062	VI
SAN LUIS RANGE (S. Margin)	80.5(129.6)	7.2	0.072	VI
GRAVEL HILLS - HARPER LAKE	81.1(130.5)	7.1	0.056	VI
HELENDALE - S. LOCKHARDT	81.4(131.0)	7.3	0.062	VI
SIERRA MADRE	81.6(131.3)	7.2	0.071	VI
CHANNEL IS. THRUST (Eastern)	81.7(131.5)	7.5	0.083	VII
BLACKWATER	82.8(133.2)	7.1	0.055	VI

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	ESTIMATED MAX. EARTHQUAKE EVENT: PEAK SITE ACCEL. g	ESTIMATED MAX. EARTHQUAKE EVENT: EST. SITE INTENSITY MOD.MERC.
SAN ANDREAS - Parkfield	83.3(134.0)	6.5	0.040	V
LOS ALAMOS-W. BASELINE	85.6(137.8)	6.9	0.059	VI
ANACAPA-DUME	87.2(140.3)	7.5	0.079	VII
GREAT VALLEY 13	87.4(140.7)	6.5	0.047	VI
INDEPENDENCE	87.5(140.8)	7.1	0.064	VI
OAK RIDGE(Blind Thrust Offshore)	88.1(141.8)	7.1	0.064	VI
LIONS HEAD	89.6(144.2)	6.6	0.048	VI
TANK CANYON	90.0(144.8)	6.4	0.043	VI
CLAMSHELL-SAWPIT	90.3(145.3)	6.5	0.046	VI
LOS OSOS	90.9(146.3)	7.0	0.059	VI
MALIBU COAST	91.8(147.8)	6.7	0.050	VI
RINCONADA	92.0(148.0)	7.5	0.062	VI
HOLLYWOOD	92.1(148.2)	6.4	0.043	VI
CASMALIA (Orcutt Frontal Fault)	93.1(149.9)	6.5	0.044	VI
UPPER ELYSIAN PARK BLIND THRUST	93.2(150.0)	6.4	0.042	VI
PUENTE HILLS BLIND THRUST	94.0(151.3)	7.1	0.061	VI
RAYMOND	94.5(152.1)	6.5	0.044	VI
SANTA MONICA	94.9(152.8)	6.6	0.046	VI
NEWPORT-INGLEWOOD (L.A.Basin)	98.5(158.5)	7.1	0.048	VI

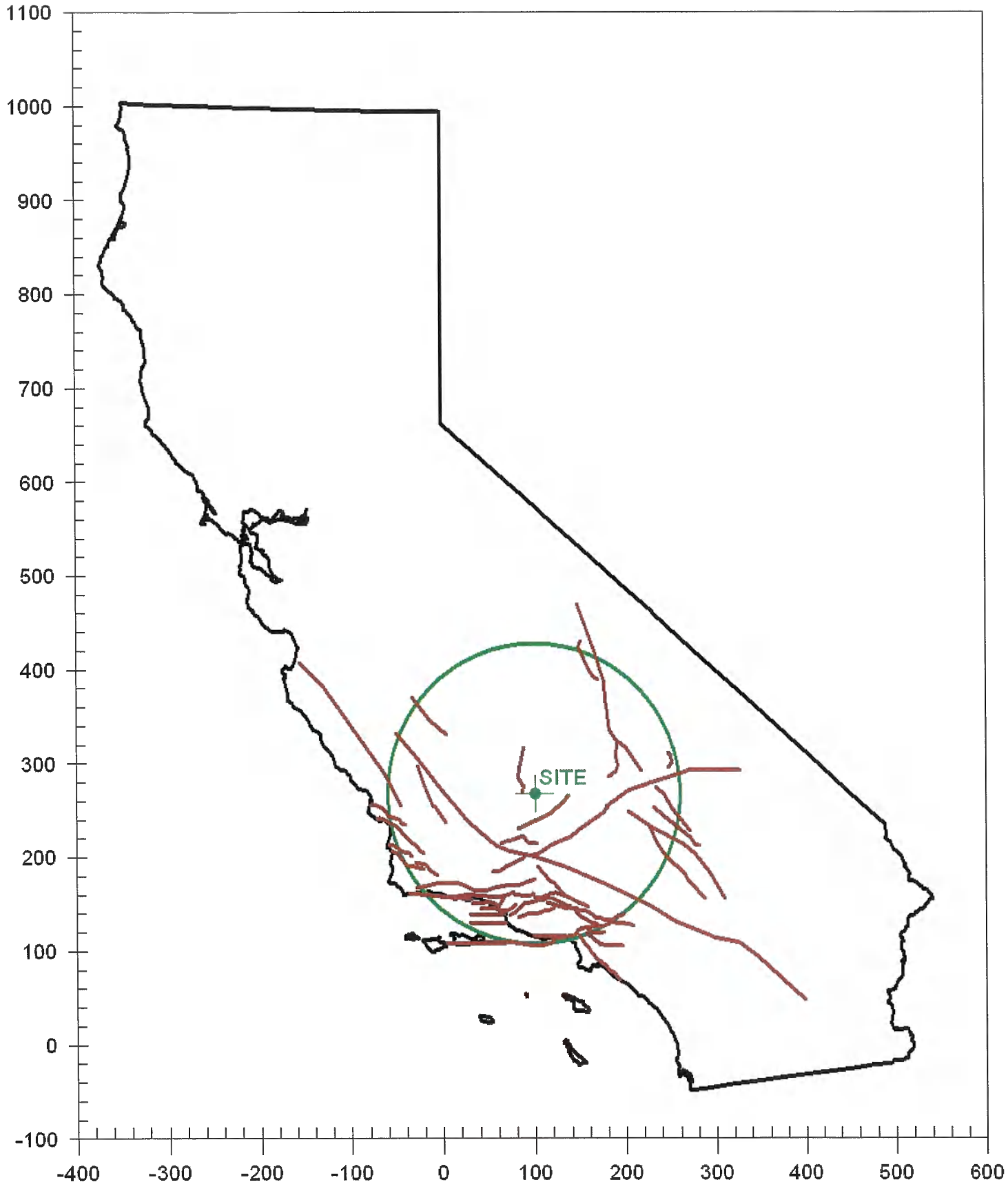
-END OF SEARCH- 59 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE Kern Front FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 9.0 MILES (14.5 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.2595 g

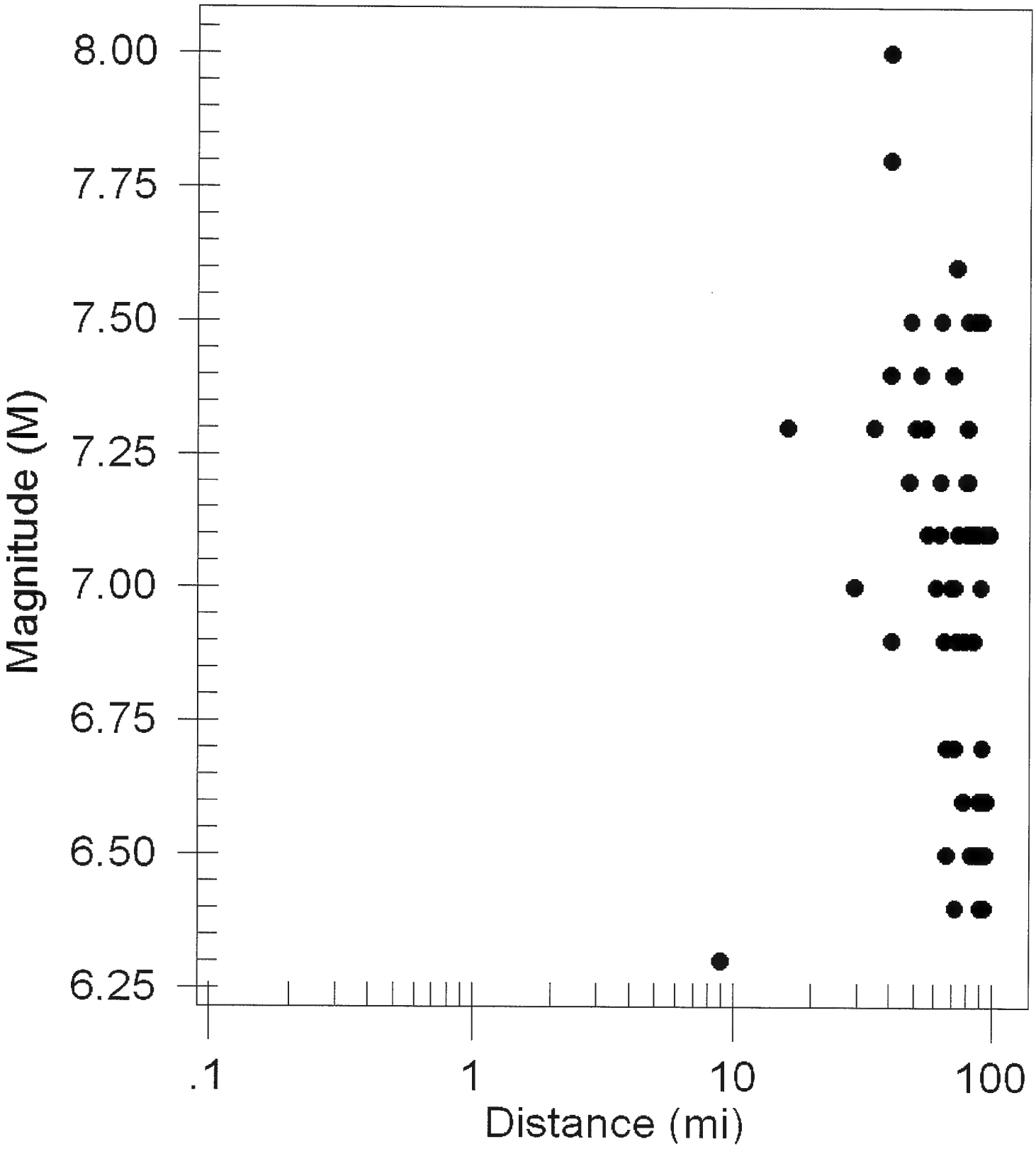
CALIFORNIA FAULT MAP

17179 New City School



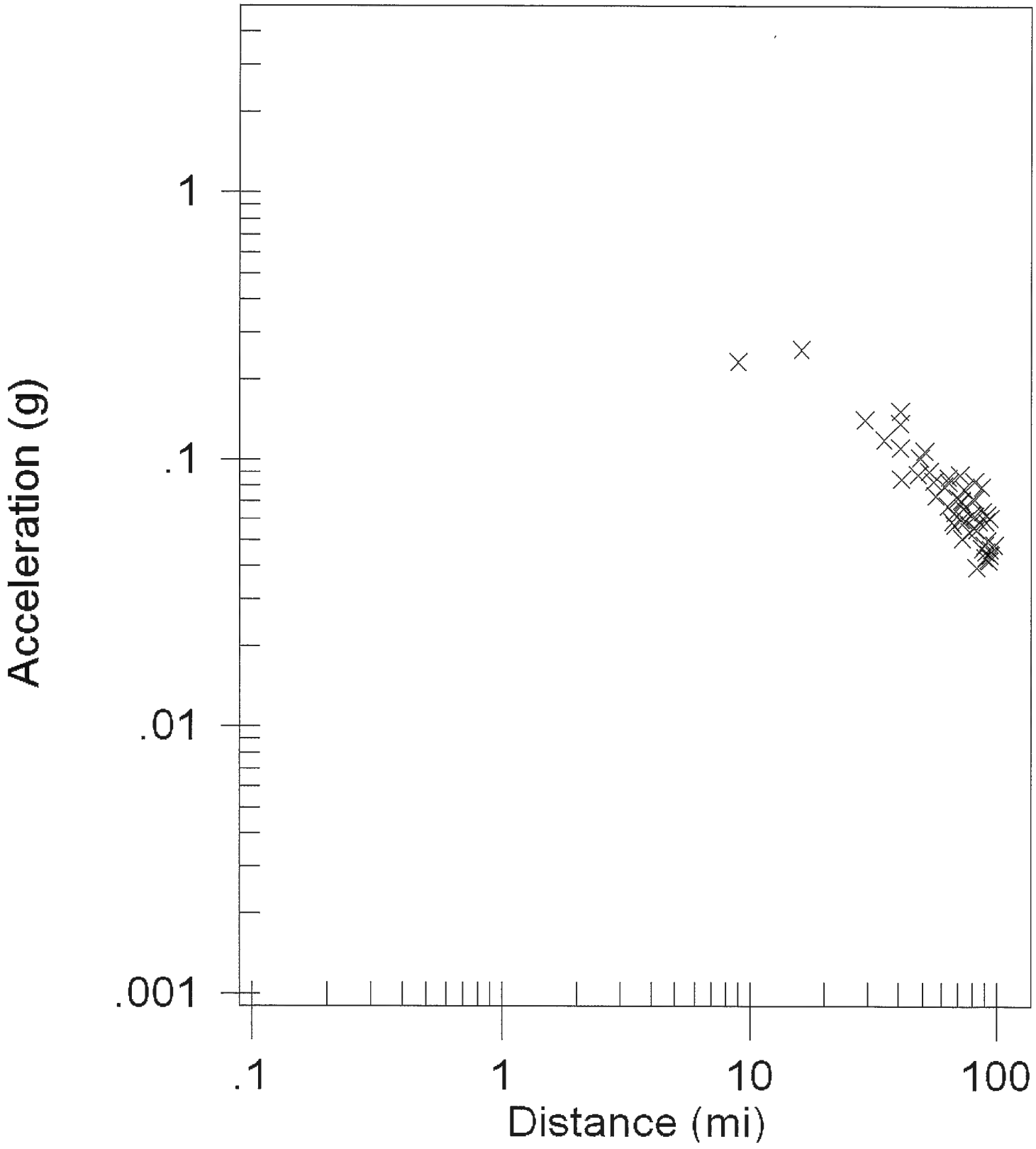
EARTHQUAKE MAGNITUDES & DISTANCES

BCSD School Site



MAXIMUM EARTHQUAKES

BCSD School Site



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*    E Q S E A R C H     *
*                        *
*     Version 3.00       *
*                        *
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ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 17179

DATE: 10-28-2019

JOB NAME: 17179 BCSD School Site

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

SITE COORDINATES:
SITE LATITUDE: 35.4109
SITE LONGITUDE: 118.8818

SEARCH DATES:
START DATE: 1800
END DATE: 2010

SEARCH RADIUS:
100.0 mi
160.9 km

ATTENUATION RELATION: 3) Boore et al. (1997) Horiz. - NEHRP D (250)
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
ASSUMED SOURCE TYPE: DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
SCOND: 0 Depth Source: A
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km): 0.0

EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	35.3830	118.8500	07/29/1952	7 347.0	0.0	6.10	0.391	X	2.6(4.2)
DMG	35.4000	118.8170	07/29/1952	8 146.0	0.0	5.10	0.204	VIII	3.7(6.0)
DMG	35.3330	118.9170	08/22/1952	224124.0	0.0	5.80	0.238	IX	5.7(9.2)
DMG	35.3000	118.8000	12/23/1905	2223 0.0	0.0	5.00	0.118	VII	8.9(14.4)
DMG	35.5000	118.7000	01/06/1905	1430 0.0	0.0	5.00	0.097	VII	11.9(19.2)
DMG	35.6000	118.8000	06/30/1926	1331 0.0	0.0	5.00	0.087	VII	13.8(22.3)
DMG	35.2170	118.8170	07/23/1952	1317 5.0	0.0	5.70	0.125	VII	13.9(22.3)
DMG	35.3330	118.6000	07/31/1952	12 9 9.0	0.0	5.80	0.115	VII	16.7(27.0)
DMG	35.3670	118.5830	07/23/1952	03832.0	0.0	6.10	0.133	VIII	17.1(27.5)
DMG	35.3670	118.5830	07/23/1952	31923.0	0.0	5.00	0.074	VII	17.1(27.5)
DMG	35.1330	118.7670	07/21/1952	194122.0	0.0	5.50	0.085	VII	20.2(32.6)
DMG	35.1830	118.6500	07/21/1952	151358.0	0.0	5.10	0.068	VI	20.4(32.9)
DMG	35.3150	118.5160	07/25/1952	194323.7	11.2	5.70	0.090	VII	21.6(34.8)
GSP	35.1490	119.1040	05/28/1993	044740.6	21.0	5.20	0.068	VI	22.0(35.4)
DMG	35.3110	118.4990	07/25/1952	1313 8.2	2.8	5.00	0.060	VI	22.6(36.4)
DMG	35.3170	118.4940	07/25/1952	19 944.6	5.5	5.70	0.086	VII	22.8(36.6)
DMG	35.1500	118.6330	01/27/1954	141948.0	0.0	5.00	0.060	VI	22.8(36.7)
DMG	35.2330	118.5330	07/21/1952	174244.0	0.0	5.10	0.062	VI	23.2(37.3)
DMG	35.0000	118.8330	07/23/1952	181351.0	0.0	5.20	0.056	VI	28.5(45.9)
DMG	35.0000	118.8330	07/23/1952	75319.0	0.0	5.40	0.062	VI	28.5(45.9)
DMG	35.0000	119.0000	02/16/1919	1557 0.0	0.0	5.00	0.050	VI	29.1(46.9)
DMG	35.0000	119.0000	07/21/1952	12 531.0	0.0	6.40	0.104	VII	29.1(46.9)
DMG	35.0000	119.0170	01/12/1954	233349.0	0.0	5.90	0.079	VII	29.4(47.3)
DMG	35.0000	119.0170	07/21/1952	115214.0	0.0	7.70	0.204	VIII	29.4(47.3)
DMG	35.0000	119.0330	07/21/1952	12 2 0.0	0.0	5.60	0.067	VI	29.6(47.7)
DMG	34.9830	118.9830	05/23/1954	235243.0	0.0	5.10	0.051	VI	30.1(48.4)
DMG	34.9500	118.8670	07/21/1952	121936.0	0.0	5.30	0.054	VI	31.8(51.2)
DMG	34.9410	118.9870	11/15/1961	53855.5	10.7	5.00	0.045	VI	33.0(53.1)
PAS	34.9430	118.7430	06/10/1988	23 643.0	6.8	5.40	0.055	VI	33.2(53.5)
DMG	34.9320	118.9760	03/01/1963	02557.9	13.9	5.00	0.045	VI	33.5(53.9)
T-A	34.9200	118.9200	01/20/1857	0 0 0.0	0.0	5.00	0.044	VI	34.0(54.6)
T-A	34.9200	118.9200	05/23/1857	0 0 0.0	0.0	5.00	0.044	VI	34.0(54.6)
DMG	34.9000	118.9000	10/23/1916	244 0.0	0.0	6.00	0.072	VII	35.3(56.8)
DMG	34.9000	118.9500	08/01/1952	13 430.0	0.0	5.10	0.045	VI	35.5(57.1)
DMG	34.8670	118.9330	09/21/1941	1953 7.2	0.0	5.20	0.045	VI	37.7(60.6)
T-A	34.8300	118.7500	11/27/1852	0 0 0.0	0.0	7.00	0.110	VII	40.8(65.6)
DMG	34.8000	119.1000	09/05/1883	1230 0.0	0.0	6.00	0.061	VI	43.9(70.7)
DMG	36.0800	118.8200	05/29/1915	646 0.0	0.0	5.00	0.035	V	46.3(74.5)
GSP	35.2100	118.0660	07/11/1992	181416.2	10.0	5.70	0.049	VI	48.0(77.3)
DMG	34.7000	119.0000	10/23/1916	254 0.0	0.0	5.50	0.043	VI	49.5(79.7)
DMG	35.7150	118.0740	03/15/1946	14 035.4	0.0	5.30	0.038	V	50.0(80.4)
DMG	35.7250	118.0550	03/15/1946	134935.9	22.0	6.30	0.064	VI	51.2(82.5)
DMG	35.3000	119.8000	01/09/1857	16 0 0.0	0.0	7.90	0.146	VIII	52.3(84.1)
DMG	35.7450	118.0390	03/16/1946	94617.9	0.0	5.10	0.033	V	52.6(84.7)
DMG	35.7780	118.0490	01/28/1961	81246.2	5.5	5.30	0.036	V	53.2(85.6)
DMG	35.7510	118.0290	03/15/1946	215433.4	0.0	5.20	0.035	V	53.3(85.8)
DMG	35.7140	117.9770	03/15/1946	191853.6	0.0	5.40	0.037	V	55.0(88.4)
DMG	35.7530	117.9860	03/15/1946	1321 0.9	0.0	5.20	0.033	V	55.6(89.4)
T-A	36.1700	119.3200	07/25/1868	230 0.0	0.0	5.00	0.029	V	57.9(93.1)
DMG	35.7470	117.9080	03/18/1946	155042.6	4.4	5.30	0.033	V	59.4(95.6)
DMG	35.8310	117.7610	10/19/1961	5 943.9	-2.0	5.20	0.028	V	69.3(111.5)
GSP	34.3940	118.6690	06/26/1995	084028.9	13.0	5.00	0.025	V	71.2(114.6)
GSB	34.3790	118.7110	01/19/1994	210928.6	14.0	5.50	0.032	V	71.9(115.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.5000	119.5000	06/29/1926	2321 0.0	0.0	5.50	0.032	V	72.0(115.8)
DMG	34.5000	119.5000	08/05/1930	1125 0.0	0.0	5.00	0.025	V	72.0(115.8)
GSP	34.3770	118.6980	01/18/1994	004308.9	11.0	5.20	0.027	V	72.1(116.1)
DMG	34.5190	118.1980	08/23/1952	10 9 7.1	13.1	5.00	0.024	V	72.7(117.0)
GSP	34.3780	118.6180	01/19/1994	211144.9	11.0	5.10	0.026	V	72.9(117.3)
GSP	34.3690	118.6720	04/26/1997	103730.7	16.0	5.10	0.026	V	72.9(117.3)
GSP	35.7760	117.6620	08/17/1995	223959.0	5.0	5.40	0.030	V	73.0(117.4)
GSP	35.7660	117.6490	01/07/1996	143253.1	5.0	5.20	0.027	V	73.4(118.2)
GSB	35.7610	117.6390	09/20/1995	232736.3	5.0	6.10	0.043	VI	73.8(118.8)
DMG	34.4110	118.4010	02/09/1971	141028.0	8.0	5.30	0.028	V	74.2(119.4)
DMG	34.4110	118.4010	02/09/1971	14 1 8.0	8.0	5.80	0.037	V	74.2(119.4)
DMG	34.4110	118.4010	02/09/1971	14 041.8	8.4	6.40	0.050	VI	74.2(119.4)
DMG	34.4110	118.4010	02/09/1971	14 244.0	8.0	5.80	0.037	V	74.2(119.4)
GSP	34.3260	118.6980	01/17/1994	233330.7	9.0	5.60	0.033	V	75.6(121.7)
T-A	34.5000	119.6700	06/01/1893	12 0 0.0	0.0	5.00	0.023	IV	77.1(124.1)
GSP	34.3050	118.5790	01/29/1994	112036.0	1.0	5.10	0.024	V	78.3(125.9)
DMG	34.3000	118.6000	04/04/1893	1940 0.0	0.0	6.00	0.039	V	78.3(126.1)
DMG	35.6310	117.5130	09/17/1938	1423 4.1	-2.0	5.00	0.023	IV	78.4(126.2)
GSB	34.3010	118.5650	01/17/1994	204602.4	9.0	5.20	0.026	V	78.7(126.7)
DMG	34.3080	118.4540	02/09/1971	144346.7	6.2	5.20	0.025	V	79.9(128.6)
DMG	35.7500	120.2500	03/10/1922	112120.0	0.0	6.50	0.050	VI	80.3(129.2)
DMG	34.3670	119.5830	07/01/1941	75054.8	0.0	5.90	0.036	V	82.3(132.4)
GSP	36.0750	117.6500	11/27/1996	201724.1	1.0	5.30	0.026	V	82.9(133.4)
PAS	36.1510	120.0490	08/04/1985	12 156.0	6.0	5.80	0.034	V	83.0(133.5)
GSP	36.0670	117.6380	03/06/1998	054740.3	1.0	5.20	0.024	V	83.1(133.8)
MGI	34.4000	119.7000	03/25/1806	8 0 0.0	0.0	5.00	0.022	IV	83.8(134.8)
DMG	36.4000	118.0000	07/05/1871	21 6 0.0	0.0	5.20	0.024	V	84.2(135.6)
GSP	36.0760	117.6180	03/07/1998	003646.8	1.0	5.00	0.022	IV	84.4(135.8)
DMG	35.7500	120.3300	08/18/1922	512 0.0	0.0	5.00	0.022	IV	84.6(136.2)
GSP	34.2310	118.4750	03/20/1994	212012.3	13.0	5.30	0.025	V	84.7(136.2)
GSP	34.2130	118.5370	01/17/1994	123055.4	18.0	6.70	0.053	VI	85.0(136.8)
DMG	35.8000	120.3300	12/28/1939	121538.0	0.0	5.00	0.022	IV	85.6(137.8)
DMG	35.8000	120.3300	06/08/1934	447 0.0	0.0	6.00	0.036	V	85.6(137.8)
DMG	35.8000	120.3300	06/08/1934	430 0.0	0.0	5.00	0.022	IV	85.6(137.8)
DMG	35.8000	120.3300	06/05/1934	2148 0.0	0.0	5.00	0.022	IV	85.6(137.8)
MGI	36.6000	118.4000	09/04/1868	0 0 0.0	0.0	5.00	0.021	IV	86.4(139.0)
T-A	34.4200	119.8200	00/00/1862	0 0 0.0	0.0	5.70	0.031	V	86.6(139.4)
PAS	34.3470	119.6960	08/13/1978	225453.4	12.8	5.10	0.022	IV	86.7(139.6)
MGI	35.2500	120.5000	07/10/1917	043 0.0	0.0	5.30	0.024	IV	91.8(147.8)
MGI	35.2500	120.5000	07/09/1917	2222 0.0	0.0	5.00	0.020	IV	91.8(147.8)
MGI	35.2500	120.5000	07/09/1917	2238 0.0	0.0	5.30	0.024	IV	91.8(147.8)
MGI	35.2500	120.5000	07/10/1917	045 0.0	0.0	5.30	0.024	IV	91.8(147.8)
MGI	36.5800	118.0800	07/06/1917	11 1 0.0	0.0	5.70	0.029	V	92.3(148.6)
T-A	36.5800	118.0700	08/13/1882	0 0 0.0	0.0	5.00	0.020	IV	92.6(149.0)
T-A	36.5800	118.0700	04/18/1872	0 0 0.0	0.0	5.00	0.020	IV	92.6(149.0)
MGI	34.9000	120.4000	03/29/1928	625 0.0	0.0	5.30	0.024	IV	92.7(149.1)
DMG	34.3000	119.8000	06/29/1925	144216.0	0.0	6.25	0.039	V	92.7(149.1)
MGI	34.3000	119.8000	07/03/1925	1821 0.0	0.0	5.30	0.024	IV	92.7(149.1)
MGI	34.3000	119.8000	07/03/1925	1638 0.0	0.0	5.30	0.024	IV	92.7(149.1)
MGI	36.6000	118.1000	05/17/1872	21 0 0.0	0.0	5.00	0.020	IV	93.0(149.6)
DMG	34.0650	119.0350	02/21/1973	144557.3	8.0	5.90	0.032	V	93.3(150.2)
GSP	34.2620	118.0020	06/28/1991	144354.5	11.0	5.40	0.025	V	93.7(150.8)
DMG	34.7000	120.3000	01/12/1915	431 0.0	0.0	5.50	0.026	V	94.0(151.2)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.7000	120.3000	07/31/1902	920 0.0	0.0	5.50	0.026	V	94.0(151.2)
PAS	36.1820	120.2680	02/14/1987	72650.8	6.0	5.10	0.021	IV	94.1(151.5)
DMG	36.7000	118.3000	08/17/1896	1130 0.0	0.0	5.90	0.032	V	94.7(152.5)
DMG	34.1000	119.4000	05/19/1893	035 0.0	0.0	5.50	0.026	V	95.2(153.1)
BRK	36.2200	120.2600	09/09/1983	91614.0	0.0	5.40	0.024	V	95.3(153.3)
GSB	35.9170	120.4650	12/20/1994	102747.2	8.0	5.00	0.020	IV	95.4(153.6)
MGI	34.8000	120.4000	12/12/1902	0 0 0.0	0.0	5.70	0.029	V	95.6(153.8)
MGI	35.0000	120.5000	11/19/1927	332 0.0	0.0	5.00	0.020	IV	95.6(153.8)
DMG	36.1700	120.3200	12/27/1926	919 0.0	0.0	5.00	0.020	IV	96.1(154.6)
DMG	35.9500	120.4700	11/16/1956	323 9.0	0.0	5.00	0.020	IV	96.5(155.3)
DMG	35.9300	120.4800	12/24/1934	1626 0.0	0.0	5.00	0.020	IV	96.5(155.4)
BRK	36.2200	120.2900	05/02/1983	2346 6.0	0.0	5.60	0.027	V	96.6(155.5)
BRK	36.2200	120.2900	05/02/1983	234239.0	0.0	6.70	0.048	VI	96.6(155.5)
MGI	35.5000	120.6000	01/01/1830	0 0 0.0	0.0	5.00	0.020	IV	96.8(155.8)
BRK	36.2400	120.2900	05/09/1983	24912.0	0.0	5.20	0.022	IV	97.4(156.8)
DMG	34.0000	119.0000	09/24/1827	4 0 0.0	0.0	7.00	0.056	VI	97.6(157.1)
MGI	34.0000	119.0000	12/14/1912	0 0 0.0	0.0	5.70	0.028	V	97.6(157.1)
DMG	35.9500	120.5000	06/28/1966	42613.4	0.0	5.50	0.025	V	98.1(157.8)
MGI	34.0800	118.2600	07/16/1920	18 8 0.0	0.0	5.00	0.019	IV	98.4(158.4)
DMG	34.2000	119.8000	12/21/1812	19 0 0.0	0.0	7.00	0.055	VI	98.5(158.5)
DMG	35.9700	120.5000	06/28/1966	4 856.2	0.0	5.10	0.020	IV	98.6(158.7)
DMG	36.7000	118.1000	03/26/1872	1030 0.0	0.0	7.80	0.084	VII	99.1(159.5)
DMG	36.0000	120.5000	03/03/1901	745 0.0	0.0	5.50	0.025	V	99.4(160.0)
DMG	36.0000	120.5000	02/02/1881	011 0.0	0.0	5.60	0.026	V	99.4(160.0)
DMG	35.9500	120.5300	06/29/1966	195325.9	0.0	5.00	0.019	IV	99.6(160.4)
MGI	34.0000	118.5000	11/19/1918	2018 0.0	0.0	5.00	0.019	IV	99.8(160.6)
DMG	34.0000	118.5000	08/04/1927	1224 0.0	0.0	5.00	0.019	IV	99.8(160.6)

****

-END OF SEARCH- 133 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2010

LENGTH OF SEARCH TIME: 211 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 2.6 MILES (4.2 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.9

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.391 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.621
b-value= 0.414
beta-value= 0.954

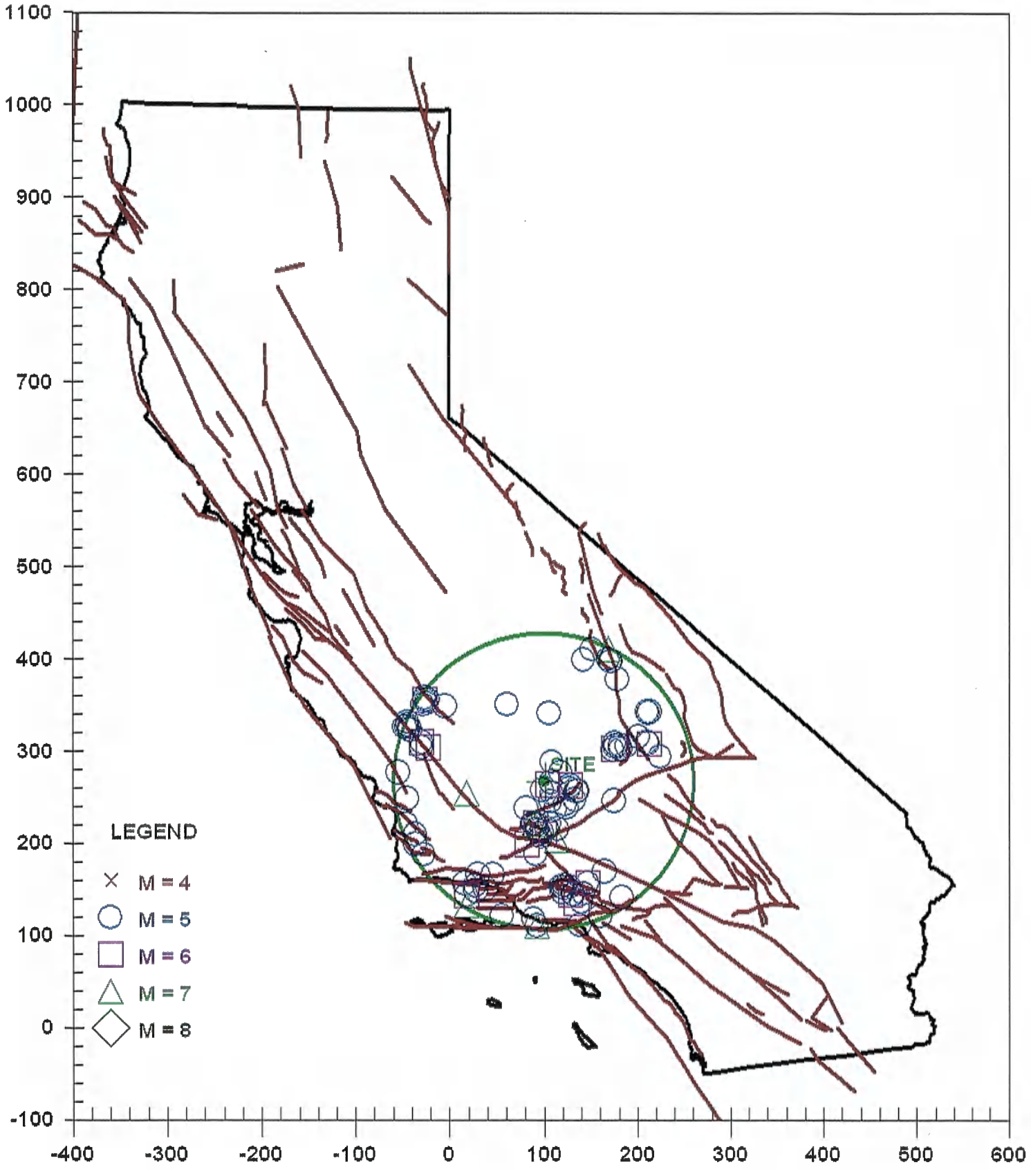
TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year

4.0	133	0.63333
4.5	133	0.63333
5.0	133	0.63333
5.5	50	0.23810
6.0	20	0.09524
6.5	9	0.04286
7.0	6	0.02857
7.5	3	0.01429

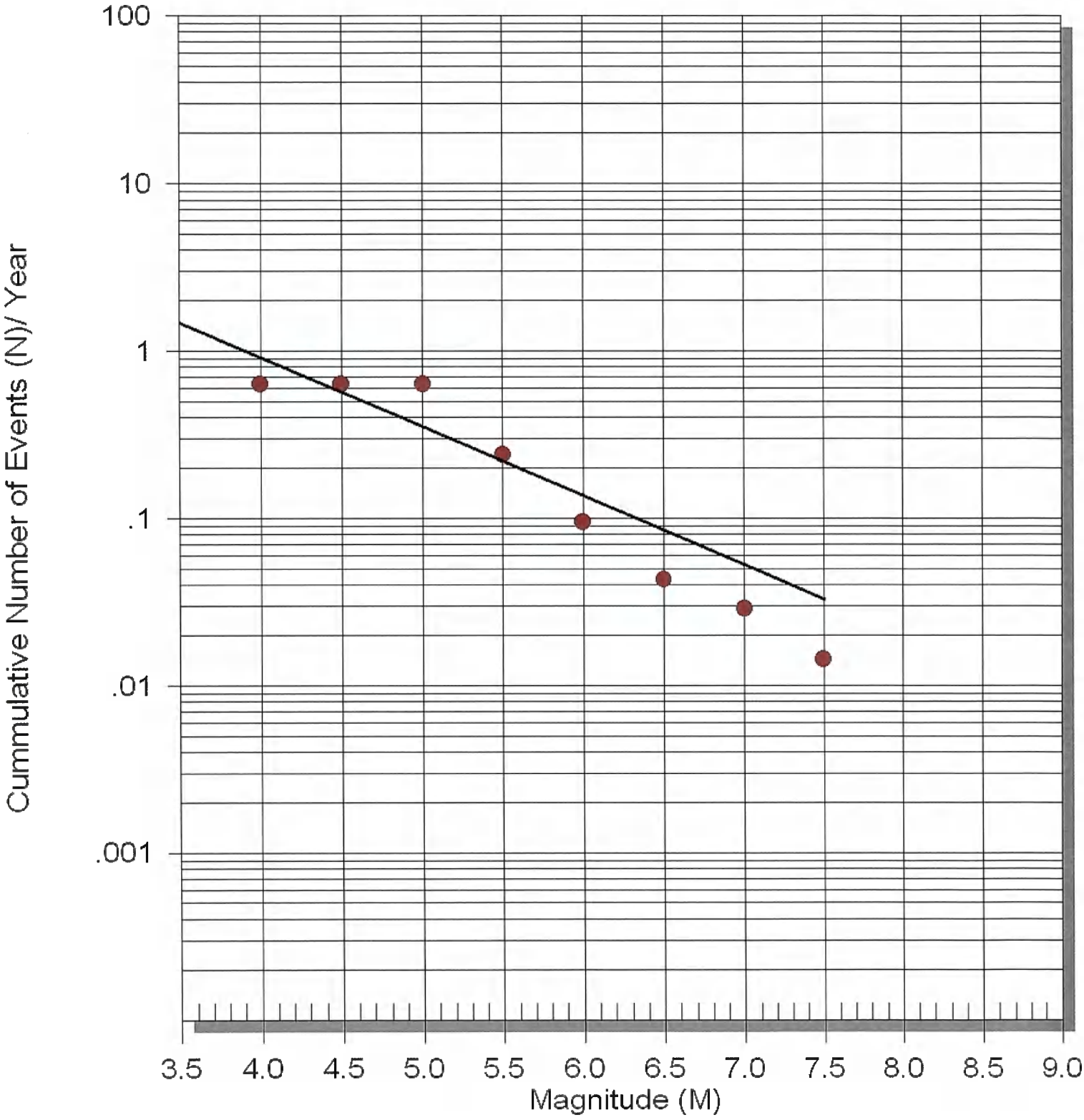
EARTHQUAKE EPICENTER MAP

17179 BCSD School Site



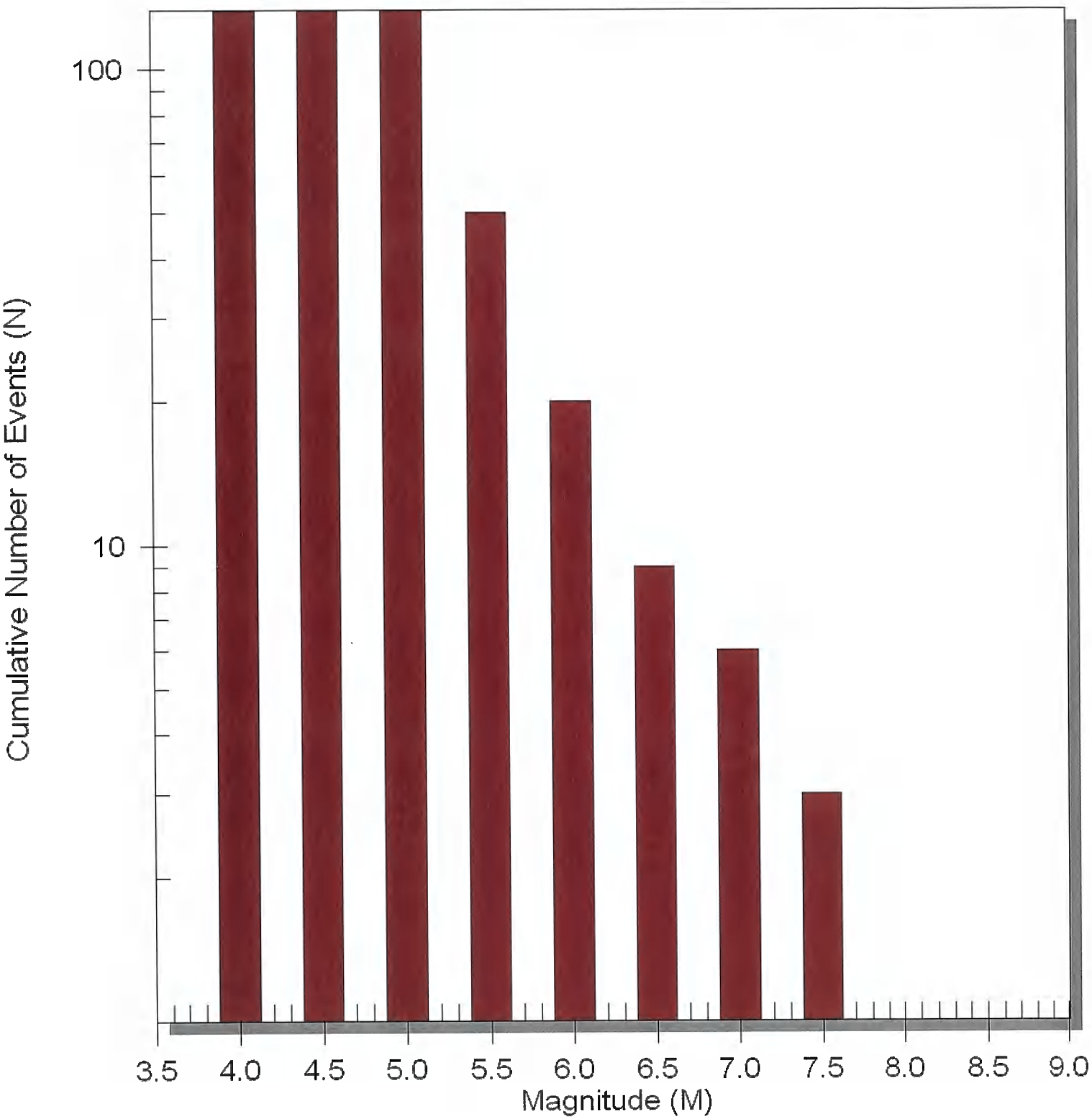
EARTHQUAKE RECURRENCE CURVE

17179 BCSD School Site



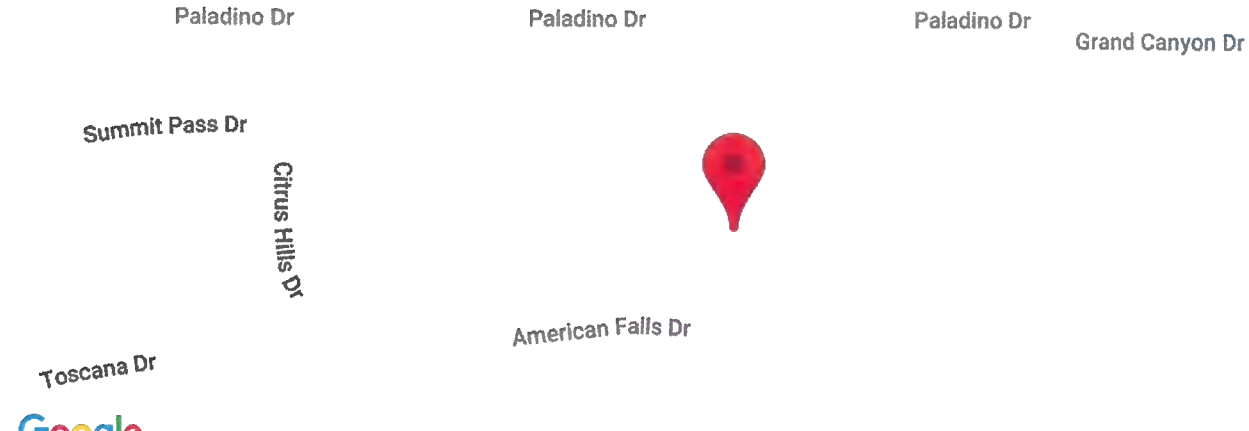
Number of Earthquakes (N) Above Magnitude (M)

17179 BCSD School Site



BCSD Proposed School Site

Latitude, Longitude: 35.4109, -118.8818



Date	10/31/2019, 3:08:16 PM
Design Code Reference Document	ASCE7-16
Risk Category	III
Site Class	D - Stiff Soil

Type	Value		Description
S_S	0.923		MCE_R ground motion. (for 0.2 second period)
S_1	0.328		MCE_R ground motion. (for 1.0s period)
S_{MS}	1.044		Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	0.646	Site-modified spectral acceleration value
S_{DS}	0.696		Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	0.431	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.131	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second 1.97
PGA	0.398	MCE_G peak ground acceleration
F_{PGA}	1.202	Site amplification factor at PGA
PGA_M	0.478	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	0.923	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.998	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.328	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.356	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.925	Mapped value of the risk coefficient at short periods
C_{R1}	0.923	Mapped value of the risk coefficient at a period of 1 s

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U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (v4.1.

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

35.4109

Time Horizon

Return period in years

2475

Longitude

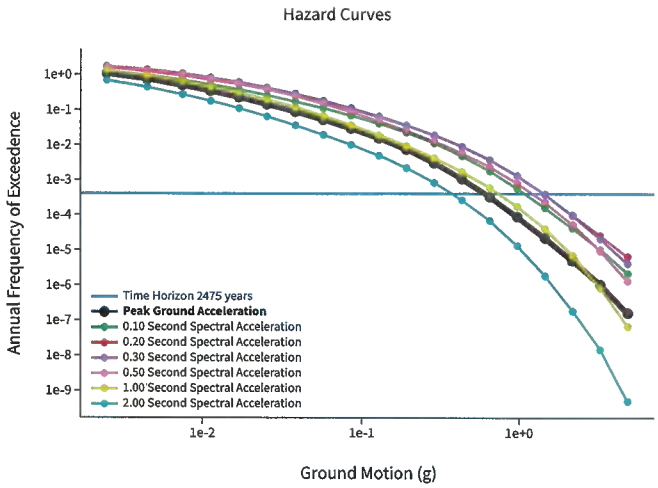
Decimal degrees, negative values for western longitudes

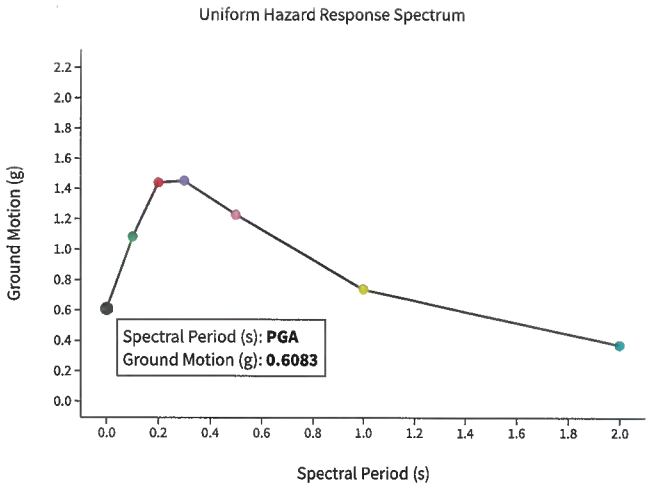
-118.8818

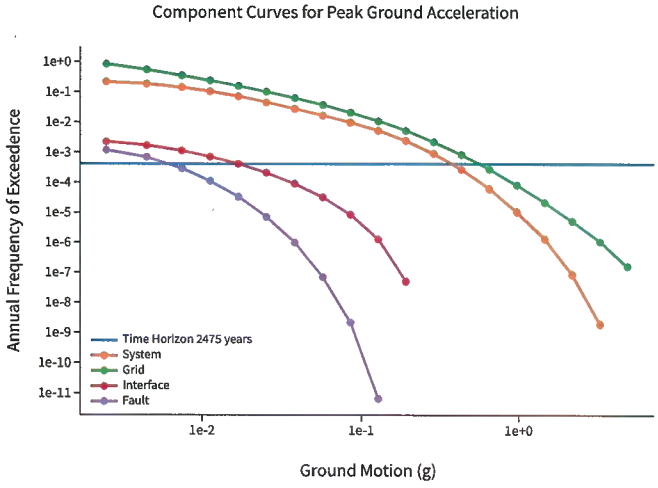
Site Class

259 m/s (Site class D)

Hazard Curve





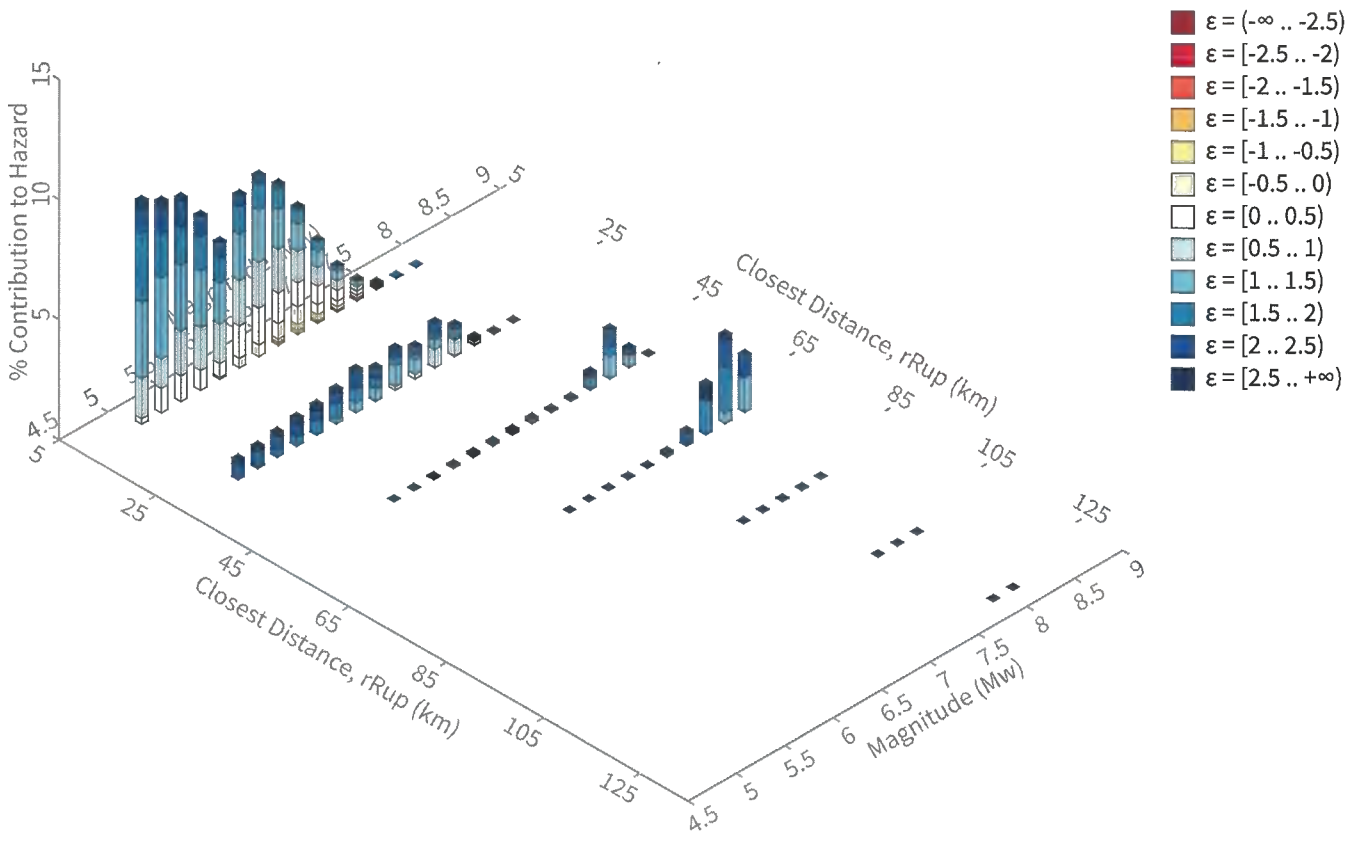


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.60828759 g

Recovered targets

Return period: 2784.2098 yrs
Exceedance rate: 0.00035916834 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.16 %

Mean (over all sources)

m: 6.25
r: 19.06 km
ε_0: 1.29 σ

Mode (largest m-r bin)

m: 5.1
r: 9.33 km
ε_0: 1.43 σ
Contribution: 9.2 %

Mode (largest m-r-ε_0 bin)

m: 5.3
r: 8.53 km
ε_0: 1.27 σ
Contribution: 3.36 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM31 (opt)	Grid							41.69
PointSourceFinite: -118.882, 35.433		5.55	5.69	0.75	118.882°W	35.433°N	0.00	5.35
PointSourceFinite: -118.882, 35.433		5.55	5.69	0.75	118.882°W	35.433°N	0.00	5.33
PointSourceFinite: -118.882, 35.505		10.47	5.91	1.18	118.882°W	35.505°N	0.00	2.86
PointSourceFinite: -118.882, 35.505		10.47	5.91	1.18	118.882°W	35.505°N	0.00	2.84
PointSourceFinite: -118.882, 35.478		8.43	5.82	1.03	118.882°W	35.478°N	0.00	2.75
PointSourceFinite: -118.882, 35.478		8.43	5.82	1.03	118.882°W	35.478°N	0.00	2.73
PointSourceFinite: -118.882, 35.523		11.90	5.97	1.26	118.882°W	35.523°N	0.00	2.36
PointSourceFinite: -118.882, 35.523		11.90	5.97	1.26	118.882°W	35.523°N	0.00	2.34
PointSourceFinite: -118.882, 35.541		13.41	6.02	1.35	118.882°W	35.541°N	0.00	1.58
PointSourceFinite: -118.882, 35.541		13.41	6.02	1.35	118.882°W	35.541°N	0.00	1.57
PointSourceFinite: -118.882, 35.559		14.84	6.10	1.40	118.882°W	35.559°N	0.00	1.51
PointSourceFinite: -118.882, 35.559		14.84	6.10	1.40	118.882°W	35.559°N	0.00	1.50
UC33brAvg_FM32 (opt)	Grid							41.65
PointSourceFinite: -118.882, 35.433		5.55	5.69	0.75	118.882°W	35.433°N	0.00	5.35
PointSourceFinite: -118.882, 35.433		5.55	5.69	0.75	118.882°W	35.433°N	0.00	5.32
PointSourceFinite: -118.882, 35.505		10.47	5.91	1.18	118.882°W	35.505°N	0.00	2.85
PointSourceFinite: -118.882, 35.505		10.47	5.91	1.18	118.882°W	35.505°N	0.00	2.84
PointSourceFinite: -118.882, 35.478		8.43	5.82	1.03	118.882°W	35.478°N	0.00	2.75
PointSourceFinite: -118.882, 35.478		8.43	5.82	1.03	118.882°W	35.478°N	0.00	2.73
PointSourceFinite: -118.882, 35.523		11.90	5.97	1.26	118.882°W	35.523°N	0.00	2.36
PointSourceFinite: -118.882, 35.523		11.90	5.97	1.26	118.882°W	35.523°N	0.00	2.34
PointSourceFinite: -118.882, 35.541		13.41	6.02	1.35	118.882°W	35.541°N	0.00	1.58
PointSourceFinite: -118.882, 35.541		13.41	6.02	1.35	118.882°W	35.541°N	0.00	1.57
PointSourceFinite: -118.882, 35.559		14.84	6.10	1.40	118.882°W	35.559°N	0.00	1.51
PointSourceFinite: -118.882, 35.559		14.84	6.10	1.40	118.882°W	35.559°N	0.00	1.49
UC33brAvg_FM31	System							8.35
San Andreas (Big Bend) [4]		66.08	8.08	1.90	119.053°W	34.833°N	193.65	4.10
White Wolf [4]		26.53	7.07	1.35	118.727°W	35.209°N	147.98	1.41
UC33brAvg_FM32	System							8.32
San Andreas (Big Bend) [4]		66.08	8.08	1.90	119.053°W	34.833°N	193.65	4.09
White Wolf [4]		26.53	7.05	1.36	118.727°W	35.209°N	147.98	1.40

Appendix B

Trench Logs FT1 and FT2, Boring Logs, Lake Isabella Dam Inundation Map, the Flood Insurance Rate Map, LiquefyPro Results, Main Portions of Preliminary Geological Hazard Report for City in The Hills Project (2004) and Addendum #1 to this Report (2005), and Unmarked Aerial Photos (1952, 1956, 1975, 1981 and 1990) in Pocket.

NE

Elevation

Trend ~S32W →

Former Dirt Pile Area

SW

35.4120791/
-118.8800689
753.04’

Depth Below Surface

754’ **753.20’**
35.412192/-118.8798372

752’

750’

748’

746’

744’

742’

Soil Layer - dk yel brn, soft-firm, damp, tr gravel

Silty Sand/Sandy Silt - med yel brn, damp, some cobbles to 8” diameter

Less Rock

Silty Sand/Sandy Silt - med yel brn, damp, trace gravel, only occasional rock

0 8’ 16’ 24’ 32’ 40’ 48’ 56’ 64’ 72’ 80’

Trench Number: FT1 Project Number: 17189 Location: Starts ~80’ south and 270’ West of NEC

Small crack only on southside of trench

End of Former Pile Area

Elevation

754’

752’

750’

748’

746’

744’

742’

Soil Layer - dk yel brn, soft-firm, damp, tr roots

Less Top Soil

Becoming More Reddish Brown

Silty Sand/Sandy Silt - med yel brn, damp, lots of cobbles to 8” diameter

Lots of Rock, med brn-reddish brown

Less Rock

Caliche now present in top 1’ of zone, whitish

Less Caliche

Silty Sand/Sandy Silt - med yel brn, damp, trace gravel, only occasional rock

Silty Sand -med yel brn, fn-med gr, clayey, damp

80 88’ 96’ 104’ 112’ 120’ 128’ 136’ 144’ 152’ 160’

Trench Number: FT1 Project Number: 17189 Location: Starts ~80’ south and ~270’ West of NEC

Fault Trench Ft1 Sheet 1 of 4

NE

Elevation

Trend ~S32W →

35.41198/-118.88031

Lower Dirt Road Area

35.41194/-118.88042

No Signs Of Faulting

Higher Former Dirt Pile Area SW

Depth Below Surface

754’

752’

750’

748’

746’

744’

742’

Soil & Fill Layer - dk yel brn, soft-firm, damp, tr gravel

Silty Sand/Sandy Silt - with some cobbles to 8” diameter thins out

Silty Sand/Sandy Silt - med yel brn-redish brn, damp, only occasional rock, tr caliche

Massive Caliche Rich Zone

Silty Sand/Sandy Silt - med yel brn-redish brn, only occasional rock

Silty Sand/Clayey Sand -med yel brn-red brn, vfn-med gr, clayey, damp

Silty Sand/Sand -gry-grn, vfn-fn gr, semi-consolidated, tr gravel

160’ 168’ 176’ 184’ 192’ 200’ 208’ 216’ 224’ 232’ 240’

Trench Number: FT1 Project Number: 17189 Location: Starts ~80’ south and 270’ West of NEC

8/19/19

Elevation

Former Pile Area Continues

End @ 300’

35.4117867/-118.8807142

754.19’

754’

752’

750’

748’

746’

744’

742’

Soil Layer & Fill - dk yel brn, soft-firm, damp

Soil Layer & Fill - dk yel brn, soft-firm, damp

Massive Caliche Rich Zone

Silty Sand/Sandy Silt - med yel brn-redish brn, only occasional rock

Silty Sand/Sandy Silt - med yel brn-red brn,lots of cobbles to 2’ diameter, with white caliche

Silty Sand/Clayey Sand -lt tan-gry grn, vfn-fn gr, semi-consolidated, tr gravel

240’ 248’ 256’ 264’ 272’ 280’ 288’ 296’ 304’ 312’ 320’

Trench Number: FT1 Project Number: 17189 Location: Starts ~80’ south and ~270’ West of NEC

NE

Trend ~S32W →

SW 35.4116513/ -118.8809965 754.13’

Elevation

Depth Below Surface

Former Dirt Pile Area Continues

754’

752’

750’

748’

746’

744’

742’

Soil Layer & Fill - dk yel brn, soft-firm, damp

Conglomerate Zone with Silty Sand/Sandy Silt matrix - med redish brn, with cobbles to 2’ & caliche rich

Conglomerate & Caliche Rich Zone

Sand/Clayey Sand -tan-gry grn, vfn-crs gr, with clay matrix, damp, occ cobbles

320’ 328’ 336’ 344’ 352’ 362’ 368’ 376’ 384’ 392’ 400’

Trench Number: FT1 Project Number: 17189 Location: Starts ~80’ south and 270’ West of NEC

35.4115609/

-118.8811638

Former Pile Area Ends

Lower Dirt Road Area

751.81’

Elevation

Former Pile Area Continues

754’

752’

750’

748’

746’

744’

742’

Soil Layer & Fill - dk yel brn, soft-firm, damp

Conglomerate zone thinning out

Soil Layer & Fill - dk yel brn, soft-firm, damp

Conglomerate Zone with Silty Sand/Sandy Silt matrix - med redish brn, with cobbles to 2’ & caliche rich

Caliche rich zone at top of sand zone

Sand continues with trace rock & less caliche

Sand with some rock -lt tan, fn-v crs gr, semi-consolidated, less clay matrix

400’ 408’ 416’ 424’ 432’ 440’ 448’ 456’ 464’ 472’ 480’

Trench Number: FT1 Project Number: 17189 Location: Starts ~80’ south and ~270’ West of NEC

NE

Elevation

Trend ~S32W →

Field Area Starts

35.4115232/ -118.8813197 753.24’

SW

Depth Below Surface

754’
752’
750’
748’
746’
744’
742’

Thin Soil Layer - dk yel brn, soft-firm, damp

Conglomerate Zone with Silty Sand/Sandy Silt matrix - med redish brn, with cobbles to 1’

Sand with occasional rock -med yb/red brn, fn-v crs gr, less consolidated, less clay matrix

Sand/Clayey Sand -tan, vfn-crs gr, with clay matrix, damp, occ cobbles

480’ 488’ 496’ 504’ 512’ 520’ 528’ 536’ 544’ 552’ 560’

Trench Number: FT1 Project Number: 17189 Location: Starts ~80’ south and 270’ West of NEC

35.4113263/ -118.8816926

Elevation

754’
752’
750’
748’
746’
744’
742’

Soil Layer - dk yel brn, soft-firm, damp

Silty Sand/Sandy Silt - med redish brn, with cobbles to 1’

Sand -red brn, vfn-crs gr, some silt, semi-consolidated, Occasional cobbles

Sand/Clayey Sand -tan, vfn-crs gr, with clay matrix, damp, occ cobbles

No Signs of Faulting

Sand zone thinning out

Soil Layer - dk yel brn, soft-firm, damp

Silty Sand/Sandy Silt - med redish brn, vfn -fn gr with caliche, only tr cobbles

SW End 753.80’

560’ 568’ 576’ 584’ 592’ 600’ 608’ 616’ 624’ 632’ 640’

Trench Number: FT1 Project Number: 17189 Location: Starts ~80’ south and ~270’ West of NEC

Fault Trench Ft1 Sheet 4 of 4

NE Trend ~S40W → SW

Elevation 754.38’ 35.4106335/ -118.8798558

Depth Below Surface

754’
752’
750’
748’
746’
744’
742’

Soil & Fill Layer - dk yel brn, soft-firm, damp, tr roots

Silty Sand/Sandy Silt - red brn, dry, v fn gr, some cobbles to 6” diameter, some clay

Less Rock

Silty Sand/Sandy Silt - redl brn, dry, vfn gr, trace gravel, no rock

0 8’ 16’ 24’ 32’ 40’ 48’ 56’ 64’ 72’ 80’

Trench Number: FT2 Project Number: 17189 Location: Starts ~200’ north and ~280’ West of SEC

35.4103540/ -118.8802586 751.91’

Elevation

No Signs Of Faulting

Lower Dirt Road Area

754’
752’
750’
748’
746’
744’
742’

Soil & Fill Layer - dk yel brn, soft-firm, damp, tr roots

No Top Soil

Soil & Fill Layer - dk yel brn, soft-firm, damp

Silty Sand/Sandy Silt - red brn, more caliche, hard

Silty Sand/Sandy Silt - red brn, clayey, vfn gr, trace gravel, no rock, massive

Some Caliche now present, whitish

Less Caliche

Silty Sand/Sandy Silt, v fn-med gr sand, with trace gravel & small cobbles

80 88’ 96’ 104’ 112’ 120’ 128’ 136’ 144’ 152’ 160’

Trench Number: FT2 Project Number: 17189 Location: Starts ~200’ north and ~280’ West of SEC

Fault Trench FT2 Sheet 1 of 2

NE

Trend ~S40W →

SW

Elevation

Depth Below Surface

Lower Dirt Road Area Continues

No Signs Of Faulting

35.4102886/-118.8803647

751.87'

754'
752'
750'
748'
746'
744'
742'

Soil Layer & Fill - dk yel brn, soft-firm, damp

Silty Sand/Sandy Silt - with lots of caliche, red brn, vfn-med gr, dry

Thins out

Silty Sand/Sandy Silt - med yel brn-redish brn, trace rock, massive

Silty Sand/Sandy Silt - med yel brn-redish brn, fn-crs gr, only occasional rock, tr caliche

160' 168' 176' 184' 192' 200' 208' 216' 224' 232' 240'

Trench Number: FT2 Project Number: 17189 Location: Starts ~200' north and ~280' West of SEC

Elevation

Lower Dirt Road Area Continues

Roadway Ends

SW End

35.4113263/-118.16926

752.77'

754'
752'
750'
748'
746'
744'
742'

Soil Layer & Fill - dk yel brn, soft-firm, damp

Soil Layer & Fill - dk yel brn, soft-firm, damp

Caliche less obvious

Silty Sand/Sandy Silt - redish brn, with caliche zone

Less Caliche

Silty Sand/Sandy Silt - med yel brn-redish brn, occasional gravel to cobbles, Tr caliche

240' 248' 256' 264' 272' 280' 288' 296' 304' 312' 320'

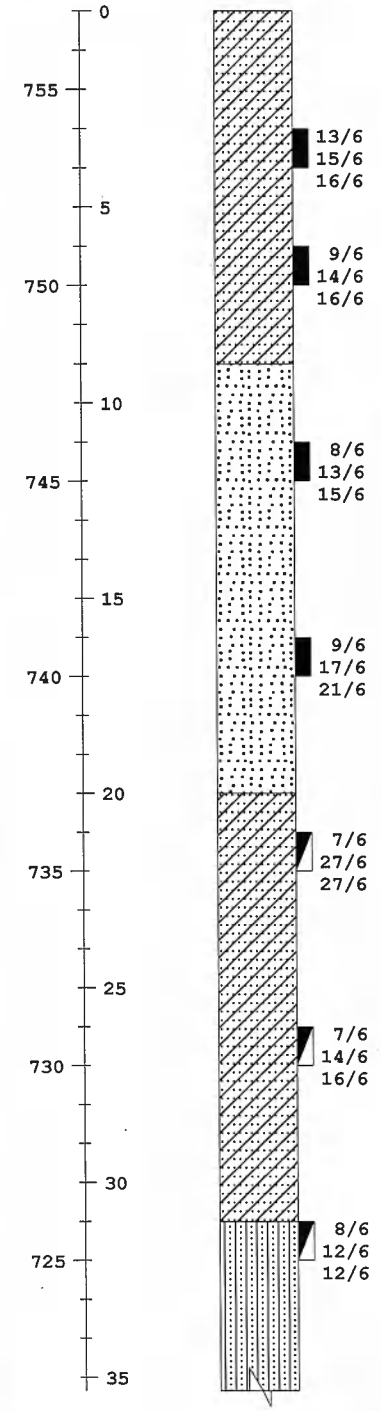
Trench Number: FT2 Project Number: 17189 Location: Starts ~200' north and ~280' West of SEC

Fault Trench FT2 Sheet 2 of 2

LOG OF TEST BORING
BORING B-1

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/24/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▽ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/23/19*
FINISH: *9/23/19*
LOGGER: *M. WATTS*



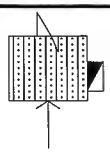
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND; light reddish-brown; dry; low plasticity.			
			Dense.		109.5	5.3
					118.1	4.8
		SP	POORLY GRADED SAND; light yellowish-brown; dry; fine to medium.			
			Medium dense; fine.		113.0	1.4
			Dense.		101.8	1.3
		SC	CLAYEY SAND; yellowish-brown; dry to damp; low plasticity.			7.3
			Very dense.			
			Dense.			7.4
		SM	SILTY SAND; light yellish-brown; medium dense; cohesvie; trace of gravel.			3.4

Figure Number 2

LOG OF TEST BORING
BORING B-1

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/24/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ⏚ **:** *N/A* **CAVING -** ➧ **:** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/23/19*
FINISH: *9/23/19*
LOGGER: *M. WATTS*



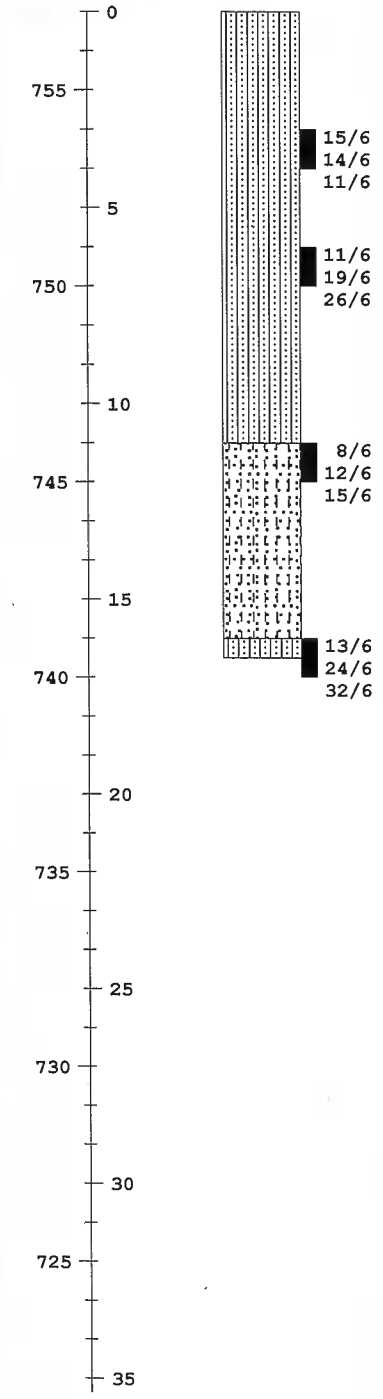
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
720			Dense; rock.	Sampler bouncing on rock.		1.2
			BOTTOM. Refusal at 37' due to rock.			
40						
715						
45						
710						
50						
705						
55						
700						
60						
695						
65						
690						
70						

Figure Number 2

LOG OF TEST BORING
BORING B-2

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/24/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ **:** *N/A* **CAVING -** ▶ **:** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/23/19*
FINISH: *9/23/19*
LOGGER: *M. WATTS*



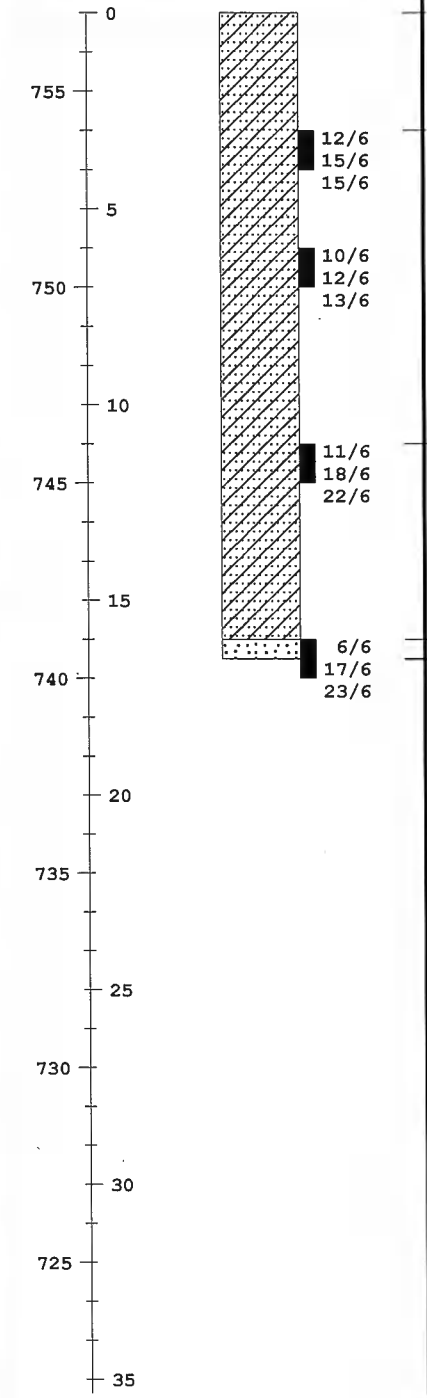
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SM	SILTY SAND; light reddish-brown; trace of clay; dry; fine.			
			Medium dense.		110.4	3.4
			Dense.		119.4	1.1
		SP-SM	POORLY GRADED SAND with low fine content; yellowish-brown; non cohesive; medium dense; fine to medium.		108.5	2.8
		SM	SILTY SAND; yellowish-brown; dry to damp; very dense; fine.		120.3	5.1
			BOTTOM.			

Figure Number 3

LOG OF TEST BORING
BORING B-3

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/24/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▽ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/23/19*
FINISH: *9/23/19*
LOGGER: *M. WATTS*



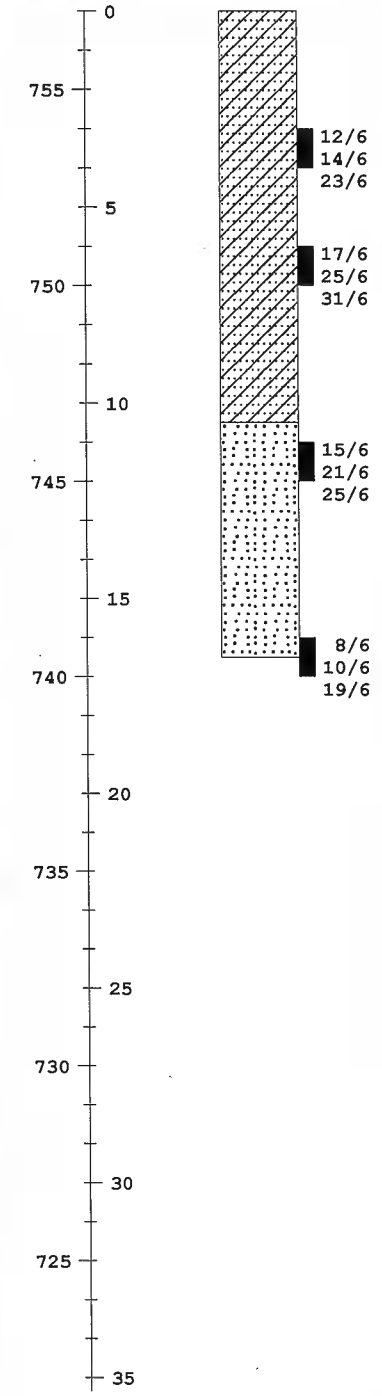
ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	SC	CLAYEY SAND; reddish-brown; dry to damp; low plasticity.			
		Medium dense.		98.7	6.3
				109.4	3.3
		Dense.		108.2	1.5
	SP	POORLY GRADED SAND; light yellowish-brown; non cohesive; dense.		102.1	1.4
		BOTTOM.			

Figure Number 4

LOG OF TEST BORING
BORING B-4

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/26/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ⏚ : *N/A* **CAVING - ➧ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/24/19*
FINISH: *9/24/19*
LOGGER: *M. WATTS*



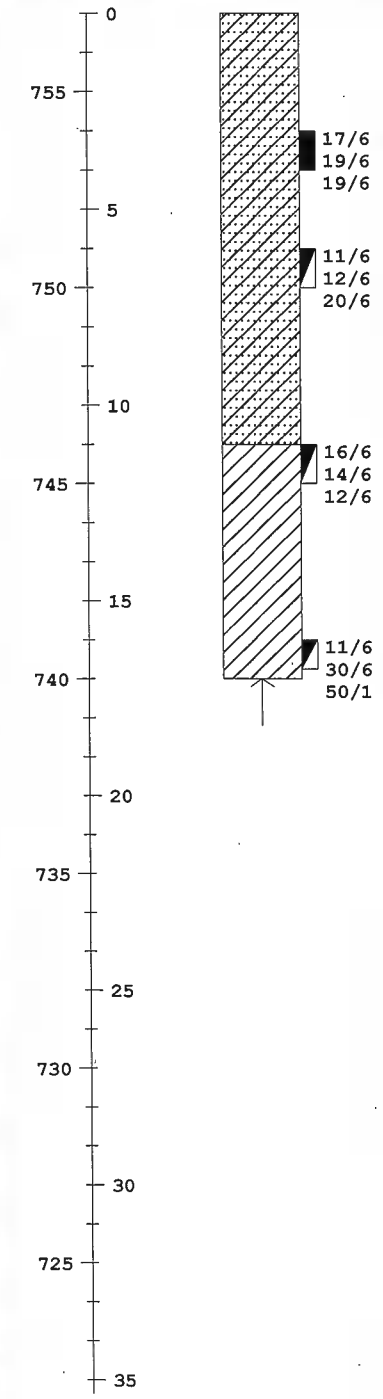
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND; light reddish-brown; dry; low plasticity.			
			Dense.		110.6	7.7
			Very dense		104.6	6.1
		SP	POORLY GRADED SAND; light yellowish-brown; dry; fine to medium.		113.8	1.5
			Dense.			
			Medium dense; fine.		100.8	1.8
			BOTTOM.			

Figure Number 5

LOG OF TEST BORING
BORING B-5

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/26/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/24/19*
FINISH: *9/24/19*
LOGGER: *M. WATTS*



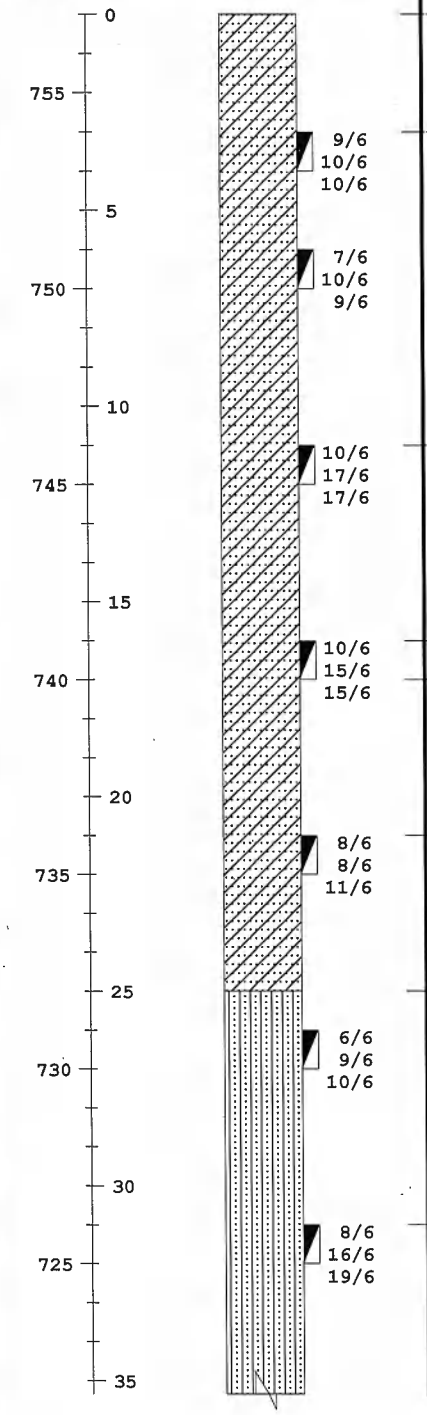
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND; light reddish-brown; dry; low plasticity.			
			Dense.		114.8	4.6
			Slow drilling due to rock.			5.0
		CL	SILTY CLAY; yellowish-brown; dry; very stiff; low plasticity.			4.7
			Hard; rock.			3.1
			BOTTOM. Refusal due to rock at 17'.	Rock snapped off center stem bit and chewed up auger bit.		

Figure Number 6

LOG OF TEST BORING
BORING B-6

PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ⏚ **:** *N/A* **CAVING -** ➧ **:** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/30/19*
FINISH: *9/30/19*
LOGGER: *M. WATTS*



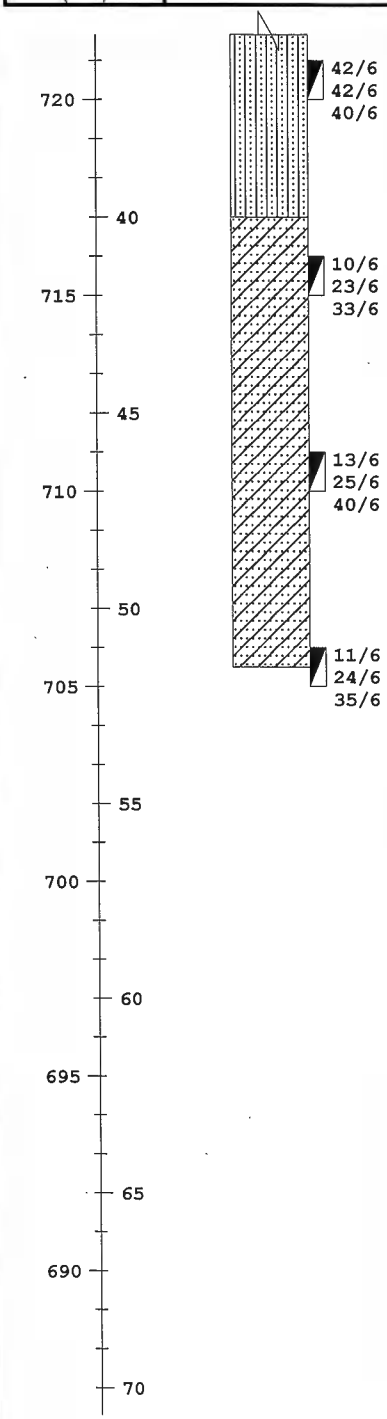
ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	SC	CLAYEY SAND; light reddish-brown; dry; low plasticity.			
		Medium dense.			7.2
					3.4
		Dense.			5.9
		Light yellowish-brown.			6.5
		Rock.			
	SC	Medium dense.			5.7
	SM	SILTY SAND; light yellowish-brown; dry to damp; fine; traces of clay.			11.0
		Dense.			3.9

Figure Number 7

LOG OF TEST BORING
BORING B-6

PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▽ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/30/19*
FINISH: *9/30/19*
LOGGER: *M. WATTS*



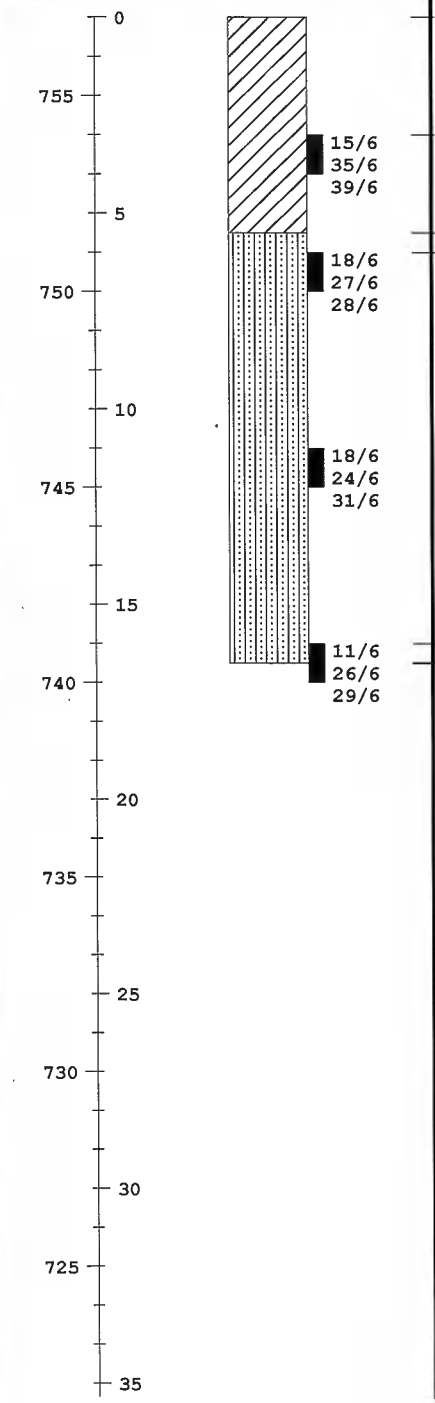
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
			Very dense; rock; slow drilling.			1.3
		SC	CLAYEY SAND; light yellowish-brown; dry to damp; low plasticity.			10.2
			Very dense.			12.3
			BOTTOM.			12.5

Figure Number 7

LOG OF TEST BORING
BORING B-7

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/26/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ **:** *N/A* **CAVING -** ▶ **:** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/24/19*
FINISH: *9/24/19*
LOGGER: *M. WATTS*



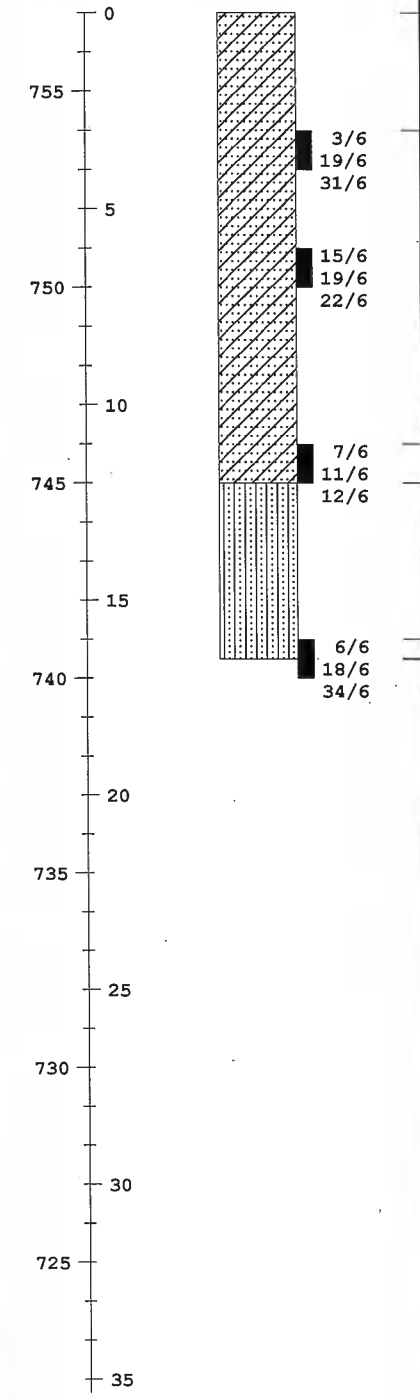
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
0		CL	SANDY CLAY; light reddish-brown; dry; low plasticity.			
755	15/6 35/6 39/6		Reddish-brown; hard.		121.2	7.7
5		SM	SILTY SAND; light reddish-brown; dry to damp; fine; traces of clay.		115.0	3.5
750	18/6 27/6 28/6		Very dense.			
10						
745	18/6 24/6 31/6				114.6	4.5
15						
740	11/6 26/6 29/6		POORLY GRADED SAND; light brown; non cohesive; very dense, dry.		112.5	1.9
20			BOTTOM.			
735						
25						
730						
30						
725						
35						

Figure Number 8

LOG OF TEST BORING
BORING B-8

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/26/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/24/19*
FINISH: *9/24/19*
LOGGER: *M. WATTS*



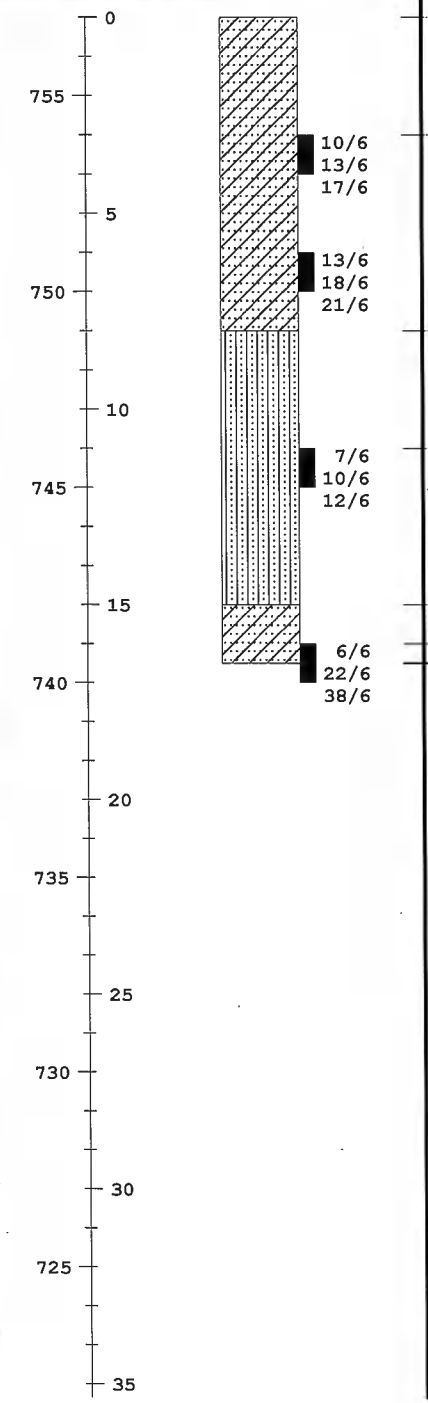
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND; light reddish-brown; dry; low plasticity.			
		SC	Dense.		115.5	6.3
					110.8	3.3
			Medium dense.		100.3	1.2
		SM	SILTY SAND; light yellowish-brown; dry; fine; nose cone.			
			Very dense.		112.4	6.1
			BOTTOM.			

Figure Number 9

LOG OF TEST BORING
BORING B-9

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/27/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ⬟ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/26/19*
FINISH: *9/26/19*
LOGGER: *M. WATTS*



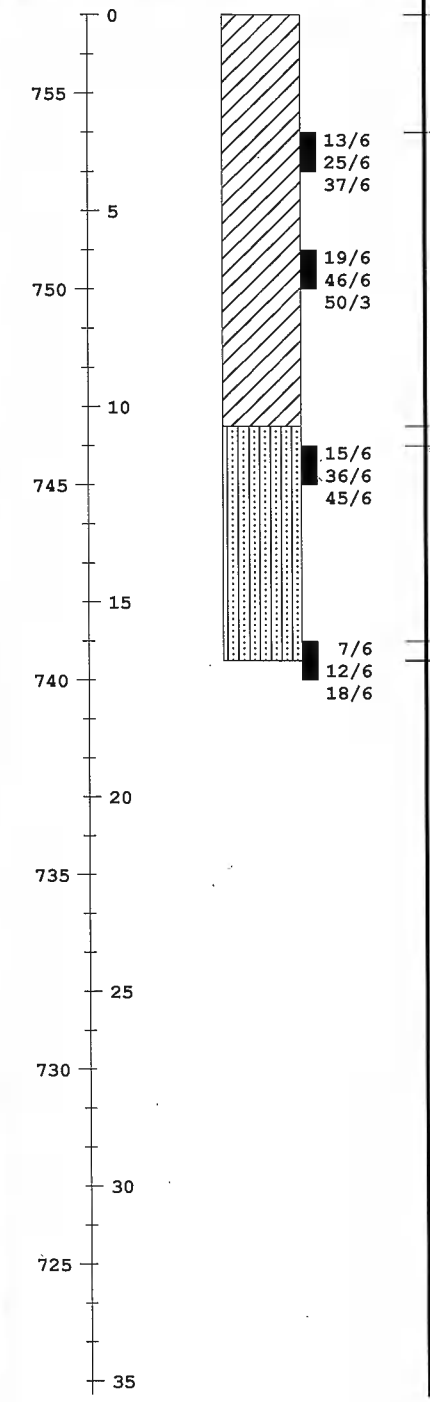
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND; yellowish-brown; dry; low plasticity.			
			Dense.		111.6	7.7
					113.9	8.0
		SM	SILTY SAND; yellowish-brown; dry to damp; fine.			
			Medium dense.		110.2	4.6
		SC	CLAYEY SAND; yellowish-brown; damp; low to medium plasticity.		123.5	13.5
			Very dense.			
			BOTTOM.			

Figure Number 10

LOG OF TEST BORING
BORING B-10

PROJECT: *BCSD New Elementary School*
BORING DATE: */19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ⏚ : *N/A* **CAVING - ⯈ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/26/19*
FINISH: *9/26/19*
LOGGER: *M. WATTS*



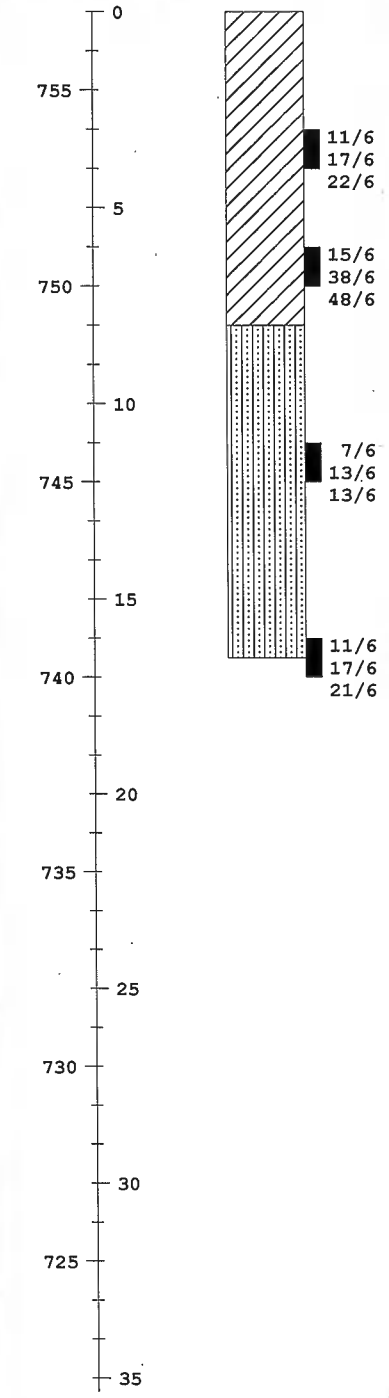
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY; reddish-brown; dry to damp; low to medium plasticity.			
			Hard.		125.4	10.1
					121.5	9.1
		SM	SILTY SAND; light reddish-brown; dry; fine; traces of clay.		123.5	4.1
			Very dense.			
			Dense.		102.7	2.4
			BOTTOM.			

Figure Number 11

LOG OF TEST BORING
BORING B-11

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/27/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/26/19*
FINISH: *9/26/19*
LOGGER: *M. WATTS*



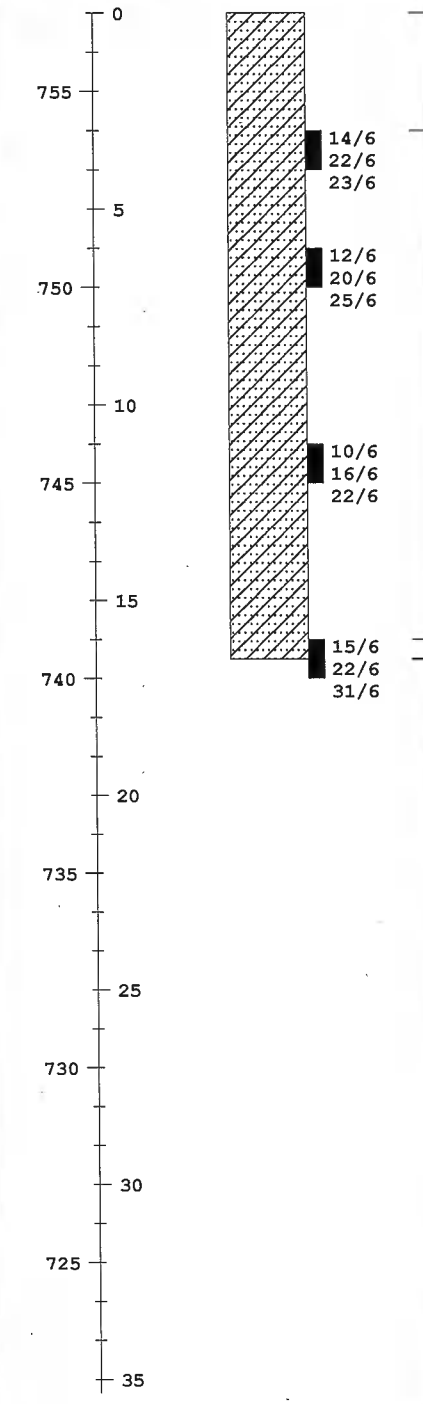
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY; light reddish-brown; dry; low plasticity.			
			Hard.		113.2	11.4
			Rock.		104.7	5.3
		SM	SILTY SAND; light yellowish-brown; dry; fine to medium.			
			Medium dense.		110.9	2.5
			Dense.		106.6	1.7
			BOTTOM.			

Figure Number 12

LOG OF TEST BORING
BORING B-12

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/27/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ **:** *N/A* **CAVING -** ▶ **:** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/26/19*
FINISH: *9/26/19*
LOGGER: *M. WATTS*



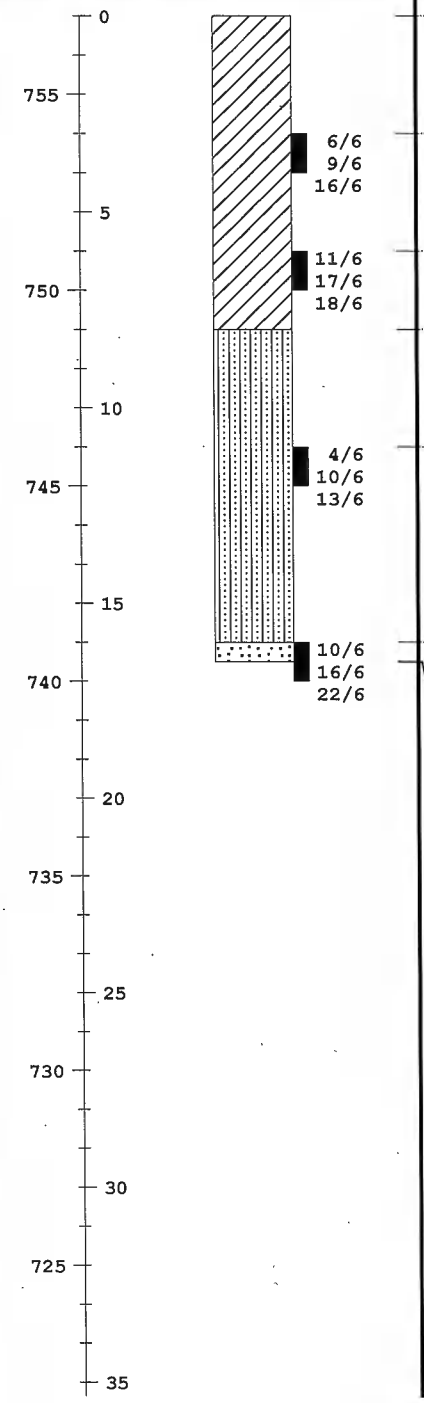
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND; light reddish-brown; dry; low plasticity.			
			Dense.		109.6	8.3
					112.9	9.1
					112.0	2.4
			Very dense.		111.1	1.6
			BOTTOM.			

Figure Number 13

LOG OF TEST BORING
BORING B-13

PROJECT: *BCSD New Elementary School*
BORING DATE: *9/27/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/26/19*
FINISH: *9/26/19*
LOGGER: *M. WATTS*



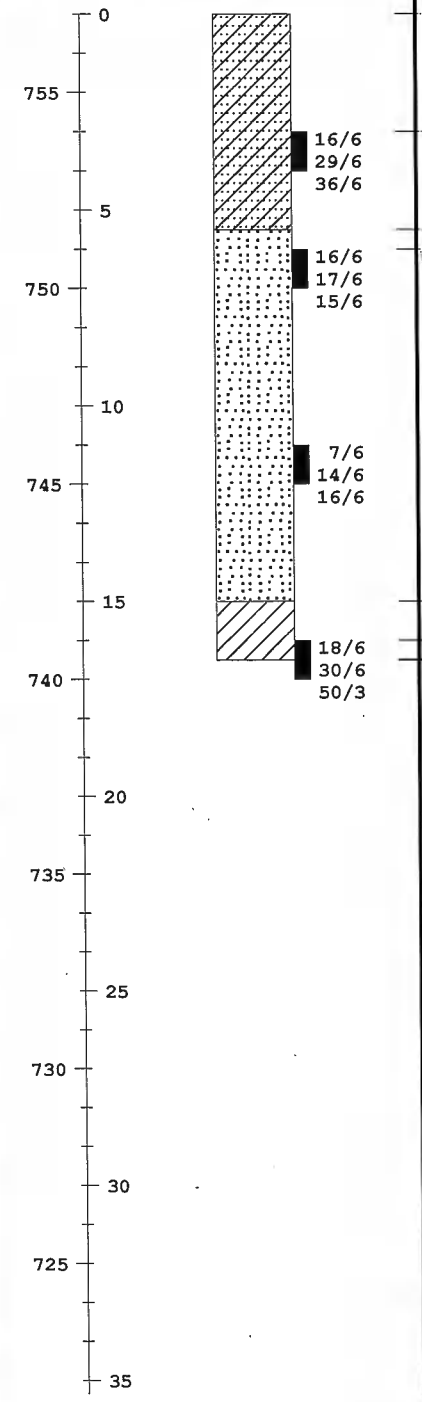
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY; light reddish-brown; dry; low plasticity.			
			Very stiff.		99.0	9.3
			Hard.		105.6	6.7
		SM	SILTY SAND; light yellowish-brown; dry; fine to medium.			
			Medium dense.		110.2	1.8
		SP	POORLY GRADED SAND; light yellowish-brown; non cohesive; dense.		107.2	2.2
			BOTTOM.			

Figure Number 14

LOG OF TEST BORING
BORING B-14

PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ⏚ : *N/A* **CAVING - ⏵ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/27/19*
FINISH: *9/27/19*
LOGGER: *M. WATTS*



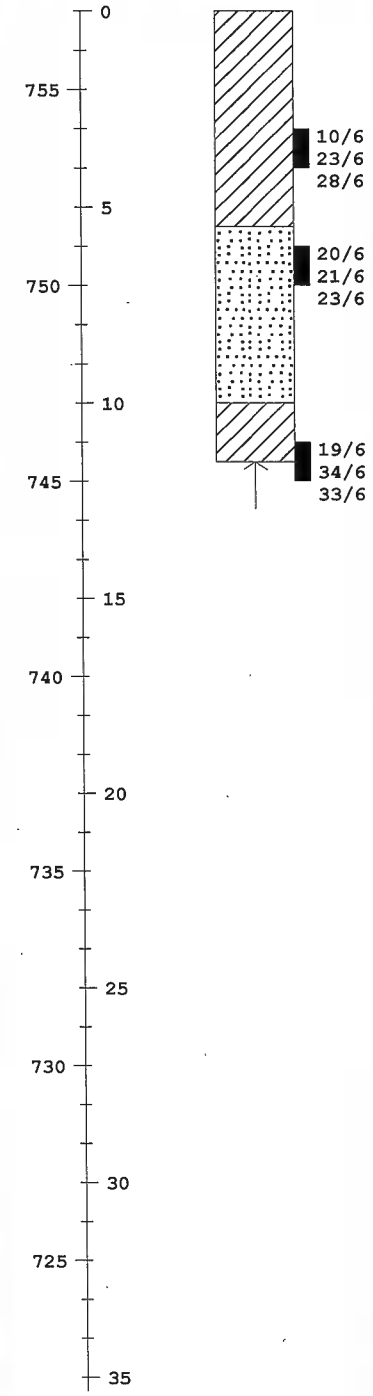
ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	SC	CLAYEY SAND; light reddish-brown; dry; low plasticity.			
		Very dense; rock.		119.2	7.5
	SP	POORLY GRADED SAND; light reddish-brown; dry; fine; traces of clay.		110.5	4.8
		Dense; slow drilling due to rock.		104.9	2.1
	CL	SANDY CLAY; light reddish-brown; dry; low to medium plasticity.		130.3	8.7
		Hard.			
		BOTTOM.			

Figure Number 15

LOG OF TEST BORING
BORING B-15

PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▽ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/27/19*
FINISH: *9/27/19*
LOGGER: *M. WATTS*



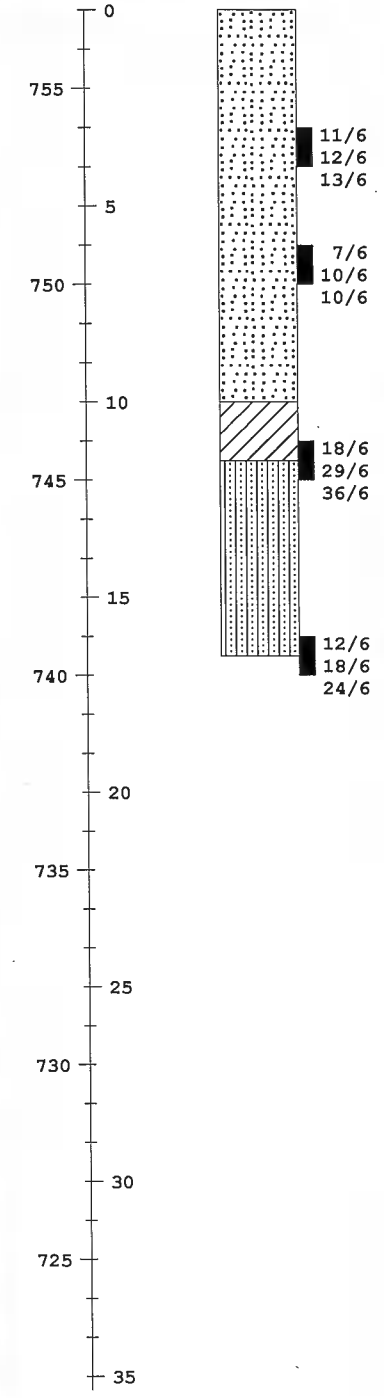
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY; light reddish-brown; dry; low to medium plasticity.			
			Hard; rock.		124.9	12.1
		SP	POORLY GRADED SAND; light yellowish-brown; dry; fine; traces of clay.		104.7	5.3
			Dense.			
		CL	CLAY; reddish-brown; dry to damp; low to medium plasticity.		113.2	12.7
			Hard.			
			BOTTOM. Refusal due to hard/ tight drilling.			

Figure Number 16

LOG OF TEST BORING
BORING B-16

PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ⏚ **:** *N/A* **CAVING -** ➧ **:** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/30/19*
FINISH: *9/30/19*
LOGGER: *M. WATTS*



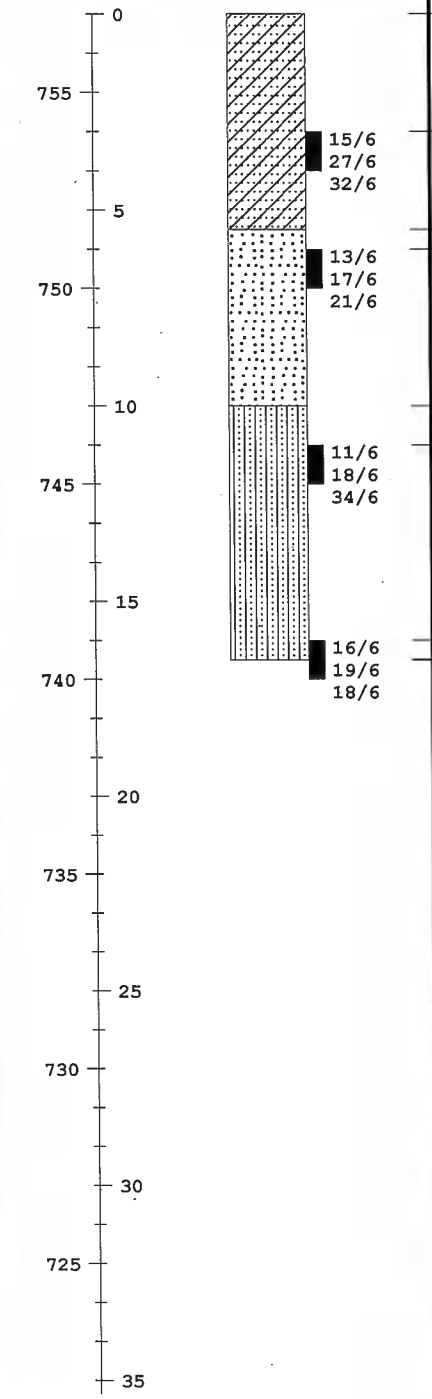
ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	SP	POORLY GRADED SAND; light reddish-brown; dry; fine; traces of clay.			
		Medium dense.		108.1	3.0
				104.2	2.3
	CL	SANDY CLAY; reddish-brown; damp; low plasticity.		115.7	6.9
	SM	Very dense. SILTY SAND; light yellowish-brown; dry; fine; clay.			
		Dense.		116.8	10.7
		BOTTOM.			

Figure Number 17

LOG OF TEST BORING
BORING B-17

PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *9/30/19*
FINISH: *9/30/19*
LOGGER: *M. WATTS*



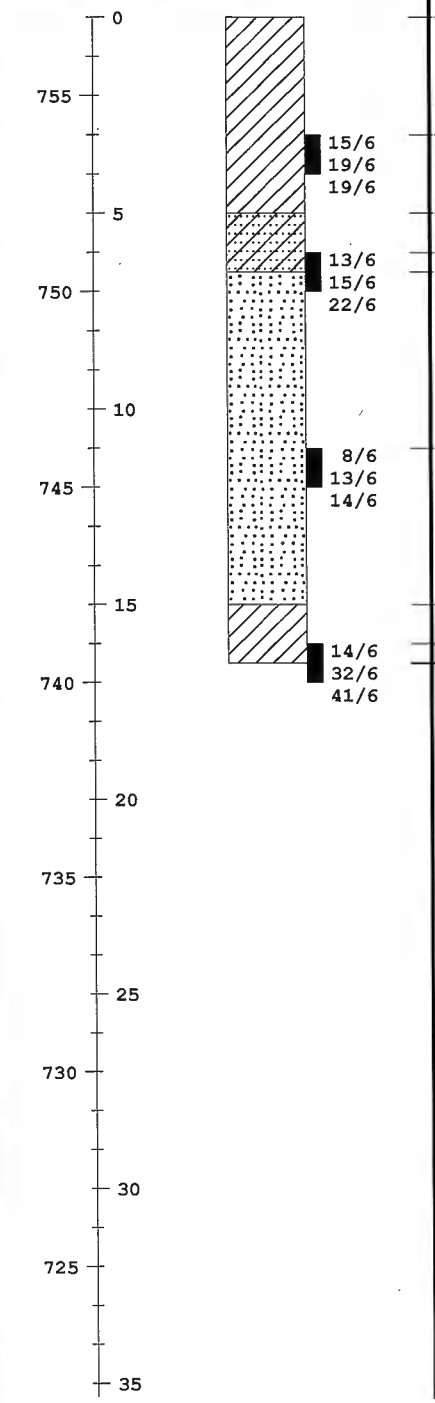
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND; light reddish-brown; dry; low plasticity.			
			Very dense.		95.2	14.8
		SP	POORLY GRADED SAND; light reddish-brown; dry; fine to medium.		114.7	3.0
			Dense.			
		SM	SILTY SAND; yellowish-brown; dry to damp; fine; traces of clay.		118.7	5.8
			Very dense; rock.			
			Dense.		108.0	7.1
			BOTTOM.			

Figure Number 18

LOG OF TEST BORING
BORING B-18

PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▼ **:** *N/A* **CAVING -** ▶ **:** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *10/1/19*
FINISH: *10/1/19*
LOGGER: *M. WATTS*



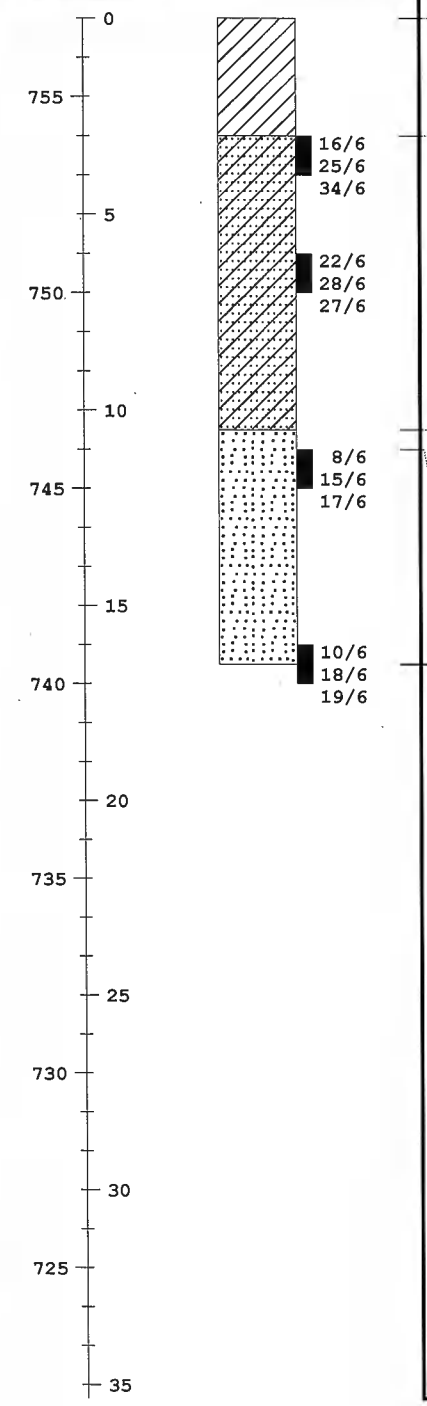
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	CLAY; light reddish-brown; dry; low plasticity.			
			Hard.		96.9	18.8
		SC	CLAYEY SAND; reddish-brown; dry to damp; fine to medium.		108.8	5.5
		SP	Dense. POORLY GRADED SAND; light yellowish-brown; dry; fine to medium; nose cone.			
			Medium dense.		110.5	1.5
		CL	CLAY; reddish-brown; dry to damp; low to medium plasticity.		101.5	1.5
			Hard.			
			BOTTOM.			

Figure Number 19

LOG OF TEST BORING
BORING B-19

PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▽ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *10/1/19*
FINISH: *10/1/19*
LOGGER: *M. WATTS*



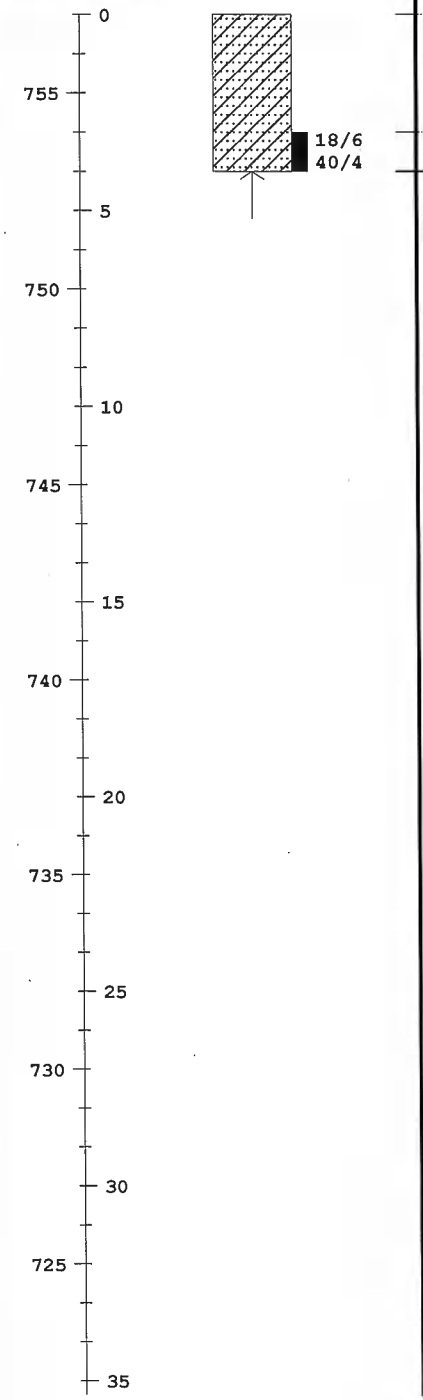
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	CLAY; light reddish-brown; dry; low plasticity.			
		SC	CLAYEY SAND; reddish-brown; dry to damp; very dense; low plasticity; rock.		108.0	8.5
					116.5	4.7
		SP	POORLY GRADED SAND; light yellowish-brown; dry; fine to medium. Dense.		110.5	1.5
			BOTTOM.		101.5	1.5

Figure Number 20

LOG OF TEST BORING
BORING B-20

PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▽ **:** *N/A* **CAVING -** ▶ **:** *N/A*

FILE NO: *17179*
ELEV.: *757'*
START: *10/1/19*
FINISH: *10/1/19*
LOGGER: *M. WATTS*



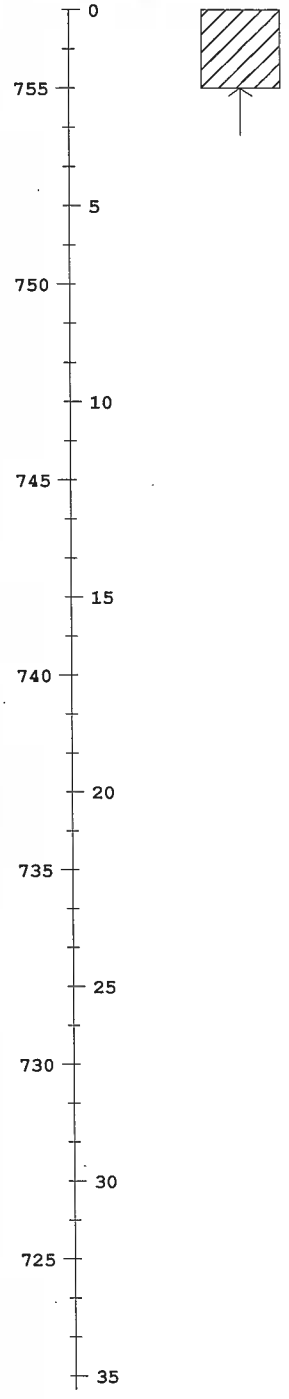
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND; light reddish-brown; dry; low plasticity.			
			Hard; rock; minimal recovery due to rock.	Moved 3 times, -15' E. of original & - 15' W.	97.8	3.3
			BOTTOM. Refusal due to rock.			

Figure Number 21

LOG OF TEST BORING
BORING B-21

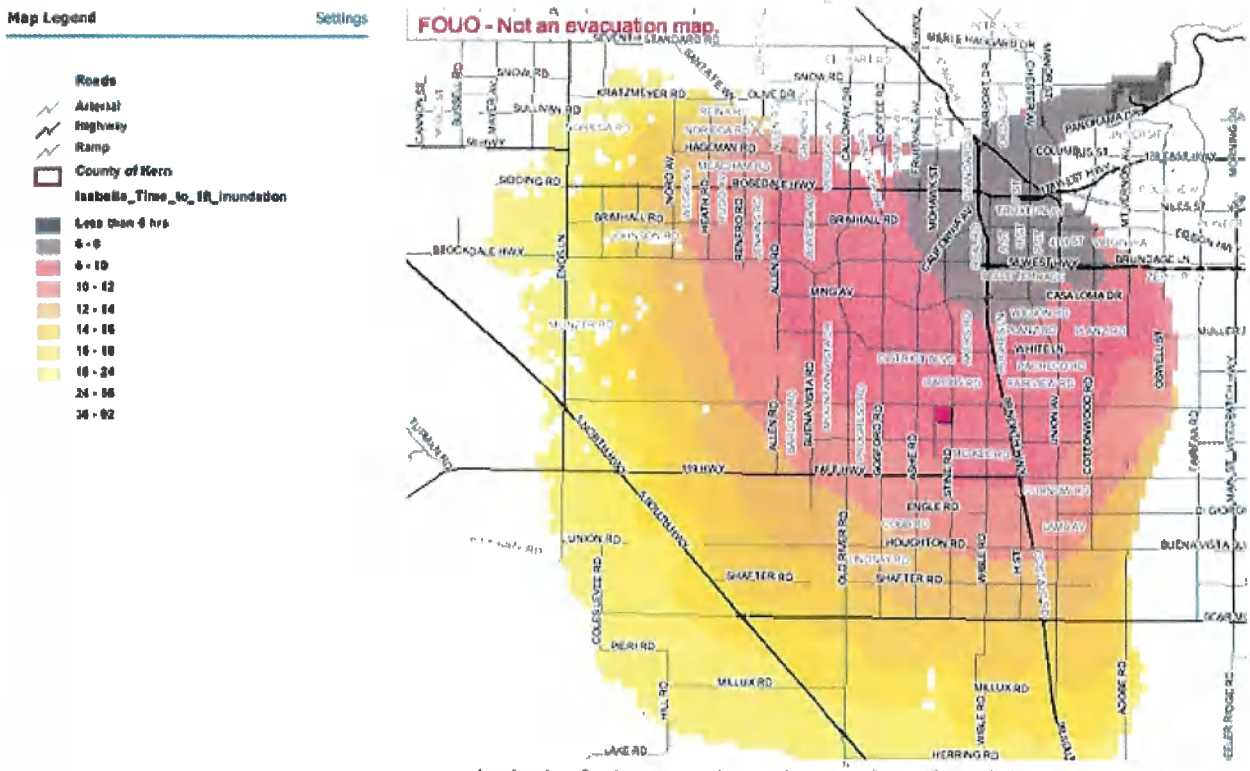
PROJECT: *BCSD New Elementary School*
BORING DATE: *10/10/19*
BORING LOCATION: *See Boring Location Map, Figure 1*
DRILL METHOD: *4.25" I.D. Hollow-Stem Auger*
DESCRIPTION: *Geotechnical Feasibility, Geohazard & FAULT Study*
DEPTH TO WATER - ▽ : *N/A* **CAVING - ▶ :** *N/A*

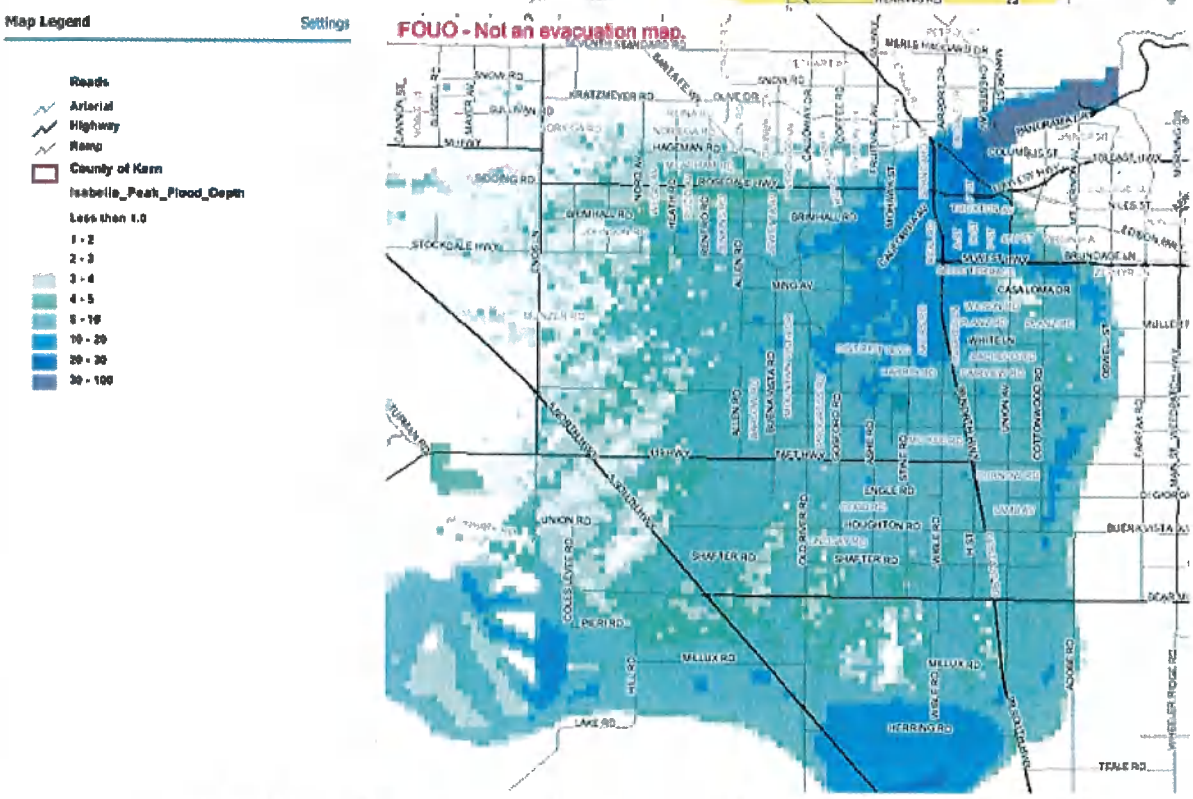
FILE NO: *17179*
ELEV.: *757'*
START: *10/1/19*
FINISH: *10/1/19*
LOGGER: *M. WATTS*



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	CLAY; light reddish-brown; dry; low plasticity; rock.			
			BOTTOM. Refusal due to rock.			

Figure Number 22

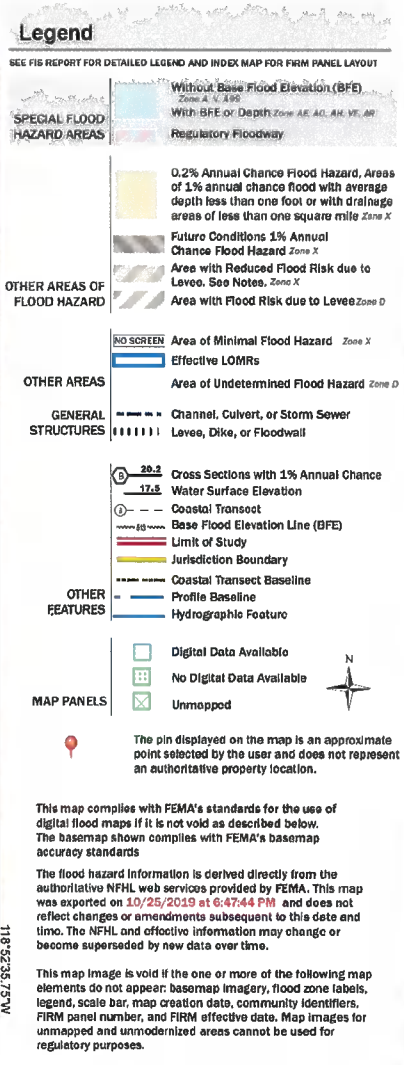




Source: Kern County Map Info System, US Army Corps of Engineers Preliminary Flood Results

SOILS ENGINEERING, INC. **4400 Yeager Way** **Bakersfield, CA 93313** **(661) 831 - 5100** DATE: 10/19 PROJECT: #17179	**Proposed BCSD School Site** **SW of Paladino Drive and Masterson Street** **Bakersfield, CA** **Lake Isabella Dam Inundation Map**	

National Flood Hazard Layer FIRMette



SOILS ENGINEERING, INC.
4400 Yeager Way
Bakersfield, CA 93313
(661) 831 - 5100

DATE: 10/19
PROJECT: #17179

Proposed BCSD School Site
SW of Paladino Drive and Masterson Street
Bakersfield, CA

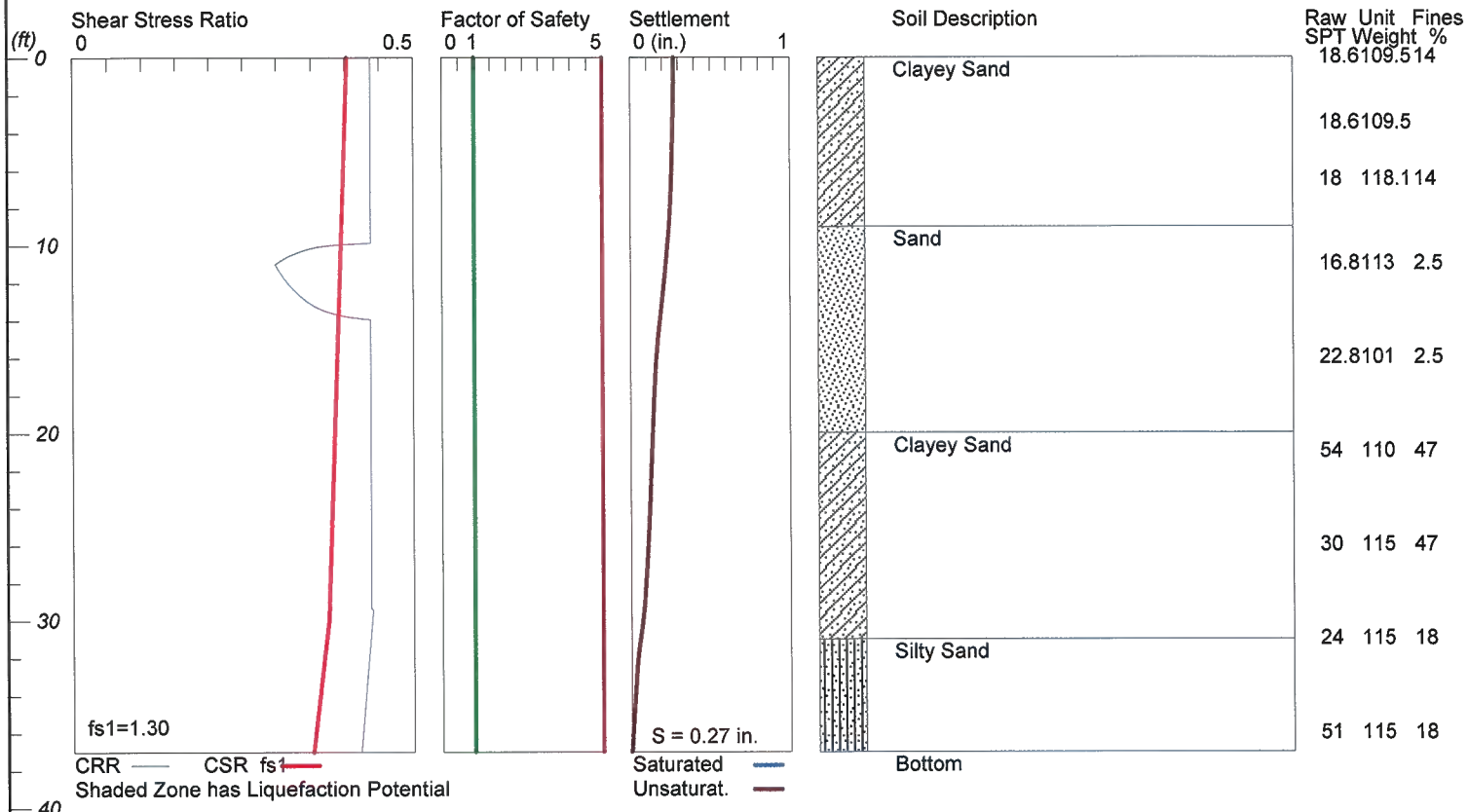
FEMA Map

LIQUEFACTION ANALYSIS

Proposed BCSD School Site

Hole No.=B-1 ***Water Depth=100 ft***

Magnitude=7.9
Acceleration=0.478g



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LIQUEFACTION ANALYSIS SUMMARY
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Font: Courier New, Regular, Size 8 is recommended for this report.
Licensed to Robert Becker, Soils Engineering 11/1/2019 10:46:33

Input File Name: O:\b. PROJECT FILES (ACTIVE)\17100-17199\17179 BCSD, New Elementary School, Geotechnical & Geohazard Study\OFFICE REPORTS\Geohaz\LiquefyPro files\17179 B-1 LiquefyPro.liq
Title: Proposed BCSD School Site
Subtitle: 17179

Surface Elev.=
Hole No.=B-1
Depth of Hole= 37.00 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 100.00 ft
Max. Acceleration= 0.48 g
Earthquake Magnitude= 7.90

Input Data:
Surface Elev.=
Hole No.=B-1
Depth of Hole=37.00 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 100.00 ft
Max. Acceleration=0.48 g
Earthquake Magnitude=7.90
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	18.60	109.50	14.00
3.50	18.60	109.50	14.00
6.50	18.00	118.10	14.00
11.00	16.80	113.00	2.50
16.00	22.80	101.00	2.50
21.00	54.00	110.00	47.00
26.00	30.00	115.00	47.00
31.00	24.00	115.00	18.00
36.00	51.00	115.00	18.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.27 in.
Total Settlement of Saturated and Unsaturated Sands=0.27 in.
Differential Settlement=0.137 to 0.181 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.44	0.40	5.00	0.00	0.27	0.27
0.05	0.44	0.40	5.00	0.00	0.27	0.27
0.10	0.44	0.40	5.00	0.00	0.27	0.27
0.15	0.44	0.40	5.00	0.00	0.27	0.27
0.20	0.44	0.40	5.00	0.00	0.27	0.27
0.25	0.44	0.40	5.00	0.00	0.27	0.27
0.30	0.44	0.40	5.00	0.00	0.27	0.27
0.35	0.44	0.40	5.00	0.00	0.27	0.27
0.40	0.44	0.40	5.00	0.00	0.27	0.27
0.45	0.44	0.40	5.00	0.00	0.27	0.27
0.50	0.44	0.40	5.00	0.00	0.27	0.27
0.55	0.44	0.40	5.00	0.00	0.27	0.27
0.60	0.44	0.40	5.00	0.00	0.27	0.27
0.65	0.44	0.40	5.00	0.00	0.27	0.27
0.70	0.44	0.40	5.00	0.00	0.27	0.27
0.75	0.44	0.40	5.00	0.00	0.27	0.27
0.80	0.44	0.40	5.00	0.00	0.27	0.27
0.85	0.44	0.40	5.00	0.00	0.27	0.27
0.90	0.44	0.40	5.00	0.00	0.27	0.27
0.95	0.44	0.40	5.00	0.00	0.27	0.27
1.00	0.44	0.40	5.00	0.00	0.27	0.27
1.05	0.44	0.40	5.00	0.00	0.27	0.27
1.10	0.44	0.40	5.00	0.00	0.27	0.27
1.15	0.44	0.40	5.00	0.00	0.27	0.27
1.20	0.44	0.40	5.00	0.00	0.27	0.27
1.25	0.44	0.40	5.00	0.00	0.27	0.27
1.30	0.44	0.40	5.00	0.00	0.27	0.27
1.35	0.44	0.40	5.00	0.00	0.27	0.27
1.40	0.44	0.40	5.00	0.00	0.27	0.27
1.45	0.44	0.40	5.00	0.00	0.27	0.27
1.50	0.44	0.40	5.00	0.00	0.27	0.27
1.55	0.44	0.40	5.00	0.00	0.27	0.27
1.60	0.44	0.40	5.00	0.00	0.27	0.27
1.65	0.44	0.40	5.00	0.00	0.27	0.27
1.70	0.44	0.40	5.00	0.00	0.27	0.27

1.75	0.44	0.40	5.00	0.00	0.27	0.27
1.80	0.44	0.40	5.00	0.00	0.27	0.27
1.85	0.44	0.40	5.00	0.00	0.27	0.27
1.90	0.44	0.40	5.00	0.00	0.27	0.27
1.95	0.44	0.40	5.00	0.00	0.27	0.27
2.00	0.44	0.40	5.00	0.00	0.27	0.27
2.05	0.44	0.40	5.00	0.00	0.27	0.27
2.10	0.44	0.40	5.00	0.00	0.27	0.27
2.15	0.44	0.40	5.00	0.00	0.27	0.27
2.20	0.44	0.40	5.00	0.00	0.27	0.27
2.25	0.44	0.40	5.00	0.00	0.27	0.27
2.30	0.44	0.40	5.00	0.00	0.27	0.27
2.35	0.44	0.40	5.00	0.00	0.27	0.27
2.40	0.44	0.40	5.00	0.00	0.27	0.27
2.45	0.44	0.40	5.00	0.00	0.27	0.27
2.50	0.44	0.40	5.00	0.00	0.27	0.27
2.55	0.44	0.40	5.00	0.00	0.27	0.27
2.60	0.44	0.40	5.00	0.00	0.27	0.27
2.65	0.44	0.40	5.00	0.00	0.27	0.27
2.70	0.44	0.40	5.00	0.00	0.27	0.27
2.75	0.44	0.40	5.00	0.00	0.27	0.27
2.80	0.44	0.40	5.00	0.00	0.27	0.27
2.85	0.44	0.40	5.00	0.00	0.27	0.27
2.90	0.44	0.40	5.00	0.00	0.27	0.27
2.95	0.44	0.40	5.00	0.00	0.27	0.27
3.00	0.44	0.40	5.00	0.00	0.27	0.27
3.05	0.44	0.40	5.00	0.00	0.27	0.27
3.10	0.44	0.40	5.00	0.00	0.27	0.27
3.15	0.44	0.40	5.00	0.00	0.27	0.27
3.20	0.44	0.40	5.00	0.00	0.27	0.27
3.25	0.44	0.40	5.00	0.00	0.27	0.27
3.30	0.44	0.40	5.00	0.00	0.27	0.27
3.35	0.44	0.40	5.00	0.00	0.27	0.27
3.40	0.44	0.40	5.00	0.00	0.27	0.27
3.45	0.44	0.40	5.00	0.00	0.27	0.27
3.50	0.44	0.40	5.00	0.00	0.27	0.27
3.55	0.44	0.40	5.00	0.00	0.27	0.27
3.60	0.44	0.40	5.00	0.00	0.27	0.27
3.65	0.44	0.40	5.00	0.00	0.27	0.27
3.70	0.44	0.40	5.00	0.00	0.27	0.27
3.75	0.44	0.40	5.00	0.00	0.27	0.27
3.80	0.44	0.40	5.00	0.00	0.27	0.27
3.85	0.44	0.40	5.00	0.00	0.27	0.27
3.90	0.44	0.40	5.00	0.00	0.27	0.27
3.95	0.44	0.40	5.00	0.00	0.27	0.27
4.00	0.44	0.40	5.00	0.00	0.27	0.27
4.05	0.44	0.40	5.00	0.00	0.27	0.27
4.10	0.44	0.40	5.00	0.00	0.27	0.27
4.15	0.44	0.40	5.00	0.00	0.27	0.27
4.20	0.44	0.40	5.00	0.00	0.27	0.27
4.25	0.44	0.40	5.00	0.00	0.27	0.27
4.30	0.44	0.40	5.00	0.00	0.27	0.27
4.35	0.44	0.40	5.00	0.00	0.27	0.27
4.40	0.44	0.40	5.00	0.00	0.27	0.27
4.45	0.44	0.40	5.00	0.00	0.27	0.27
4.50	0.44	0.40	5.00	0.00	0.27	0.27
4.55	0.44	0.40	5.00	0.00	0.27	0.27
4.60	0.44	0.40	5.00	0.00	0.27	0.27
4.65	0.44	0.40	5.00	0.00	0.27	0.27

4.70	0.44	0.40	5.00	0.00	0.27	0.27
4.75	0.44	0.40	5.00	0.00	0.27	0.27
4.80	0.44	0.40	5.00	0.00	0.26	0.26
4.85	0.44	0.40	5.00	0.00	0.26	0.26
4.90	0.44	0.40	5.00	0.00	0.26	0.26
4.95	0.44	0.40	5.00	0.00	0.26	0.26
5.00	0.44	0.40	5.00	0.00	0.26	0.26
5.05	0.44	0.40	5.00	0.00	0.26	0.26
5.10	0.44	0.40	5.00	0.00	0.26	0.26
5.15	0.44	0.40	5.00	0.00	0.26	0.26
5.20	0.44	0.40	5.00	0.00	0.26	0.26
5.25	0.44	0.40	5.00	0.00	0.26	0.26
5.30	0.44	0.40	5.00	0.00	0.26	0.26
5.35	0.44	0.40	5.00	0.00	0.26	0.26
5.40	0.44	0.40	5.00	0.00	0.26	0.26
5.45	0.44	0.40	5.00	0.00	0.26	0.26
5.50	0.44	0.40	5.00	0.00	0.26	0.26
5.55	0.44	0.40	5.00	0.00	0.26	0.26
5.60	0.44	0.40	5.00	0.00	0.26	0.26
5.65	0.44	0.40	5.00	0.00	0.26	0.26
5.70	0.44	0.40	5.00	0.00	0.26	0.26
5.75	0.44	0.40	5.00	0.00	0.26	0.26
5.80	0.44	0.40	5.00	0.00	0.26	0.26
5.85	0.44	0.40	5.00	0.00	0.26	0.26
5.90	0.44	0.40	5.00	0.00	0.26	0.26
5.95	0.44	0.40	5.00	0.00	0.26	0.26
6.00	0.44	0.40	5.00	0.00	0.26	0.26
6.05	0.44	0.40	5.00	0.00	0.26	0.26
6.10	0.44	0.40	5.00	0.00	0.26	0.26
6.15	0.44	0.40	5.00	0.00	0.26	0.26
6.20	0.44	0.40	5.00	0.00	0.26	0.26
6.25	0.44	0.40	5.00	0.00	0.26	0.26
6.30	0.44	0.40	5.00	0.00	0.26	0.26
6.35	0.44	0.40	5.00	0.00	0.26	0.26
6.40	0.44	0.40	5.00	0.00	0.26	0.26
6.45	0.44	0.40	5.00	0.00	0.26	0.26
6.50	0.44	0.40	5.00	0.00	0.26	0.26
6.55	0.44	0.40	5.00	0.00	0.26	0.26
6.60	0.44	0.40	5.00	0.00	0.26	0.26
6.65	0.44	0.40	5.00	0.00	0.26	0.26
6.70	0.44	0.40	5.00	0.00	0.26	0.26
6.75	0.44	0.40	5.00	0.00	0.26	0.26
6.80	0.44	0.40	5.00	0.00	0.26	0.26
6.85	0.44	0.40	5.00	0.00	0.26	0.26
6.90	0.44	0.40	5.00	0.00	0.26	0.26
6.95	0.44	0.40	5.00	0.00	0.26	0.26
7.00	0.44	0.40	5.00	0.00	0.26	0.26
7.05	0.44	0.40	5.00	0.00	0.26	0.26
7.10	0.44	0.40	5.00	0.00	0.26	0.26
7.15	0.44	0.40	5.00	0.00	0.26	0.26
7.20	0.44	0.40	5.00	0.00	0.26	0.26
7.25	0.44	0.40	5.00	0.00	0.26	0.26
7.30	0.44	0.40	5.00	0.00	0.25	0.25
7.35	0.44	0.40	5.00	0.00	0.25	0.25
7.40	0.44	0.40	5.00	0.00	0.25	0.25
7.45	0.44	0.40	5.00	0.00	0.25	0.25
7.50	0.44	0.40	5.00	0.00	0.25	0.25
7.55	0.44	0.40	5.00	0.00	0.25	0.25
7.60	0.44	0.40	5.00	0.00	0.25	0.25

7.65	0.44	0.40	5.00	0.00	0.25	0.25
7.70	0.44	0.40	5.00	0.00	0.25	0.25
7.75	0.44	0.40	5.00	0.00	0.25	0.25
7.80	0.44	0.40	5.00	0.00	0.25	0.25
7.85	0.44	0.40	5.00	0.00	0.25	0.25
7.90	0.44	0.40	5.00	0.00	0.25	0.25
7.95	0.44	0.40	5.00	0.00	0.25	0.25
8.00	0.44	0.40	5.00	0.00	0.25	0.25
8.05	0.44	0.40	5.00	0.00	0.25	0.25
8.10	0.44	0.40	5.00	0.00	0.25	0.25
8.15	0.44	0.40	5.00	0.00	0.25	0.25
8.20	0.44	0.40	5.00	0.00	0.25	0.25
8.25	0.44	0.40	5.00	0.00	0.25	0.25
8.30	0.44	0.40	5.00	0.00	0.25	0.25
8.35	0.44	0.40	5.00	0.00	0.25	0.25
8.40	0.44	0.40	5.00	0.00	0.25	0.25
8.45	0.44	0.40	5.00	0.00	0.25	0.25
8.50	0.44	0.40	5.00	0.00	0.25	0.25
8.55	0.44	0.40	5.00	0.00	0.25	0.25
8.60	0.44	0.40	5.00	0.00	0.25	0.25
8.65	0.44	0.40	5.00	0.00	0.25	0.25
8.70	0.44	0.40	5.00	0.00	0.25	0.25
8.75	0.44	0.40	5.00	0.00	0.25	0.25
8.80	0.44	0.40	5.00	0.00	0.25	0.25
8.85	0.44	0.40	5.00	0.00	0.24	0.24
8.90	0.44	0.40	5.00	0.00	0.24	0.24
8.95	0.44	0.40	5.00	0.00	0.24	0.24
9.00	0.44	0.40	5.00	0.00	0.24	0.24
9.05	0.44	0.40	5.00	0.00	0.24	0.24
9.10	0.44	0.40	5.00	0.00	0.24	0.24
9.15	0.44	0.40	5.00	0.00	0.24	0.24
9.20	0.44	0.40	5.00	0.00	0.24	0.24
9.25	0.44	0.40	5.00	0.00	0.24	0.24
9.30	0.44	0.40	5.00	0.00	0.24	0.24
9.35	0.44	0.40	5.00	0.00	0.24	0.24
9.40	0.44	0.40	5.00	0.00	0.24	0.24
9.45	0.44	0.40	5.00	0.00	0.24	0.24
9.50	0.44	0.39	5.00	0.00	0.24	0.24
9.55	0.44	0.39	5.00	0.00	0.24	0.24
9.60	0.44	0.39	5.00	0.00	0.24	0.24
9.65	0.44	0.39	5.00	0.00	0.24	0.24
9.70	0.44	0.39	5.00	0.00	0.24	0.24
9.75	0.44	0.39	5.00	0.00	0.24	0.24
9.80	0.44	0.39	5.00	0.00	0.24	0.24
9.85	0.44	0.39	5.00	0.00	0.23	0.23
9.90	0.41	0.39	5.00	0.00	0.23	0.23
9.95	0.39	0.39	5.00	0.00	0.23	0.23
10.00	0.37	0.39	5.00	0.00	0.23	0.23
10.05	0.36	0.39	5.00	0.00	0.23	0.23
10.10	0.35	0.39	5.00	0.00	0.23	0.23
10.15	0.35	0.39	5.00	0.00	0.23	0.23
10.20	0.34	0.39	5.00	0.00	0.23	0.23
10.25	0.34	0.39	5.00	0.00	0.23	0.23
10.30	0.34	0.39	5.00	0.00	0.23	0.23
10.35	0.33	0.39	5.00	0.00	0.23	0.23
10.40	0.33	0.39	5.00	0.00	0.23	0.23
10.45	0.32	0.39	5.00	0.00	0.23	0.23
10.50	0.32	0.39	5.00	0.00	0.23	0.23
10.55	0.32	0.39	5.00	0.00	0.23	0.23

10.60	0.32	0.39	5.00	0.00	0.23	0.23
10.65	0.31	0.39	5.00	0.00	0.23	0.23
10.70	0.31	0.39	5.00	0.00	0.23	0.23
10.75	0.31	0.39	5.00	0.00	0.22	0.22
10.80	0.31	0.39	5.00	0.00	0.22	0.22
10.85	0.30	0.39	5.00	0.00	0.22	0.22
10.90	0.30	0.39	5.00	0.00	0.22	0.22
10.95	0.30	0.39	5.00	0.00	0.22	0.22
11.00	0.30	0.39	5.00	0.00	0.22	0.22
11.05	0.30	0.39	5.00	0.00	0.22	0.22
11.10	0.30	0.39	5.00	0.00	0.22	0.22
11.15	0.30	0.39	5.00	0.00	0.22	0.22
11.20	0.30	0.39	5.00	0.00	0.22	0.22
11.25	0.30	0.39	5.00	0.00	0.22	0.22
11.30	0.30	0.39	5.00	0.00	0.22	0.22
11.35	0.30	0.39	5.00	0.00	0.22	0.22
11.40	0.31	0.39	5.00	0.00	0.22	0.22
11.45	0.31	0.39	5.00	0.00	0.22	0.22
11.50	0.31	0.39	5.00	0.00	0.22	0.22
11.55	0.31	0.39	5.00	0.00	0.22	0.22
11.60	0.31	0.39	5.00	0.00	0.21	0.21
11.65	0.31	0.39	5.00	0.00	0.21	0.21
11.70	0.31	0.39	5.00	0.00	0.21	0.21
11.75	0.31	0.39	5.00	0.00	0.21	0.21
11.80	0.31	0.39	5.00	0.00	0.21	0.21
11.85	0.31	0.39	5.00	0.00	0.21	0.21
11.90	0.32	0.39	5.00	0.00	0.21	0.21
11.95	0.32	0.39	5.00	0.00	0.21	0.21
12.00	0.32	0.39	5.00	0.00	0.21	0.21
12.05	0.32	0.39	5.00	0.00	0.21	0.21
12.10	0.32	0.39	5.00	0.00	0.21	0.21
12.15	0.32	0.39	5.00	0.00	0.21	0.21
12.20	0.32	0.39	5.00	0.00	0.21	0.21
12.25	0.32	0.39	5.00	0.00	0.21	0.21
12.30	0.32	0.39	5.00	0.00	0.21	0.21
12.35	0.33	0.39	5.00	0.00	0.21	0.21
12.40	0.33	0.39	5.00	0.00	0.21	0.21
12.45	0.33	0.39	5.00	0.00	0.20	0.20
12.50	0.33	0.39	5.00	0.00	0.20	0.20
12.55	0.33	0.39	5.00	0.00	0.20	0.20
12.60	0.33	0.39	5.00	0.00	0.20	0.20
12.65	0.33	0.39	5.00	0.00	0.20	0.20
12.70	0.34	0.39	5.00	0.00	0.20	0.20
12.75	0.34	0.39	5.00	0.00	0.20	0.20
12.80	0.34	0.39	5.00	0.00	0.20	0.20
12.85	0.34	0.39	5.00	0.00	0.20	0.20
12.90	0.34	0.39	5.00	0.00	0.20	0.20
12.95	0.34	0.39	5.00	0.00	0.20	0.20
13.00	0.35	0.39	5.00	0.00	0.20	0.20
13.05	0.35	0.39	5.00	0.00	0.20	0.20
13.10	0.35	0.39	5.00	0.00	0.20	0.20
13.15	0.35	0.39	5.00	0.00	0.20	0.20
13.20	0.35	0.39	5.00	0.00	0.19	0.19
13.25	0.36	0.39	5.00	0.00	0.19	0.19
13.30	0.36	0.39	5.00	0.00	0.19	0.19
13.35	0.36	0.39	5.00	0.00	0.19	0.19
13.40	0.37	0.39	5.00	0.00	0.19	0.19
13.45	0.37	0.39	5.00	0.00	0.19	0.19
13.50	0.37	0.39	5.00	0.00	0.19	0.19

13.55	0.38	0.39	5.00	0.00	0.19	0.19
13.60	0.38	0.39	5.00	0.00	0.19	0.19
13.65	0.39	0.39	5.00	0.00	0.19	0.19
13.70	0.39	0.39	5.00	0.00	0.19	0.19
13.75	0.40	0.39	5.00	0.00	0.19	0.19
13.80	0.41	0.39	5.00	0.00	0.19	0.19
13.85	0.41	0.39	5.00	0.00	0.19	0.19
13.90	0.42	0.39	5.00	0.00	0.19	0.19
13.95	0.44	0.39	5.00	0.00	0.18	0.18
14.00	0.44	0.39	5.00	0.00	0.18	0.18
14.05	0.44	0.39	5.00	0.00	0.18	0.18
14.10	0.44	0.39	5.00	0.00	0.18	0.18
14.15	0.44	0.39	5.00	0.00	0.18	0.18
14.20	0.44	0.39	5.00	0.00	0.18	0.18
14.25	0.44	0.39	5.00	0.00	0.18	0.18
14.30	0.44	0.39	5.00	0.00	0.18	0.18
14.35	0.44	0.39	5.00	0.00	0.18	0.18
14.40	0.44	0.39	5.00	0.00	0.18	0.18
14.45	0.44	0.39	5.00	0.00	0.18	0.18
14.50	0.44	0.39	5.00	0.00	0.18	0.18
14.55	0.44	0.39	5.00	0.00	0.18	0.18
14.60	0.44	0.39	5.00	0.00	0.18	0.18
14.65	0.44	0.39	5.00	0.00	0.18	0.18
14.70	0.44	0.39	5.00	0.00	0.17	0.17
14.75	0.44	0.39	5.00	0.00	0.17	0.17
14.80	0.44	0.39	5.00	0.00	0.17	0.17
14.85	0.44	0.39	5.00	0.00	0.17	0.17
14.90	0.44	0.39	5.00	0.00	0.17	0.17
14.95	0.44	0.39	5.00	0.00	0.17	0.17
15.00	0.44	0.39	5.00	0.00	0.17	0.17
15.05	0.44	0.39	5.00	0.00	0.17	0.17
15.10	0.44	0.39	5.00	0.00	0.17	0.17
15.15	0.44	0.39	5.00	0.00	0.17	0.17
15.20	0.44	0.39	5.00	0.00	0.17	0.17
15.25	0.44	0.39	5.00	0.00	0.17	0.17
15.30	0.44	0.39	5.00	0.00	0.17	0.17
15.35	0.44	0.39	5.00	0.00	0.17	0.17
15.40	0.44	0.39	5.00	0.00	0.17	0.17
15.45	0.44	0.39	5.00	0.00	0.17	0.17
15.50	0.44	0.39	5.00	0.00	0.17	0.17
15.55	0.44	0.39	5.00	0.00	0.17	0.17
15.60	0.44	0.39	5.00	0.00	0.16	0.16
15.65	0.44	0.39	5.00	0.00	0.16	0.16
15.70	0.44	0.39	5.00	0.00	0.16	0.16
15.75	0.44	0.39	5.00	0.00	0.16	0.16
15.80	0.44	0.39	5.00	0.00	0.16	0.16
15.85	0.44	0.39	5.00	0.00	0.16	0.16
15.90	0.44	0.39	5.00	0.00	0.16	0.16
15.95	0.44	0.39	5.00	0.00	0.16	0.16
16.00	0.44	0.39	5.00	0.00	0.16	0.16
16.05	0.44	0.39	5.00	0.00	0.16	0.16
16.10	0.44	0.39	5.00	0.00	0.16	0.16
16.15	0.44	0.39	5.00	0.00	0.16	0.16
16.20	0.44	0.39	5.00	0.00	0.16	0.16
16.25	0.44	0.39	5.00	0.00	0.16	0.16
16.30	0.44	0.39	5.00	0.00	0.16	0.16
16.35	0.44	0.39	5.00	0.00	0.16	0.16
16.40	0.44	0.39	5.00	0.00	0.16	0.16
16.45	0.44	0.39	5.00	0.00	0.16	0.16

16.50	0.44	0.39	5.00	0.00	0.16	0.16
16.55	0.44	0.39	5.00	0.00	0.16	0.16
16.60	0.44	0.39	5.00	0.00	0.16	0.16
16.65	0.44	0.39	5.00	0.00	0.16	0.16
16.70	0.44	0.39	5.00	0.00	0.15	0.15
16.75	0.44	0.39	5.00	0.00	0.15	0.15
16.80	0.44	0.39	5.00	0.00	0.15	0.15
16.85	0.44	0.39	5.00	0.00	0.15	0.15
16.90	0.44	0.39	5.00	0.00	0.15	0.15
16.95	0.44	0.39	5.00	0.00	0.15	0.15
17.00	0.44	0.39	5.00	0.00	0.15	0.15
17.05	0.44	0.39	5.00	0.00	0.15	0.15
17.10	0.44	0.39	5.00	0.00	0.15	0.15
17.15	0.44	0.39	5.00	0.00	0.15	0.15
17.20	0.44	0.39	5.00	0.00	0.15	0.15
17.25	0.44	0.39	5.00	0.00	0.15	0.15
17.30	0.44	0.39	5.00	0.00	0.15	0.15
17.35	0.44	0.39	5.00	0.00	0.15	0.15
17.40	0.44	0.39	5.00	0.00	0.15	0.15
17.45	0.44	0.39	5.00	0.00	0.15	0.15
17.50	0.44	0.39	5.00	0.00	0.15	0.15
17.55	0.44	0.39	5.00	0.00	0.15	0.15
17.60	0.44	0.39	5.00	0.00	0.15	0.15
17.65	0.44	0.39	5.00	0.00	0.15	0.15
17.70	0.44	0.39	5.00	0.00	0.15	0.15
17.75	0.44	0.39	5.00	0.00	0.15	0.15
17.80	0.44	0.39	5.00	0.00	0.15	0.15
17.85	0.44	0.39	5.00	0.00	0.15	0.15
17.90	0.44	0.39	5.00	0.00	0.15	0.15
17.95	0.44	0.39	5.00	0.00	0.15	0.15
18.00	0.44	0.39	5.00	0.00	0.15	0.15
18.05	0.44	0.39	5.00	0.00	0.15	0.15
18.10	0.44	0.39	5.00	0.00	0.15	0.15
18.15	0.44	0.39	5.00	0.00	0.15	0.15
18.20	0.44	0.39	5.00	0.00	0.15	0.15
18.25	0.44	0.39	5.00	0.00	0.15	0.15
18.30	0.44	0.39	5.00	0.00	0.15	0.15
18.35	0.44	0.39	5.00	0.00	0.14	0.14
18.40	0.44	0.39	5.00	0.00	0.14	0.14
18.45	0.44	0.39	5.00	0.00	0.14	0.14
18.50	0.44	0.39	5.00	0.00	0.14	0.14
18.55	0.44	0.39	5.00	0.00	0.14	0.14
18.60	0.44	0.39	5.00	0.00	0.14	0.14
18.65	0.44	0.39	5.00	0.00	0.14	0.14
18.70	0.44	0.39	5.00	0.00	0.14	0.14
18.75	0.44	0.39	5.00	0.00	0.14	0.14
18.80	0.44	0.39	5.00	0.00	0.14	0.14
18.85	0.44	0.39	5.00	0.00	0.14	0.14
18.90	0.44	0.39	5.00	0.00	0.14	0.14
18.95	0.44	0.39	5.00	0.00	0.14	0.14
19.00	0.44	0.39	5.00	0.00	0.14	0.14
19.05	0.44	0.39	5.00	0.00	0.14	0.14
19.10	0.44	0.39	5.00	0.00	0.14	0.14
19.15	0.44	0.39	5.00	0.00	0.14	0.14
19.20	0.44	0.39	5.00	0.00	0.14	0.14
19.25	0.44	0.39	5.00	0.00	0.14	0.14
19.30	0.44	0.39	5.00	0.00	0.14	0.14
19.35	0.44	0.39	5.00	0.00	0.14	0.14
19.40	0.44	0.39	5.00	0.00	0.14	0.14

19.45	0.44	0.39	5.00	0.00	0.14	0.14
19.50	0.44	0.39	5.00	0.00	0.14	0.14
19.55	0.44	0.39	5.00	0.00	0.14	0.14
19.60	0.44	0.39	5.00	0.00	0.14	0.14
19.65	0.44	0.39	5.00	0.00	0.14	0.14
19.70	0.44	0.39	5.00	0.00	0.14	0.14
19.75	0.44	0.39	5.00	0.00	0.14	0.14
19.80	0.44	0.39	5.00	0.00	0.14	0.14
19.85	0.44	0.39	5.00	0.00	0.14	0.14
19.90	0.44	0.39	5.00	0.00	0.14	0.14
19.95	0.44	0.39	5.00	0.00	0.14	0.14
20.00	0.44	0.39	5.00	0.00	0.14	0.14
20.05	0.44	0.39	5.00	0.00	0.14	0.14
20.10	0.44	0.38	5.00	0.00	0.14	0.14
20.15	0.44	0.38	5.00	0.00	0.14	0.14
20.20	0.44	0.38	5.00	0.00	0.14	0.14
20.25	0.44	0.38	5.00	0.00	0.14	0.14
20.30	0.44	0.38	5.00	0.00	0.13	0.13
20.35	0.44	0.38	5.00	0.00	0.13	0.13
20.40	0.44	0.38	5.00	0.00	0.13	0.13
20.45	0.44	0.38	5.00	0.00	0.13	0.13
20.50	0.44	0.38	5.00	0.00	0.13	0.13
20.55	0.44	0.38	5.00	0.00	0.13	0.13
20.60	0.44	0.38	5.00	0.00	0.13	0.13
20.65	0.44	0.38	5.00	0.00	0.13	0.13
20.70	0.44	0.38	5.00	0.00	0.13	0.13
20.75	0.44	0.38	5.00	0.00	0.13	0.13
20.80	0.44	0.38	5.00	0.00	0.13	0.13
20.85	0.44	0.38	5.00	0.00	0.13	0.13
20.90	0.44	0.38	5.00	0.00	0.13	0.13
20.95	0.44	0.38	5.00	0.00	0.13	0.13
21.00	0.44	0.38	5.00	0.00	0.13	0.13
21.05	0.44	0.38	5.00	0.00	0.13	0.13
21.10	0.44	0.38	5.00	0.00	0.13	0.13
21.15	0.44	0.38	5.00	0.00	0.13	0.13
21.20	0.44	0.38	5.00	0.00	0.13	0.13
21.25	0.44	0.38	5.00	0.00	0.13	0.13
21.30	0.44	0.38	5.00	0.00	0.13	0.13
21.35	0.44	0.38	5.00	0.00	0.13	0.13
21.40	0.44	0.38	5.00	0.00	0.13	0.13
21.45	0.44	0.38	5.00	0.00	0.13	0.13
21.50	0.44	0.38	5.00	0.00	0.13	0.13
21.55	0.44	0.38	5.00	0.00	0.13	0.13
21.60	0.44	0.38	5.00	0.00	0.13	0.13
21.65	0.44	0.38	5.00	0.00	0.13	0.13
21.70	0.44	0.38	5.00	0.00	0.13	0.13
21.75	0.44	0.38	5.00	0.00	0.13	0.13
21.80	0.44	0.38	5.00	0.00	0.13	0.13
21.85	0.44	0.38	5.00	0.00	0.13	0.13
21.90	0.44	0.38	5.00	0.00	0.13	0.13
21.95	0.44	0.38	5.00	0.00	0.13	0.13
22.00	0.44	0.38	5.00	0.00	0.13	0.13
22.05	0.44	0.38	5.00	0.00	0.13	0.13
22.10	0.44	0.38	5.00	0.00	0.13	0.13
22.15	0.44	0.38	5.00	0.00	0.13	0.13
22.20	0.44	0.38	5.00	0.00	0.13	0.13
22.25	0.44	0.38	5.00	0.00	0.12	0.12
22.30	0.44	0.38	5.00	0.00	0.12	0.12
22.35	0.44	0.38	5.00	0.00	0.12	0.12

22.40	0.44	0.38	5.00	0.00	0.12	0.12
22.45	0.44	0.38	5.00	0.00	0.12	0.12
22.50	0.44	0.38	5.00	0.00	0.12	0.12
22.55	0.44	0.38	5.00	0.00	0.12	0.12
22.60	0.44	0.38	5.00	0.00	0.12	0.12
22.65	0.44	0.38	5.00	0.00	0.12	0.12
22.70	0.44	0.38	5.00	0.00	0.12	0.12
22.75	0.44	0.38	5.00	0.00	0.12	0.12
22.80	0.44	0.38	5.00	0.00	0.12	0.12
22.85	0.44	0.38	5.00	0.00	0.12	0.12
22.90	0.44	0.38	5.00	0.00	0.12	0.12
22.95	0.44	0.38	5.00	0.00	0.12	0.12
23.00	0.44	0.38	5.00	0.00	0.12	0.12
23.05	0.44	0.38	5.00	0.00	0.12	0.12
23.10	0.44	0.38	5.00	0.00	0.12	0.12
23.15	0.44	0.38	5.00	0.00	0.12	0.12
23.20	0.44	0.38	5.00	0.00	0.12	0.12
23.25	0.44	0.38	5.00	0.00	0.12	0.12
23.30	0.44	0.38	5.00	0.00	0.12	0.12
23.35	0.44	0.38	5.00	0.00	0.12	0.12
23.40	0.44	0.38	5.00	0.00	0.12	0.12
23.45	0.44	0.38	5.00	0.00	0.12	0.12
23.50	0.44	0.38	5.00	0.00	0.12	0.12
23.55	0.44	0.38	5.00	0.00	0.12	0.12
23.60	0.44	0.38	5.00	0.00	0.12	0.12
23.65	0.44	0.38	5.00	0.00	0.12	0.12
23.70	0.44	0.38	5.00	0.00	0.12	0.12
23.75	0.44	0.38	5.00	0.00	0.12	0.12
23.80	0.44	0.38	5.00	0.00	0.12	0.12
23.85	0.44	0.38	5.00	0.00	0.12	0.12
23.90	0.44	0.38	5.00	0.00	0.12	0.12
23.95	0.44	0.38	5.00	0.00	0.12	0.12
24.00	0.44	0.38	5.00	0.00	0.12	0.12
24.05	0.44	0.38	5.00	0.00	0.12	0.12
24.10	0.44	0.38	5.00	0.00	0.12	0.12
24.15	0.44	0.38	5.00	0.00	0.12	0.12
24.20	0.44	0.38	5.00	0.00	0.12	0.12
24.25	0.44	0.38	5.00	0.00	0.12	0.12
24.30	0.44	0.38	5.00	0.00	0.12	0.12
24.35	0.44	0.38	5.00	0.00	0.12	0.12
24.40	0.44	0.38	5.00	0.00	0.11	0.11
24.45	0.44	0.38	5.00	0.00	0.11	0.11
24.50	0.44	0.38	5.00	0.00	0.11	0.11
24.55	0.44	0.38	5.00	0.00	0.11	0.11
24.60	0.44	0.38	5.00	0.00	0.11	0.11
24.65	0.44	0.38	5.00	0.00	0.11	0.11
24.70	0.44	0.38	5.00	0.00	0.11	0.11
24.75	0.44	0.38	5.00	0.00	0.11	0.11
24.80	0.44	0.38	5.00	0.00	0.11	0.11
24.85	0.44	0.38	5.00	0.00	0.11	0.11
24.90	0.44	0.38	5.00	0.00	0.11	0.11
24.95	0.44	0.38	5.00	0.00	0.11	0.11
25.00	0.44	0.38	5.00	0.00	0.11	0.11
25.05	0.44	0.38	5.00	0.00	0.11	0.11
25.10	0.44	0.38	5.00	0.00	0.11	0.11
25.15	0.44	0.38	5.00	0.00	0.11	0.11
25.20	0.44	0.38	5.00	0.00	0.11	0.11
25.25	0.44	0.38	5.00	0.00	0.11	0.11
25.30	0.44	0.38	5.00	0.00	0.11	0.11

25.35	0.44	0.38	5.00	0.00	0.11	0.11
25.40	0.44	0.38	5.00	0.00	0.11	0.11
25.45	0.44	0.38	5.00	0.00	0.11	0.11
25.50	0.44	0.38	5.00	0.00	0.11	0.11
25.55	0.44	0.38	5.00	0.00	0.11	0.11
25.60	0.44	0.38	5.00	0.00	0.11	0.11
25.65	0.44	0.38	5.00	0.00	0.11	0.11
25.70	0.44	0.38	5.00	0.00	0.11	0.11
25.75	0.44	0.38	5.00	0.00	0.11	0.11
25.80	0.44	0.38	5.00	0.00	0.11	0.11
25.85	0.44	0.38	5.00	0.00	0.11	0.11
25.90	0.44	0.38	5.00	0.00	0.11	0.11
25.95	0.44	0.38	5.00	0.00	0.11	0.11
26.00	0.44	0.38	5.00	0.00	0.11	0.11
26.05	0.44	0.38	5.00	0.00	0.11	0.11
26.10	0.44	0.38	5.00	0.00	0.10	0.10
26.15	0.44	0.38	5.00	0.00	0.10	0.10
26.20	0.44	0.38	5.00	0.00	0.10	0.10
26.25	0.44	0.38	5.00	0.00	0.10	0.10
26.30	0.44	0.38	5.00	0.00	0.10	0.10
26.35	0.44	0.38	5.00	0.00	0.10	0.10
26.40	0.44	0.38	5.00	0.00	0.10	0.10
26.45	0.44	0.38	5.00	0.00	0.10	0.10
26.50	0.44	0.38	5.00	0.00	0.10	0.10
26.55	0.44	0.38	5.00	0.00	0.10	0.10
26.60	0.44	0.38	5.00	0.00	0.10	0.10
26.65	0.44	0.38	5.00	0.00	0.10	0.10
26.70	0.44	0.38	5.00	0.00	0.10	0.10
26.75	0.44	0.38	5.00	0.00	0.10	0.10
26.80	0.44	0.38	5.00	0.00	0.10	0.10
26.85	0.44	0.38	5.00	0.00	0.10	0.10
26.90	0.44	0.38	5.00	0.00	0.10	0.10
26.95	0.44	0.38	5.00	0.00	0.10	0.10
27.00	0.44	0.38	5.00	0.00	0.10	0.10
27.05	0.44	0.38	5.00	0.00	0.10	0.10
27.10	0.44	0.38	5.00	0.00	0.10	0.10
27.15	0.44	0.38	5.00	0.00	0.10	0.10
27.20	0.44	0.38	5.00	0.00	0.10	0.10
27.25	0.44	0.38	5.00	0.00	0.10	0.10
27.30	0.44	0.38	5.00	0.00	0.10	0.10
27.35	0.44	0.38	5.00	0.00	0.10	0.10
27.40	0.44	0.38	5.00	0.00	0.10	0.10
27.45	0.44	0.38	5.00	0.00	0.10	0.10
27.50	0.44	0.38	5.00	0.00	0.09	0.09
27.55	0.44	0.38	5.00	0.00	0.09	0.09
27.60	0.44	0.38	5.00	0.00	0.09	0.09
27.65	0.44	0.38	5.00	0.00	0.09	0.09
27.70	0.44	0.38	5.00	0.00	0.09	0.09
27.75	0.44	0.38	5.00	0.00	0.09	0.09
27.80	0.44	0.38	5.00	0.00	0.09	0.09
27.85	0.44	0.38	5.00	0.00	0.09	0.09
27.90	0.44	0.38	5.00	0.00	0.09	0.09
27.95	0.44	0.38	5.00	0.00	0.09	0.09
28.00	0.44	0.38	5.00	0.00	0.09	0.09
28.05	0.44	0.38	5.00	0.00	0.09	0.09
28.10	0.44	0.38	5.00	0.00	0.09	0.09
28.15	0.44	0.38	5.00	0.00	0.09	0.09
28.20	0.44	0.38	5.00	0.00	0.09	0.09
28.25	0.44	0.38	5.00	0.00	0.09	0.09

28.30	0.44	0.38	5.00	0.00	0.09	0.09
28.35	0.44	0.38	5.00	0.00	0.09	0.09
28.40	0.44	0.38	5.00	0.00	0.09	0.09
28.45	0.44	0.38	5.00	0.00	0.09	0.09
28.50	0.44	0.38	5.00	0.00	0.09	0.09
28.55	0.44	0.38	5.00	0.00	0.09	0.09
28.60	0.44	0.38	5.00	0.00	0.09	0.09
28.65	0.44	0.38	5.00	0.00	0.09	0.09
28.70	0.44	0.38	5.00	0.00	0.09	0.09
28.75	0.44	0.38	5.00	0.00	0.08	0.08
28.80	0.44	0.38	5.00	0.00	0.08	0.08
28.85	0.44	0.38	5.00	0.00	0.08	0.08
28.90	0.44	0.38	5.00	0.00	0.08	0.08
28.95	0.44	0.38	5.00	0.00	0.08	0.08
29.00	0.44	0.38	5.00	0.00	0.08	0.08
29.05	0.44	0.38	5.00	0.00	0.08	0.08
29.10	0.44	0.38	5.00	0.00	0.08	0.08
29.15	0.44	0.38	5.00	0.00	0.08	0.08
29.20	0.44	0.38	5.00	0.00	0.08	0.08
29.25	0.44	0.38	5.00	0.00	0.08	0.08
29.30	0.44	0.38	5.00	0.00	0.08	0.08
29.35	0.44	0.38	5.00	0.00	0.08	0.08
29.40	0.44	0.38	5.00	0.00	0.08	0.08
29.45	0.44	0.38	5.00	0.00	0.08	0.08
29.50	0.44	0.38	5.00	0.00	0.08	0.08
29.55	0.44	0.38	5.00	0.00	0.08	0.08
29.60	0.44	0.38	5.00	0.00	0.08	0.08
29.65	0.44	0.38	5.00	0.00	0.08	0.08
29.70	0.44	0.38	5.00	0.00	0.07	0.07
29.75	0.44	0.38	5.00	0.00	0.07	0.07
29.80	0.44	0.38	5.00	0.00	0.07	0.07
29.85	0.44	0.38	5.00	0.00	0.07	0.07
29.90	0.44	0.38	5.00	0.00	0.07	0.07
29.95	0.44	0.38	5.00	0.00	0.07	0.07
30.00	0.44	0.38	5.00	0.00	0.07	0.07
30.05	0.44	0.38	5.00	0.00	0.07	0.07
30.10	0.44	0.38	5.00	0.00	0.07	0.07
30.15	0.44	0.38	5.00	0.00	0.07	0.07
30.20	0.44	0.37	5.00	0.00	0.07	0.07
30.25	0.44	0.37	5.00	0.00	0.07	0.07
30.30	0.44	0.37	5.00	0.00	0.07	0.07
30.35	0.44	0.37	5.00	0.00	0.07	0.07
30.40	0.44	0.37	5.00	0.00	0.07	0.07
30.45	0.44	0.37	5.00	0.00	0.06	0.06
30.50	0.44	0.37	5.00	0.00	0.06	0.06
30.55	0.44	0.37	5.00	0.00	0.06	0.06
30.60	0.44	0.37	5.00	0.00	0.06	0.06
30.65	0.44	0.37	5.00	0.00	0.06	0.06
30.70	0.44	0.37	5.00	0.00	0.06	0.06
30.75	0.44	0.37	5.00	0.00	0.06	0.06
30.80	0.44	0.37	5.00	0.00	0.06	0.06
30.85	0.44	0.37	5.00	0.00	0.06	0.06
30.90	0.44	0.37	5.00	0.00	0.06	0.06
30.95	0.44	0.37	5.00	0.00	0.06	0.06
31.00	0.44	0.37	5.00	0.00	0.06	0.06
31.05	0.44	0.37	5.00	0.00	0.05	0.05
31.10	0.44	0.37	5.00	0.00	0.05	0.05
31.15	0.44	0.37	5.00	0.00	0.05	0.05
31.20	0.44	0.37	5.00	0.00	0.05	0.05

31.25	0.44	0.37	5.00	0.00	0.05	0.05
31.30	0.44	0.37	5.00	0.00	0.05	0.05
31.35	0.44	0.37	5.00	0.00	0.05	0.05
31.40	0.44	0.37	5.00	0.00	0.05	0.05
31.45	0.44	0.37	5.00	0.00	0.05	0.05
31.50	0.44	0.37	5.00	0.00	0.05	0.05
31.55	0.43	0.37	5.00	0.00	0.05	0.05
31.60	0.43	0.37	5.00	0.00	0.05	0.05
31.65	0.43	0.37	5.00	0.00	0.04	0.04
31.70	0.43	0.37	5.00	0.00	0.04	0.04
31.75	0.43	0.37	5.00	0.00	0.04	0.04
31.80	0.43	0.37	5.00	0.00	0.04	0.04
31.85	0.43	0.37	5.00	0.00	0.04	0.04
31.90	0.43	0.37	5.00	0.00	0.04	0.04
31.95	0.43	0.37	5.00	0.00	0.04	0.04
32.00	0.43	0.37	5.00	0.00	0.04	0.04
32.05	0.43	0.37	5.00	0.00	0.04	0.04
32.10	0.43	0.37	5.00	0.00	0.04	0.04
32.15	0.43	0.37	5.00	0.00	0.04	0.04
32.20	0.43	0.37	5.00	0.00	0.04	0.04
32.25	0.43	0.37	5.00	0.00	0.04	0.04
32.30	0.43	0.37	5.00	0.00	0.04	0.04
32.35	0.43	0.37	5.00	0.00	0.04	0.04
32.40	0.43	0.37	5.00	0.00	0.04	0.04
32.45	0.43	0.37	5.00	0.00	0.04	0.04
32.50	0.43	0.37	5.00	0.00	0.03	0.03
32.55	0.43	0.37	5.00	0.00	0.03	0.03
32.60	0.43	0.37	5.00	0.00	0.03	0.03
32.65	0.43	0.37	5.00	0.00	0.03	0.03
32.70	0.43	0.37	5.00	0.00	0.03	0.03
32.75	0.43	0.37	5.00	0.00	0.03	0.03
32.80	0.43	0.37	5.00	0.00	0.03	0.03
32.85	0.43	0.37	5.00	0.00	0.03	0.03
32.90	0.43	0.37	5.00	0.00	0.03	0.03
32.95	0.43	0.37	5.00	0.00	0.03	0.03
33.00	0.43	0.37	5.00	0.00	0.03	0.03
33.05	0.43	0.37	5.00	0.00	0.03	0.03
33.10	0.43	0.37	5.00	0.00	0.03	0.03
33.15	0.43	0.37	5.00	0.00	0.03	0.03
33.20	0.43	0.37	5.00	0.00	0.03	0.03
33.25	0.43	0.36	5.00	0.00	0.03	0.03
33.30	0.43	0.36	5.00	0.00	0.03	0.03
33.35	0.43	0.36	5.00	0.00	0.03	0.03
33.40	0.43	0.36	5.00	0.00	0.03	0.03
33.45	0.43	0.36	5.00	0.00	0.03	0.03
33.50	0.43	0.36	5.00	0.00	0.03	0.03
33.55	0.43	0.36	5.00	0.00	0.03	0.03
33.60	0.43	0.36	5.00	0.00	0.03	0.03
33.65	0.43	0.36	5.00	0.00	0.02	0.02
33.70	0.43	0.36	5.00	0.00	0.02	0.02
33.75	0.43	0.36	5.00	0.00	0.02	0.02
33.80	0.43	0.36	5.00	0.00	0.02	0.02
33.85	0.43	0.36	5.00	0.00	0.02	0.02
33.90	0.43	0.36	5.00	0.00	0.02	0.02
33.95	0.43	0.36	5.00	0.00	0.02	0.02
34.00	0.43	0.36	5.00	0.00	0.02	0.02
34.05	0.43	0.36	5.00	0.00	0.02	0.02
34.10	0.43	0.36	5.00	0.00	0.02	0.02
34.15	0.43	0.36	5.00	0.00	0.02	0.02

34.20	0.43	0.36	5.00	0.00	0.02	0.02
34.25	0.43	0.36	5.00	0.00	0.02	0.02
34.30	0.43	0.36	5.00	0.00	0.02	0.02
34.35	0.43	0.36	5.00	0.00	0.02	0.02
34.40	0.43	0.36	5.00	0.00	0.02	0.02
34.45	0.43	0.36	5.00	0.00	0.02	0.02
34.50	0.43	0.36	5.00	0.00	0.02	0.02
34.55	0.43	0.36	5.00	0.00	0.02	0.02
34.60	0.43	0.36	5.00	0.00	0.02	0.02
34.65	0.43	0.36	5.00	0.00	0.02	0.02
34.70	0.43	0.36	5.00	0.00	0.02	0.02
34.75	0.43	0.36	5.00	0.00	0.02	0.02
34.80	0.43	0.36	5.00	0.00	0.02	0.02
34.85	0.43	0.36	5.00	0.00	0.02	0.02
34.90	0.43	0.36	5.00	0.00	0.02	0.02
34.95	0.43	0.36	5.00	0.00	0.01	0.01
35.00	0.43	0.36	5.00	0.00	0.01	0.01
35.05	0.43	0.36	5.00	0.00	0.01	0.01
35.10	0.43	0.36	5.00	0.00	0.01	0.01
35.15	0.43	0.36	5.00	0.00	0.01	0.01
35.20	0.43	0.36	5.00	0.00	0.01	0.01
35.25	0.43	0.36	5.00	0.00	0.01	0.01
35.30	0.43	0.36	5.00	0.00	0.01	0.01
35.35	0.43	0.36	5.00	0.00	0.01	0.01
35.40	0.43	0.36	5.00	0.00	0.01	0.01
35.45	0.43	0.36	5.00	0.00	0.01	0.01
35.50	0.43	0.36	5.00	0.00	0.01	0.01
35.55	0.43	0.36	5.00	0.00	0.01	0.01
35.60	0.43	0.36	5.00	0.00	0.01	0.01
35.65	0.43	0.36	5.00	0.00	0.01	0.01
35.70	0.43	0.36	5.00	0.00	0.01	0.01
35.75	0.43	0.36	5.00	0.00	0.01	0.01
35.80	0.42	0.36	5.00	0.00	0.01	0.01
35.85	0.42	0.36	5.00	0.00	0.01	0.01
35.90	0.42	0.36	5.00	0.00	0.01	0.01
35.95	0.42	0.36	5.00	0.00	0.01	0.01
36.00	0.42	0.36	5.00	0.00	0.01	0.01
36.05	0.42	0.36	5.00	0.00	0.01	0.01
36.10	0.42	0.36	5.00	0.00	0.01	0.01
36.15	0.42	0.36	5.00	0.00	0.01	0.01
36.20	0.42	0.36	5.00	0.00	0.01	0.01
36.25	0.42	0.36	5.00	0.00	0.01	0.01
36.30	0.42	0.35	5.00	0.00	0.00	0.00
36.35	0.42	0.35	5.00	0.00	0.00	0.00
36.40	0.42	0.35	5.00	0.00	0.00	0.00
36.45	0.42	0.35	5.00	0.00	0.00	0.00
36.50	0.42	0.35	5.00	0.00	0.00	0.00
36.55	0.42	0.35	5.00	0.00	0.00	0.00
36.60	0.42	0.35	5.00	0.00	0.00	0.00
36.65	0.42	0.35	5.00	0.00	0.00	0.00
36.70	0.42	0.35	5.00	0.00	0.00	0.00
36.75	0.42	0.35	5.00	0.00	0.00	0.00
36.80	0.42	0.35	5.00	0.00	0.00	0.00
36.85	0.42	0.35	5.00	0.00	0.00	0.00
36.90	0.42	0.35	5.00	0.00	0.00	0.00
36.95	0.42	0.35	5.00	0.00	0.00	0.00
37.00	0.42	0.35	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone

(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units:Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)

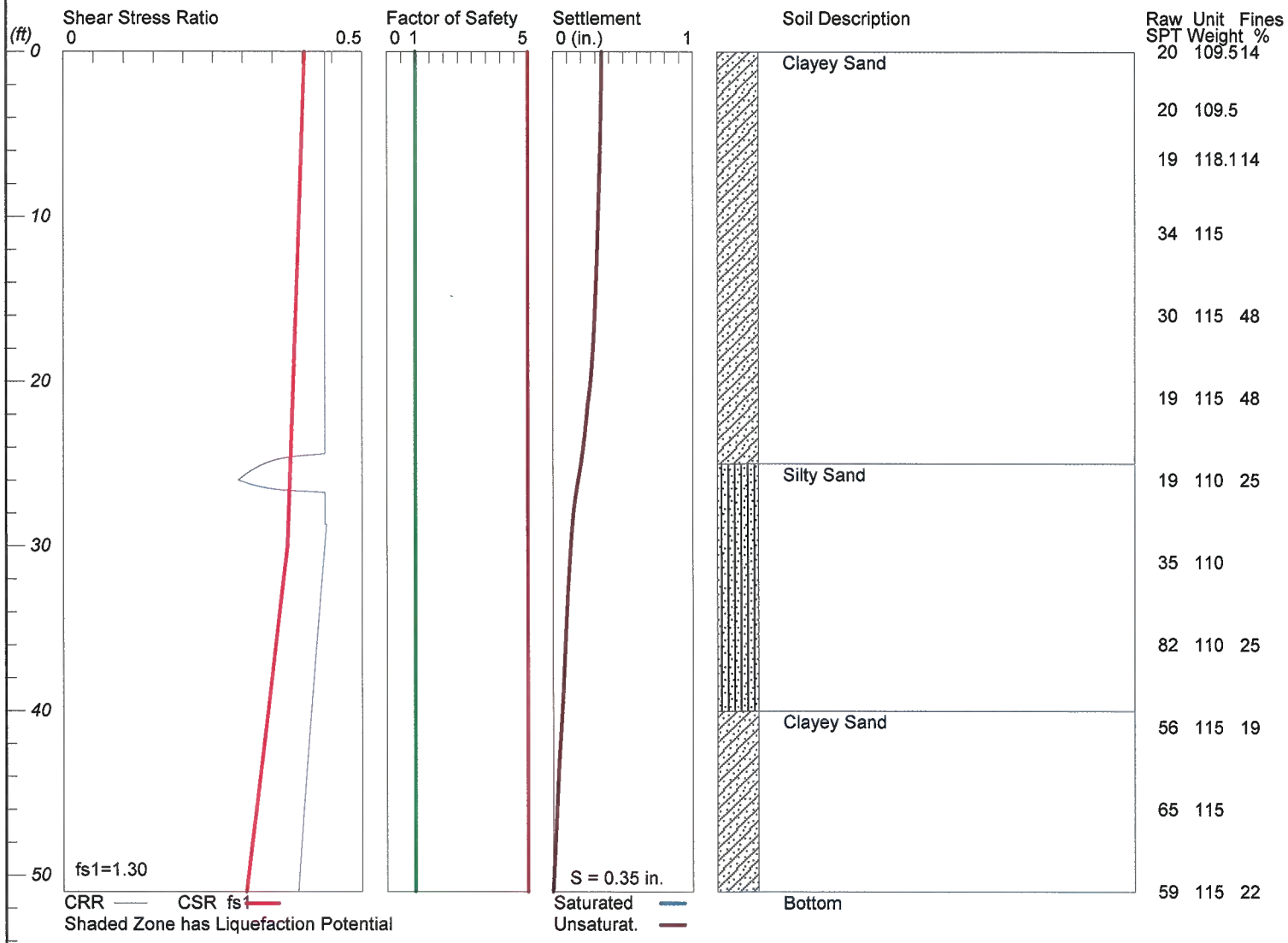
CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS

Proposed BCSD School Site

Hole No.=B-6 Water Depth=100 ft

Magnitude=7.9
Acceleration=0.478g



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LIQUEFACTION ANALYSIS SUMMARY
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Input File Name: O:\b. PROJECT FILES (ACTIVE)\17100-17199\17179 BCSD, New Elementary School, Geotechnical & Geohazard Study\OFFICE REPORTS\Geohaz\LiquefyPro files\17179 B-6 LiquefyPro.liq
Title: Proposed BCSD School Site
Subtitle: 17179

Surface Elev.=
Hole No.=B-6
Depth of Hole= 51.00 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 100.00 ft
Max. Acceleration= 0.48 g
Earthquake Magnitude= 7.90

Input Data:
Surface Elev.=
Hole No.=B-6
Depth of Hole=51.00 ft
Water Table during Earthquake= 100.00 ft
Water Table during In-Situ Testing= 100.00 ft
Max. Acceleration=0.48 g
Earthquake Magnitude=7.90
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	20.00	109.50	14.00
3.50	20.00	109.50	14.00
6.50	19.00	118.10	14.00
11.00	34.00	115.00	14.00
16.00	30.00	115.00	48.00
21.00	19.00	115.00	48.00
26.00	19.00	110.00	25.00
31.00	35.00	110.00	25.00
36.00	82.00	110.00	25.00
41.00	56.00	115.00	19.00
46.00	65.00	115.00	19.00
51.00	59.00	115.00	22.00

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.35 in.
Total Settlement of Saturated and Unsaturated Sands=0.35 in.
Differential Settlement=0.173 to 0.229 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.44	0.40	5.00	0.00	0.35	0.35
0.05	0.44	0.40	5.00	0.00	0.35	0.35
0.10	0.44	0.40	5.00	0.00	0.35	0.35
0.15	0.44	0.40	5.00	0.00	0.35	0.35
0.20	0.44	0.40	5.00	0.00	0.35	0.35
0.25	0.44	0.40	5.00	0.00	0.35	0.35
0.30	0.44	0.40	5.00	0.00	0.35	0.35
0.35	0.44	0.40	5.00	0.00	0.35	0.35
0.40	0.44	0.40	5.00	0.00	0.35	0.35
0.45	0.44	0.40	5.00	0.00	0.35	0.35
0.50	0.44	0.40	5.00	0.00	0.35	0.35
0.55	0.44	0.40	5.00	0.00	0.35	0.35
0.60	0.44	0.40	5.00	0.00	0.35	0.35
0.65	0.44	0.40	5.00	0.00	0.35	0.35
0.70	0.44	0.40	5.00	0.00	0.35	0.35
0.75	0.44	0.40	5.00	0.00	0.35	0.35
0.80	0.44	0.40	5.00	0.00	0.35	0.35
0.85	0.44	0.40	5.00	0.00	0.35	0.35
0.90	0.44	0.40	5.00	0.00	0.35	0.35
0.95	0.44	0.40	5.00	0.00	0.35	0.35
1.00	0.44	0.40	5.00	0.00	0.35	0.35
1.05	0.44	0.40	5.00	0.00	0.35	0.35
1.10	0.44	0.40	5.00	0.00	0.35	0.35
1.15	0.44	0.40	5.00	0.00	0.35	0.35
1.20	0.44	0.40	5.00	0.00	0.35	0.35
1.25	0.44	0.40	5.00	0.00	0.35	0.35
1.30	0.44	0.40	5.00	0.00	0.35	0.35
1.35	0.44	0.40	5.00	0.00	0.35	0.35
1.40	0.44	0.40	5.00	0.00	0.35	0.35
1.45	0.44	0.40	5.00	0.00	0.35	0.35
1.50	0.44	0.40	5.00	0.00	0.35	0.35
1.55	0.44	0.40	5.00	0.00	0.35	0.35
1.60	0.44	0.40	5.00	0.00	0.35	0.35

1.65	0.44	0.40	5.00	0.00	0.35	0.35
1.70	0.44	0.40	5.00	0.00	0.35	0.35
1.75	0.44	0.40	5.00	0.00	0.35	0.35
1.80	0.44	0.40	5.00	0.00	0.35	0.35
1.85	0.44	0.40	5.00	0.00	0.35	0.35
1.90	0.44	0.40	5.00	0.00	0.34	0.34
1.95	0.44	0.40	5.00	0.00	0.34	0.34
2.00	0.44	0.40	5.00	0.00	0.34	0.34
2.05	0.44	0.40	5.00	0.00	0.34	0.34
2.10	0.44	0.40	5.00	0.00	0.34	0.34
2.15	0.44	0.40	5.00	0.00	0.34	0.34
2.20	0.44	0.40	5.00	0.00	0.34	0.34
2.25	0.44	0.40	5.00	0.00	0.34	0.34
2.30	0.44	0.40	5.00	0.00	0.34	0.34
2.35	0.44	0.40	5.00	0.00	0.34	0.34
2.40	0.44	0.40	5.00	0.00	0.34	0.34
2.45	0.44	0.40	5.00	0.00	0.34	0.34
2.50	0.44	0.40	5.00	0.00	0.34	0.34
2.55	0.44	0.40	5.00	0.00	0.34	0.34
2.60	0.44	0.40	5.00	0.00	0.34	0.34
2.65	0.44	0.40	5.00	0.00	0.34	0.34
2.70	0.44	0.40	5.00	0.00	0.34	0.34
2.75	0.44	0.40	5.00	0.00	0.34	0.34
2.80	0.44	0.40	5.00	0.00	0.34	0.34
2.85	0.44	0.40	5.00	0.00	0.34	0.34
2.90	0.44	0.40	5.00	0.00	0.34	0.34
2.95	0.44	0.40	5.00	0.00	0.34	0.34
3.00	0.44	0.40	5.00	0.00	0.34	0.34
3.05	0.44	0.40	5.00	0.00	0.34	0.34
3.10	0.44	0.40	5.00	0.00	0.34	0.34
3.15	0.44	0.40	5.00	0.00	0.34	0.34
3.20	0.44	0.40	5.00	0.00	0.34	0.34
3.25	0.44	0.40	5.00	0.00	0.34	0.34
3.30	0.44	0.40	5.00	0.00	0.34	0.34
3.35	0.44	0.40	5.00	0.00	0.34	0.34
3.40	0.44	0.40	5.00	0.00	0.34	0.34
3.45	0.44	0.40	5.00	0.00	0.34	0.34
3.50	0.44	0.40	5.00	0.00	0.34	0.34
3.55	0.44	0.40	5.00	0.00	0.34	0.34
3.60	0.44	0.40	5.00	0.00	0.34	0.34
3.65	0.44	0.40	5.00	0.00	0.34	0.34
3.70	0.44	0.40	5.00	0.00	0.34	0.34
3.75	0.44	0.40	5.00	0.00	0.34	0.34
3.80	0.44	0.40	5.00	0.00	0.34	0.34
3.85	0.44	0.40	5.00	0.00	0.34	0.34
3.90	0.44	0.40	5.00	0.00	0.34	0.34
3.95	0.44	0.40	5.00	0.00	0.34	0.34
4.00	0.44	0.40	5.00	0.00	0.34	0.34
4.05	0.44	0.40	5.00	0.00	0.34	0.34
4.10	0.44	0.40	5.00	0.00	0.34	0.34
4.15	0.44	0.40	5.00	0.00	0.34	0.34
4.20	0.44	0.40	5.00	0.00	0.34	0.34
4.25	0.44	0.40	5.00	0.00	0.34	0.34
4.30	0.44	0.40	5.00	0.00	0.34	0.34
4.35	0.44	0.40	5.00	0.00	0.34	0.34
4.40	0.44	0.40	5.00	0.00	0.34	0.34
4.45	0.44	0.40	5.00	0.00	0.34	0.34
4.50	0.44	0.40	5.00	0.00	0.34	0.34
4.55	0.44	0.40	5.00	0.00	0.34	0.34

4.60	0.44	0.40	5.00	0.00	0.34	0.34
4.65	0.44	0.40	5.00	0.00	0.34	0.34
4.70	0.44	0.40	5.00	0.00	0.34	0.34
4.75	0.44	0.40	5.00	0.00	0.34	0.34
4.80	0.44	0.40	5.00	0.00	0.34	0.34
4.85	0.44	0.40	5.00	0.00	0.34	0.34
4.90	0.44	0.40	5.00	0.00	0.34	0.34
4.95	0.44	0.40	5.00	0.00	0.34	0.34
5.00	0.44	0.40	5.00	0.00	0.34	0.34
5.05	0.44	0.40	5.00	0.00	0.34	0.34
5.10	0.44	0.40	5.00	0.00	0.34	0.34
5.15	0.44	0.40	5.00	0.00	0.34	0.34
5.20	0.44	0.40	5.00	0.00	0.34	0.34
5.25	0.44	0.40	5.00	0.00	0.34	0.34
5.30	0.44	0.40	5.00	0.00	0.34	0.34
5.35	0.44	0.40	5.00	0.00	0.34	0.34
5.40	0.44	0.40	5.00	0.00	0.34	0.34
5.45	0.44	0.40	5.00	0.00	0.34	0.34
5.50	0.44	0.40	5.00	0.00	0.34	0.34
5.55	0.44	0.40	5.00	0.00	0.34	0.34
5.60	0.44	0.40	5.00	0.00	0.34	0.34
5.65	0.44	0.40	5.00	0.00	0.34	0.34
5.70	0.44	0.40	5.00	0.00	0.34	0.34
5.75	0.44	0.40	5.00	0.00	0.34	0.34
5.80	0.44	0.40	5.00	0.00	0.34	0.34
5.85	0.44	0.40	5.00	0.00	0.34	0.34
5.90	0.44	0.40	5.00	0.00	0.34	0.34
5.95	0.44	0.40	5.00	0.00	0.34	0.34
6.00	0.44	0.40	5.00	0.00	0.33	0.33
6.05	0.44	0.40	5.00	0.00	0.33	0.33
6.10	0.44	0.40	5.00	0.00	0.33	0.33
6.15	0.44	0.40	5.00	0.00	0.33	0.33
6.20	0.44	0.40	5.00	0.00	0.33	0.33
6.25	0.44	0.40	5.00	0.00	0.33	0.33
6.30	0.44	0.40	5.00	0.00	0.33	0.33
6.35	0.44	0.40	5.00	0.00	0.33	0.33
6.40	0.44	0.40	5.00	0.00	0.33	0.33
6.45	0.44	0.40	5.00	0.00	0.33	0.33
6.50	0.44	0.40	5.00	0.00	0.33	0.33
6.55	0.44	0.40	5.00	0.00	0.33	0.33
6.60	0.44	0.40	5.00	0.00	0.33	0.33
6.65	0.44	0.40	5.00	0.00	0.33	0.33
6.70	0.44	0.40	5.00	0.00	0.33	0.33
6.75	0.44	0.40	5.00	0.00	0.33	0.33
6.80	0.44	0.40	5.00	0.00	0.33	0.33
6.85	0.44	0.40	5.00	0.00	0.33	0.33
6.90	0.44	0.40	5.00	0.00	0.33	0.33
6.95	0.44	0.40	5.00	0.00	0.33	0.33
7.00	0.44	0.40	5.00	0.00	0.33	0.33
7.05	0.44	0.40	5.00	0.00	0.33	0.33
7.10	0.44	0.40	5.00	0.00	0.33	0.33
7.15	0.44	0.40	5.00	0.00	0.33	0.33
7.20	0.44	0.40	5.00	0.00	0.33	0.33
7.25	0.44	0.40	5.00	0.00	0.33	0.33
7.30	0.44	0.40	5.00	0.00	0.33	0.33
7.35	0.44	0.40	5.00	0.00	0.33	0.33
7.40	0.44	0.40	5.00	0.00	0.33	0.33
7.45	0.44	0.40	5.00	0.00	0.33	0.33
7.50	0.44	0.40	5.00	0.00	0.33	0.33

7.55	0.44	0.40	5.00	0.00	0.33	0.33
7.60	0.44	0.40	5.00	0.00	0.33	0.33
7.65	0.44	0.40	5.00	0.00	0.33	0.33
7.70	0.44	0.40	5.00	0.00	0.33	0.33
7.75	0.44	0.40	5.00	0.00	0.33	0.33
7.80	0.44	0.40	5.00	0.00	0.33	0.33
7.85	0.44	0.40	5.00	0.00	0.33	0.33
7.90	0.44	0.40	5.00	0.00	0.33	0.33
7.95	0.44	0.40	5.00	0.00	0.33	0.33
8.00	0.44	0.40	5.00	0.00	0.33	0.33
8.05	0.44	0.40	5.00	0.00	0.33	0.33
8.10	0.44	0.40	5.00	0.00	0.33	0.33
8.15	0.44	0.40	5.00	0.00	0.33	0.33
8.20	0.44	0.40	5.00	0.00	0.33	0.33
8.25	0.44	0.40	5.00	0.00	0.33	0.33
8.30	0.44	0.40	5.00	0.00	0.33	0.33
8.35	0.44	0.40	5.00	0.00	0.33	0.33
8.40	0.44	0.40	5.00	0.00	0.33	0.33
8.45	0.44	0.40	5.00	0.00	0.33	0.33
8.50	0.44	0.40	5.00	0.00	0.33	0.33
8.55	0.44	0.40	5.00	0.00	0.33	0.33
8.60	0.44	0.40	5.00	0.00	0.33	0.33
8.65	0.44	0.40	5.00	0.00	0.33	0.33
8.70	0.44	0.40	5.00	0.00	0.33	0.33
8.75	0.44	0.40	5.00	0.00	0.33	0.33
8.80	0.44	0.40	5.00	0.00	0.33	0.33
8.85	0.44	0.40	5.00	0.00	0.33	0.33
8.90	0.44	0.40	5.00	0.00	0.33	0.33
8.95	0.44	0.40	5.00	0.00	0.32	0.32
9.00	0.44	0.40	5.00	0.00	0.32	0.32
9.05	0.44	0.40	5.00	0.00	0.32	0.32
9.10	0.44	0.40	5.00	0.00	0.32	0.32
9.15	0.44	0.40	5.00	0.00	0.32	0.32
9.20	0.44	0.40	5.00	0.00	0.32	0.32
9.25	0.44	0.40	5.00	0.00	0.32	0.32
9.30	0.44	0.40	5.00	0.00	0.32	0.32
9.35	0.44	0.40	5.00	0.00	0.32	0.32
9.40	0.44	0.40	5.00	0.00	0.32	0.32
9.45	0.44	0.40	5.00	0.00	0.32	0.32
9.50	0.44	0.39	5.00	0.00	0.32	0.32
9.55	0.44	0.39	5.00	0.00	0.32	0.32
9.60	0.44	0.39	5.00	0.00	0.32	0.32
9.65	0.44	0.39	5.00	0.00	0.32	0.32
9.70	0.44	0.39	5.00	0.00	0.32	0.32
9.75	0.44	0.39	5.00	0.00	0.32	0.32
9.80	0.44	0.39	5.00	0.00	0.32	0.32
9.85	0.44	0.39	5.00	0.00	0.32	0.32
9.90	0.44	0.39	5.00	0.00	0.32	0.32
9.95	0.44	0.39	5.00	0.00	0.32	0.32
10.00	0.44	0.39	5.00	0.00	0.32	0.32
10.05	0.44	0.39	5.00	0.00	0.32	0.32
10.10	0.44	0.39	5.00	0.00	0.32	0.32
10.15	0.44	0.39	5.00	0.00	0.32	0.32
10.20	0.44	0.39	5.00	0.00	0.32	0.32
10.25	0.44	0.39	5.00	0.00	0.32	0.32
10.30	0.44	0.39	5.00	0.00	0.32	0.32
10.35	0.44	0.39	5.00	0.00	0.32	0.32
10.40	0.44	0.39	5.00	0.00	0.32	0.32
10.45	0.44	0.39	5.00	0.00	0.32	0.32

10.50	0.44	0.39	5.00	0.00	0.32	0.32
10.55	0.44	0.39	5.00	0.00	0.32	0.32
10.60	0.44	0.39	5.00	0.00	0.32	0.32
10.65	0.44	0.39	5.00	0.00	0.32	0.32
10.70	0.44	0.39	5.00	0.00	0.32	0.32
10.75	0.44	0.39	5.00	0.00	0.32	0.32
10.80	0.44	0.39	5.00	0.00	0.32	0.32
10.85	0.44	0.39	5.00	0.00	0.32	0.32
10.90	0.44	0.39	5.00	0.00	0.32	0.32
10.95	0.44	0.39	5.00	0.00	0.32	0.32
11.00	0.44	0.39	5.00	0.00	0.32	0.32
11.05	0.44	0.39	5.00	0.00	0.32	0.32
11.10	0.44	0.39	5.00	0.00	0.32	0.32
11.15	0.44	0.39	5.00	0.00	0.32	0.32
11.20	0.44	0.39	5.00	0.00	0.32	0.32
11.25	0.44	0.39	5.00	0.00	0.32	0.32
11.30	0.44	0.39	5.00	0.00	0.32	0.32
11.35	0.44	0.39	5.00	0.00	0.32	0.32
11.40	0.44	0.39	5.00	0.00	0.32	0.32
11.45	0.44	0.39	5.00	0.00	0.32	0.32
11.50	0.44	0.39	5.00	0.00	0.32	0.32
11.55	0.44	0.39	5.00	0.00	0.32	0.32
11.60	0.44	0.39	5.00	0.00	0.32	0.32
11.65	0.44	0.39	5.00	0.00	0.32	0.32
11.70	0.44	0.39	5.00	0.00	0.32	0.32
11.75	0.44	0.39	5.00	0.00	0.32	0.32
11.80	0.44	0.39	5.00	0.00	0.32	0.32
11.85	0.44	0.39	5.00	0.00	0.32	0.32
11.90	0.44	0.39	5.00	0.00	0.31	0.31
11.95	0.44	0.39	5.00	0.00	0.31	0.31
12.00	0.44	0.39	5.00	0.00	0.31	0.31
12.05	0.44	0.39	5.00	0.00	0.31	0.31
12.10	0.44	0.39	5.00	0.00	0.31	0.31
12.15	0.44	0.39	5.00	0.00	0.31	0.31
12.20	0.44	0.39	5.00	0.00	0.31	0.31
12.25	0.44	0.39	5.00	0.00	0.31	0.31
12.30	0.44	0.39	5.00	0.00	0.31	0.31
12.35	0.44	0.39	5.00	0.00	0.31	0.31
12.40	0.44	0.39	5.00	0.00	0.31	0.31
12.45	0.44	0.39	5.00	0.00	0.31	0.31
12.50	0.44	0.39	5.00	0.00	0.31	0.31
12.55	0.44	0.39	5.00	0.00	0.31	0.31
12.60	0.44	0.39	5.00	0.00	0.31	0.31
12.65	0.44	0.39	5.00	0.00	0.31	0.31
12.70	0.44	0.39	5.00	0.00	0.31	0.31
12.75	0.44	0.39	5.00	0.00	0.31	0.31
12.80	0.44	0.39	5.00	0.00	0.31	0.31
12.85	0.44	0.39	5.00	0.00	0.31	0.31
12.90	0.44	0.39	5.00	0.00	0.31	0.31
12.95	0.44	0.39	5.00	0.00	0.31	0.31
13.00	0.44	0.39	5.00	0.00	0.31	0.31
13.05	0.44	0.39	5.00	0.00	0.31	0.31
13.10	0.44	0.39	5.00	0.00	0.31	0.31
13.15	0.44	0.39	5.00	0.00	0.31	0.31
13.20	0.44	0.39	5.00	0.00	0.31	0.31
13.25	0.44	0.39	5.00	0.00	0.31	0.31
13.30	0.44	0.39	5.00	0.00	0.31	0.31
13.35	0.44	0.39	5.00	0.00	0.31	0.31
13.40	0.44	0.39	5.00	0.00	0.31	0.31

13.45	0.44	0.39	5.00	0.00	0.31	0.31
13.50	0.44	0.39	5.00	0.00	0.31	0.31
13.55	0.44	0.39	5.00	0.00	0.31	0.31
13.60	0.44	0.39	5.00	0.00	0.31	0.31
13.65	0.44	0.39	5.00	0.00	0.31	0.31
13.70	0.44	0.39	5.00	0.00	0.31	0.31
13.75	0.44	0.39	5.00	0.00	0.31	0.31
13.80	0.44	0.39	5.00	0.00	0.31	0.31
13.85	0.44	0.39	5.00	0.00	0.31	0.31
13.90	0.44	0.39	5.00	0.00	0.31	0.31
13.95	0.44	0.39	5.00	0.00	0.31	0.31
14.00	0.44	0.39	5.00	0.00	0.31	0.31
14.05	0.44	0.39	5.00	0.00	0.31	0.31
14.10	0.44	0.39	5.00	0.00	0.31	0.31
14.15	0.44	0.39	5.00	0.00	0.31	0.31
14.20	0.44	0.39	5.00	0.00	0.31	0.31
14.25	0.44	0.39	5.00	0.00	0.31	0.31
14.30	0.44	0.39	5.00	0.00	0.30	0.30
14.35	0.44	0.39	5.00	0.00	0.30	0.30
14.40	0.44	0.39	5.00	0.00	0.30	0.30
14.45	0.44	0.39	5.00	0.00	0.30	0.30
14.50	0.44	0.39	5.00	0.00	0.30	0.30
14.55	0.44	0.39	5.00	0.00	0.30	0.30
14.60	0.44	0.39	5.00	0.00	0.30	0.30
14.65	0.44	0.39	5.00	0.00	0.30	0.30
14.70	0.44	0.39	5.00	0.00	0.30	0.30
14.75	0.44	0.39	5.00	0.00	0.30	0.30
14.80	0.44	0.39	5.00	0.00	0.30	0.30
14.85	0.44	0.39	5.00	0.00	0.30	0.30
14.90	0.44	0.39	5.00	0.00	0.30	0.30
14.95	0.44	0.39	5.00	0.00	0.30	0.30
15.00	0.44	0.39	5.00	0.00	0.30	0.30
15.05	0.44	0.39	5.00	0.00	0.30	0.30
15.10	0.44	0.39	5.00	0.00	0.30	0.30
15.15	0.44	0.39	5.00	0.00	0.30	0.30
15.20	0.44	0.39	5.00	0.00	0.30	0.30
15.25	0.44	0.39	5.00	0.00	0.30	0.30
15.30	0.44	0.39	5.00	0.00	0.30	0.30
15.35	0.44	0.39	5.00	0.00	0.30	0.30
15.40	0.44	0.39	5.00	0.00	0.30	0.30
15.45	0.44	0.39	5.00	0.00	0.30	0.30
15.50	0.44	0.39	5.00	0.00	0.30	0.30
15.55	0.44	0.39	5.00	0.00	0.30	0.30
15.60	0.44	0.39	5.00	0.00	0.30	0.30
15.65	0.44	0.39	5.00	0.00	0.30	0.30
15.70	0.44	0.39	5.00	0.00	0.30	0.30
15.75	0.44	0.39	5.00	0.00	0.30	0.30
15.80	0.44	0.39	5.00	0.00	0.30	0.30
15.85	0.44	0.39	5.00	0.00	0.30	0.30
15.90	0.44	0.39	5.00	0.00	0.30	0.30
15.95	0.44	0.39	5.00	0.00	0.30	0.30
16.00	0.44	0.39	5.00	0.00	0.30	0.30
16.05	0.44	0.39	5.00	0.00	0.30	0.30
16.10	0.44	0.39	5.00	0.00	0.30	0.30
16.15	0.44	0.39	5.00	0.00	0.30	0.30
16.20	0.44	0.39	5.00	0.00	0.30	0.30
16.25	0.44	0.39	5.00	0.00	0.30	0.30
16.30	0.44	0.39	5.00	0.00	0.30	0.30
16.35	0.44	0.39	5.00	0.00	0.30	0.30

16.40	0.44	0.39	5.00	0.00	0.29	0.29
16.45	0.44	0.39	5.00	0.00	0.29	0.29
16.50	0.44	0.39	5.00	0.00	0.29	0.29
16.55	0.44	0.39	5.00	0.00	0.29	0.29
16.60	0.44	0.39	5.00	0.00	0.29	0.29
16.65	0.44	0.39	5.00	0.00	0.29	0.29
16.70	0.44	0.39	5.00	0.00	0.29	0.29
16.75	0.44	0.39	5.00	0.00	0.29	0.29
16.80	0.44	0.39	5.00	0.00	0.29	0.29
16.85	0.44	0.39	5.00	0.00	0.29	0.29
16.90	0.44	0.39	5.00	0.00	0.29	0.29
16.95	0.44	0.39	5.00	0.00	0.29	0.29
17.00	0.44	0.39	5.00	0.00	0.29	0.29
17.05	0.44	0.39	5.00	0.00	0.29	0.29
17.10	0.44	0.39	5.00	0.00	0.29	0.29
17.15	0.44	0.39	5.00	0.00	0.29	0.29
17.20	0.44	0.39	5.00	0.00	0.29	0.29
17.25	0.44	0.39	5.00	0.00	0.29	0.29
17.30	0.44	0.39	5.00	0.00	0.29	0.29
17.35	0.44	0.39	5.00	0.00	0.29	0.29
17.40	0.44	0.39	5.00	0.00	0.29	0.29
17.45	0.44	0.39	5.00	0.00	0.29	0.29
17.50	0.44	0.39	5.00	0.00	0.29	0.29
17.55	0.44	0.39	5.00	0.00	0.29	0.29
17.60	0.44	0.39	5.00	0.00	0.29	0.29
17.65	0.44	0.39	5.00	0.00	0.29	0.29
17.70	0.44	0.39	5.00	0.00	0.29	0.29
17.75	0.44	0.39	5.00	0.00	0.29	0.29
17.80	0.44	0.39	5.00	0.00	0.29	0.29
17.85	0.44	0.39	5.00	0.00	0.29	0.29
17.90	0.44	0.39	5.00	0.00	0.29	0.29
17.95	0.44	0.39	5.00	0.00	0.29	0.29
18.00	0.44	0.39	5.00	0.00	0.28	0.28
18.05	0.44	0.39	5.00	0.00	0.28	0.28
18.10	0.44	0.39	5.00	0.00	0.28	0.28
18.15	0.44	0.39	5.00	0.00	0.28	0.28
18.20	0.44	0.39	5.00	0.00	0.28	0.28
18.25	0.44	0.39	5.00	0.00	0.28	0.28
18.30	0.44	0.39	5.00	0.00	0.28	0.28
18.35	0.44	0.39	5.00	0.00	0.28	0.28
18.40	0.44	0.39	5.00	0.00	0.28	0.28
18.45	0.44	0.39	5.00	0.00	0.28	0.28
18.50	0.44	0.39	5.00	0.00	0.28	0.28
18.55	0.44	0.39	5.00	0.00	0.28	0.28
18.60	0.44	0.39	5.00	0.00	0.28	0.28
18.65	0.44	0.39	5.00	0.00	0.28	0.28
18.70	0.44	0.39	5.00	0.00	0.28	0.28
18.75	0.44	0.39	5.00	0.00	0.28	0.28
18.80	0.44	0.39	5.00	0.00	0.28	0.28
18.85	0.44	0.39	5.00	0.00	0.28	0.28
18.90	0.44	0.39	5.00	0.00	0.28	0.28
18.95	0.44	0.39	5.00	0.00	0.28	0.28
19.00	0.44	0.39	5.00	0.00	0.28	0.28
19.05	0.44	0.39	5.00	0.00	0.28	0.28
19.10	0.44	0.39	5.00	0.00	0.28	0.28
19.15	0.44	0.39	5.00	0.00	0.28	0.28
19.20	0.44	0.39	5.00	0.00	0.28	0.28
19.25	0.44	0.39	5.00	0.00	0.28	0.28
19.30	0.44	0.39	5.00	0.00	0.27	0.27

19.35	0.44	0.39	5.00	0.00	0.27	0.27
19.40	0.44	0.39	5.00	0.00	0.27	0.27
19.45	0.44	0.39	5.00	0.00	0.27	0.27
19.50	0.44	0.39	5.00	0.00	0.27	0.27
19.55	0.44	0.39	5.00	0.00	0.27	0.27
19.60	0.44	0.39	5.00	0.00	0.27	0.27
19.65	0.44	0.39	5.00	0.00	0.27	0.27
19.70	0.44	0.39	5.00	0.00	0.27	0.27
19.75	0.44	0.39	5.00	0.00	0.27	0.27
19.80	0.44	0.39	5.00	0.00	0.27	0.27
19.85	0.44	0.39	5.00	0.00	0.27	0.27
19.90	0.44	0.39	5.00	0.00	0.27	0.27
19.95	0.44	0.39	5.00	0.00	0.27	0.27
20.00	0.44	0.39	5.00	0.00	0.27	0.27
20.05	0.44	0.39	5.00	0.00	0.27	0.27
20.10	0.44	0.38	5.00	0.00	0.27	0.27
20.15	0.44	0.38	5.00	0.00	0.27	0.27
20.20	0.44	0.38	5.00	0.00	0.27	0.27
20.25	0.44	0.38	5.00	0.00	0.27	0.27
20.30	0.44	0.38	5.00	0.00	0.26	0.26
20.35	0.44	0.38	5.00	0.00	0.26	0.26
20.40	0.44	0.38	5.00	0.00	0.26	0.26
20.45	0.44	0.38	5.00	0.00	0.26	0.26
20.50	0.44	0.38	5.00	0.00	0.26	0.26
20.55	0.44	0.38	5.00	0.00	0.26	0.26
20.60	0.44	0.38	5.00	0.00	0.26	0.26
20.65	0.44	0.38	5.00	0.00	0.26	0.26
20.70	0.44	0.38	5.00	0.00	0.26	0.26
20.75	0.44	0.38	5.00	0.00	0.26	0.26
20.80	0.44	0.38	5.00	0.00	0.26	0.26
20.85	0.44	0.38	5.00	0.00	0.26	0.26
20.90	0.44	0.38	5.00	0.00	0.26	0.26
20.95	0.44	0.38	5.00	0.00	0.26	0.26
21.00	0.44	0.38	5.00	0.00	0.25	0.25
21.05	0.44	0.38	5.00	0.00	0.25	0.25
21.10	0.44	0.38	5.00	0.00	0.25	0.25
21.15	0.44	0.38	5.00	0.00	0.25	0.25
21.20	0.44	0.38	5.00	0.00	0.25	0.25
21.25	0.44	0.38	5.00	0.00	0.25	0.25
21.30	0.44	0.38	5.00	0.00	0.25	0.25
21.35	0.44	0.38	5.00	0.00	0.25	0.25
21.40	0.44	0.38	5.00	0.00	0.25	0.25
21.45	0.44	0.38	5.00	0.00	0.25	0.25
21.50	0.44	0.38	5.00	0.00	0.25	0.25
21.55	0.44	0.38	5.00	0.00	0.25	0.25
21.60	0.44	0.38	5.00	0.00	0.25	0.25
21.65	0.44	0.38	5.00	0.00	0.25	0.25
21.70	0.44	0.38	5.00	0.00	0.25	0.25
21.75	0.44	0.38	5.00	0.00	0.24	0.24
21.80	0.44	0.38	5.00	0.00	0.24	0.24
21.85	0.44	0.38	5.00	0.00	0.24	0.24
21.90	0.44	0.38	5.00	0.00	0.24	0.24
21.95	0.44	0.38	5.00	0.00	0.24	0.24
22.00	0.44	0.38	5.00	0.00	0.24	0.24
22.05	0.44	0.38	5.00	0.00	0.24	0.24
22.10	0.44	0.38	5.00	0.00	0.24	0.24
22.15	0.44	0.38	5.00	0.00	0.24	0.24
22.20	0.44	0.38	5.00	0.00	0.24	0.24
22.25	0.44	0.38	5.00	0.00	0.24	0.24

22.30	0.44	0.38	5.00	0.00	0.24	0.24
22.35	0.44	0.38	5.00	0.00	0.24	0.24
22.40	0.44	0.38	5.00	0.00	0.24	0.24
22.45	0.44	0.38	5.00	0.00	0.24	0.24
22.50	0.44	0.38	5.00	0.00	0.24	0.24
22.55	0.44	0.38	5.00	0.00	0.24	0.24
22.60	0.44	0.38	5.00	0.00	0.24	0.24
22.65	0.44	0.38	5.00	0.00	0.23	0.23
22.70	0.44	0.38	5.00	0.00	0.23	0.23
22.75	0.44	0.38	5.00	0.00	0.23	0.23
22.80	0.44	0.38	5.00	0.00	0.23	0.23
22.85	0.44	0.38	5.00	0.00	0.23	0.23
22.90	0.44	0.38	5.00	0.00	0.23	0.23
22.95	0.44	0.38	5.00	0.00	0.23	0.23
23.00	0.44	0.38	5.00	0.00	0.23	0.23
23.05	0.44	0.38	5.00	0.00	0.23	0.23
23.10	0.44	0.38	5.00	0.00	0.23	0.23
23.15	0.44	0.38	5.00	0.00	0.23	0.23
23.20	0.44	0.38	5.00	0.00	0.23	0.23
23.25	0.44	0.38	5.00	0.00	0.23	0.23
23.30	0.44	0.38	5.00	0.00	0.23	0.23
23.35	0.44	0.38	5.00	0.00	0.23	0.23
23.40	0.44	0.38	5.00	0.00	0.23	0.23
23.45	0.44	0.38	5.00	0.00	0.22	0.22
23.50	0.44	0.38	5.00	0.00	0.22	0.22
23.55	0.44	0.38	5.00	0.00	0.22	0.22
23.60	0.44	0.38	5.00	0.00	0.22	0.22
23.65	0.44	0.38	5.00	0.00	0.22	0.22
23.70	0.44	0.38	5.00	0.00	0.22	0.22
23.75	0.44	0.38	5.00	0.00	0.22	0.22
23.80	0.44	0.38	5.00	0.00	0.22	0.22
23.85	0.44	0.38	5.00	0.00	0.22	0.22
23.90	0.44	0.38	5.00	0.00	0.22	0.22
23.95	0.44	0.38	5.00	0.00	0.22	0.22
24.00	0.44	0.38	5.00	0.00	0.22	0.22
24.05	0.44	0.38	5.00	0.00	0.22	0.22
24.10	0.44	0.38	5.00	0.00	0.22	0.22
24.15	0.44	0.38	5.00	0.00	0.21	0.21
24.20	0.44	0.38	5.00	0.00	0.21	0.21
24.25	0.44	0.38	5.00	0.00	0.21	0.21
24.30	0.44	0.38	5.00	0.00	0.21	0.21
24.35	0.44	0.38	5.00	0.00	0.21	0.21
24.40	0.44	0.38	5.00	0.00	0.21	0.21
24.45	0.42	0.38	5.00	0.00	0.21	0.21
24.50	0.40	0.38	5.00	0.00	0.21	0.21
24.55	0.39	0.38	5.00	0.00	0.21	0.21
24.60	0.38	0.38	5.00	0.00	0.21	0.21
24.65	0.37	0.38	5.00	0.00	0.21	0.21
24.70	0.36	0.38	5.00	0.00	0.21	0.21
24.75	0.36	0.38	5.00	0.00	0.20	0.20
24.80	0.35	0.38	5.00	0.00	0.20	0.20
24.85	0.35	0.38	5.00	0.00	0.20	0.20
24.90	0.34	0.38	5.00	0.00	0.20	0.20
24.95	0.34	0.38	5.00	0.00	0.20	0.20
25.00	0.34	0.38	5.00	0.00	0.20	0.20
25.05	0.33	0.38	5.00	0.00	0.20	0.20
25.10	0.33	0.38	5.00	0.00	0.20	0.20
25.15	0.33	0.38	5.00	0.00	0.20	0.20
25.20	0.33	0.38	5.00	0.00	0.20	0.20

25.25	0.32	0.38	5.00	0.00	0.20	0.20
25.30	0.32	0.38	5.00	0.00	0.19	0.19
25.35	0.32	0.38	5.00	0.00	0.19	0.19
25.40	0.32	0.38	5.00	0.00	0.19	0.19
25.45	0.31	0.38	5.00	0.00	0.19	0.19
25.50	0.31	0.38	5.00	0.00	0.19	0.19
25.55	0.31	0.38	5.00	0.00	0.19	0.19
25.60	0.31	0.38	5.00	0.00	0.19	0.19
25.65	0.31	0.38	5.00	0.00	0.19	0.19
25.70	0.30	0.38	5.00	0.00	0.19	0.19
25.75	0.30	0.38	5.00	0.00	0.19	0.19
25.80	0.30	0.38	5.00	0.00	0.18	0.18
25.85	0.30	0.38	5.00	0.00	0.18	0.18
25.90	0.30	0.38	5.00	0.00	0.18	0.18
25.95	0.29	0.38	5.00	0.00	0.18	0.18
26.00	0.29	0.38	5.00	0.00	0.18	0.18
26.05	0.30	0.38	5.00	0.00	0.18	0.18
26.10	0.30	0.38	5.00	0.00	0.18	0.18
26.15	0.30	0.38	5.00	0.00	0.18	0.18
26.20	0.31	0.38	5.00	0.00	0.18	0.18
26.25	0.31	0.38	5.00	0.00	0.18	0.18
26.30	0.32	0.38	5.00	0.00	0.17	0.17
26.35	0.32	0.38	5.00	0.00	0.17	0.17
26.40	0.33	0.38	5.00	0.00	0.17	0.17
26.45	0.34	0.38	5.00	0.00	0.17	0.17
26.50	0.34	0.38	5.00	0.00	0.17	0.17
26.55	0.35	0.38	5.00	0.00	0.17	0.17
26.60	0.37	0.38	5.00	0.00	0.17	0.17
26.65	0.38	0.38	5.00	0.00	0.17	0.17
26.70	0.41	0.38	5.00	0.00	0.17	0.17
26.75	0.44	0.38	5.00	0.00	0.17	0.17
26.80	0.44	0.38	5.00	0.00	0.17	0.17
26.85	0.44	0.38	5.00	0.00	0.16	0.16
26.90	0.44	0.38	5.00	0.00	0.16	0.16
26.95	0.44	0.38	5.00	0.00	0.16	0.16
27.00	0.44	0.38	5.00	0.00	0.16	0.16
27.05	0.44	0.38	5.00	0.00	0.16	0.16
27.10	0.44	0.38	5.00	0.00	0.16	0.16
27.15	0.44	0.38	5.00	0.00	0.16	0.16
27.20	0.44	0.38	5.00	0.00	0.16	0.16
27.25	0.44	0.38	5.00	0.00	0.16	0.16
27.30	0.44	0.38	5.00	0.00	0.16	0.16
27.35	0.44	0.38	5.00	0.00	0.16	0.16
27.40	0.44	0.38	5.00	0.00	0.16	0.16
27.45	0.44	0.38	5.00	0.00	0.15	0.15
27.50	0.44	0.38	5.00	0.00	0.15	0.15
27.55	0.44	0.38	5.00	0.00	0.15	0.15
27.60	0.44	0.38	5.00	0.00	0.15	0.15
27.65	0.44	0.38	5.00	0.00	0.15	0.15
27.70	0.44	0.38	5.00	0.00	0.15	0.15
27.75	0.44	0.38	5.00	0.00	0.15	0.15
27.80	0.44	0.38	5.00	0.00	0.15	0.15
27.85	0.44	0.38	5.00	0.00	0.15	0.15
27.90	0.44	0.38	5.00	0.00	0.15	0.15
27.95	0.44	0.38	5.00	0.00	0.15	0.15
28.00	0.44	0.38	5.00	0.00	0.15	0.15
28.05	0.44	0.38	5.00	0.00	0.15	0.15
28.10	0.44	0.38	5.00	0.00	0.15	0.15
28.15	0.44	0.38	5.00	0.00	0.14	0.14

28.20	0.44	0.38	5.00	0.00	0.14	0.14
28.25	0.44	0.38	5.00	0.00	0.14	0.14
28.30	0.44	0.38	5.00	0.00	0.14	0.14
28.35	0.44	0.38	5.00	0.00	0.14	0.14
28.40	0.44	0.38	5.00	0.00	0.14	0.14
28.45	0.44	0.38	5.00	0.00	0.14	0.14
28.50	0.44	0.38	5.00	0.00	0.14	0.14
28.55	0.44	0.38	5.00	0.00	0.14	0.14
28.60	0.44	0.38	5.00	0.00	0.14	0.14
28.65	0.44	0.38	5.00	0.00	0.14	0.14
28.70	0.44	0.38	5.00	0.00	0.14	0.14
28.75	0.44	0.38	5.00	0.00	0.14	0.14
28.80	0.44	0.38	5.00	0.00	0.14	0.14
28.85	0.44	0.38	5.00	0.00	0.14	0.14
28.90	0.44	0.38	5.00	0.00	0.14	0.14
28.95	0.44	0.38	5.00	0.00	0.14	0.14
29.00	0.44	0.38	5.00	0.00	0.14	0.14
29.05	0.44	0.38	5.00	0.00	0.14	0.14
29.10	0.44	0.38	5.00	0.00	0.14	0.14
29.15	0.44	0.38	5.00	0.00	0.13	0.13
29.20	0.44	0.38	5.00	0.00	0.13	0.13
29.25	0.44	0.38	5.00	0.00	0.13	0.13
29.30	0.44	0.38	5.00	0.00	0.13	0.13
29.35	0.44	0.38	5.00	0.00	0.13	0.13
29.40	0.44	0.38	5.00	0.00	0.13	0.13
29.45	0.44	0.38	5.00	0.00	0.13	0.13
29.50	0.44	0.38	5.00	0.00	0.13	0.13
29.55	0.44	0.38	5.00	0.00	0.13	0.13
29.60	0.44	0.38	5.00	0.00	0.13	0.13
29.65	0.44	0.38	5.00	0.00	0.13	0.13
29.70	0.44	0.38	5.00	0.00	0.13	0.13
29.75	0.44	0.38	5.00	0.00	0.13	0.13
29.80	0.44	0.38	5.00	0.00	0.13	0.13
29.85	0.44	0.38	5.00	0.00	0.13	0.13
29.90	0.44	0.38	5.00	0.00	0.13	0.13
29.95	0.44	0.38	5.00	0.00	0.13	0.13
30.00	0.44	0.38	5.00	0.00	0.13	0.13
30.05	0.44	0.38	5.00	0.00	0.13	0.13
30.10	0.44	0.38	5.00	0.00	0.13	0.13
30.15	0.44	0.38	5.00	0.00	0.13	0.13
30.20	0.44	0.37	5.00	0.00	0.13	0.13
30.25	0.44	0.37	5.00	0.00	0.13	0.13
30.30	0.44	0.37	5.00	0.00	0.12	0.12
30.35	0.44	0.37	5.00	0.00	0.12	0.12
30.40	0.44	0.37	5.00	0.00	0.12	0.12
30.45	0.44	0.37	5.00	0.00	0.12	0.12
30.50	0.44	0.37	5.00	0.00	0.12	0.12
30.55	0.44	0.37	5.00	0.00	0.12	0.12
30.60	0.44	0.37	5.00	0.00	0.12	0.12
30.65	0.44	0.37	5.00	0.00	0.12	0.12
30.70	0.44	0.37	5.00	0.00	0.12	0.12
30.75	0.44	0.37	5.00	0.00	0.12	0.12
30.80	0.44	0.37	5.00	0.00	0.12	0.12
30.85	0.44	0.37	5.00	0.00	0.12	0.12
30.90	0.44	0.37	5.00	0.00	0.12	0.12
30.95	0.43	0.37	5.00	0.00	0.12	0.12
31.00	0.43	0.37	5.00	0.00	0.12	0.12
31.05	0.43	0.37	5.00	0.00	0.12	0.12
31.10	0.43	0.37	5.00	0.00	0.12	0.12

31.15	0.43	0.37	5.00	0.00	0.12	0.12
31.20	0.43	0.37	5.00	0.00	0.12	0.12
31.25	0.43	0.37	5.00	0.00	0.12	0.12
31.30	0.43	0.37	5.00	0.00	0.12	0.12
31.35	0.43	0.37	5.00	0.00	0.12	0.12
31.40	0.43	0.37	5.00	0.00	0.12	0.12
31.45	0.43	0.37	5.00	0.00	0.12	0.12
31.50	0.43	0.37	5.00	0.00	0.12	0.12
31.55	0.43	0.37	5.00	0.00	0.11	0.11
31.60	0.43	0.37	5.00	0.00	0.11	0.11
31.65	0.43	0.37	5.00	0.00	0.11	0.11
31.70	0.43	0.37	5.00	0.00	0.11	0.11
31.75	0.43	0.37	5.00	0.00	0.11	0.11
31.80	0.43	0.37	5.00	0.00	0.11	0.11
31.85	0.43	0.37	5.00	0.00	0.11	0.11
31.90	0.43	0.37	5.00	0.00	0.11	0.11
31.95	0.43	0.37	5.00	0.00	0.11	0.11
32.00	0.43	0.37	5.00	0.00	0.11	0.11
32.05	0.43	0.37	5.00	0.00	0.11	0.11
32.10	0.43	0.37	5.00	0.00	0.11	0.11
32.15	0.43	0.37	5.00	0.00	0.11	0.11
32.20	0.43	0.37	5.00	0.00	0.11	0.11
32.25	0.43	0.37	5.00	0.00	0.11	0.11
32.30	0.43	0.37	5.00	0.00	0.11	0.11
32.35	0.43	0.37	5.00	0.00	0.11	0.11
32.40	0.43	0.37	5.00	0.00	0.11	0.11
32.45	0.43	0.37	5.00	0.00	0.11	0.11
32.50	0.43	0.37	5.00	0.00	0.11	0.11
32.55	0.43	0.37	5.00	0.00	0.11	0.11
32.60	0.43	0.37	5.00	0.00	0.11	0.11
32.65	0.43	0.37	5.00	0.00	0.11	0.11
32.70	0.43	0.37	5.00	0.00	0.11	0.11
32.75	0.43	0.37	5.00	0.00	0.11	0.11
32.80	0.43	0.37	5.00	0.00	0.11	0.11
32.85	0.43	0.37	5.00	0.00	0.11	0.11
32.90	0.43	0.37	5.00	0.00	0.11	0.11
32.95	0.43	0.37	5.00	0.00	0.11	0.11
33.00	0.43	0.37	5.00	0.00	0.10	0.10
33.05	0.43	0.37	5.00	0.00	0.10	0.10
33.10	0.43	0.37	5.00	0.00	0.10	0.10
33.15	0.43	0.37	5.00	0.00	0.10	0.10
33.20	0.43	0.37	5.00	0.00	0.10	0.10
33.25	0.43	0.36	5.00	0.00	0.10	0.10
33.30	0.43	0.36	5.00	0.00	0.10	0.10
33.35	0.43	0.36	5.00	0.00	0.10	0.10
33.40	0.43	0.36	5.00	0.00	0.10	0.10
33.45	0.43	0.36	5.00	0.00	0.10	0.10
33.50	0.43	0.36	5.00	0.00	0.10	0.10
33.55	0.43	0.36	5.00	0.00	0.10	0.10
33.60	0.43	0.36	5.00	0.00	0.10	0.10
33.65	0.43	0.36	5.00	0.00	0.10	0.10
33.70	0.43	0.36	5.00	0.00	0.10	0.10
33.75	0.43	0.36	5.00	0.00	0.10	0.10
33.80	0.43	0.36	5.00	0.00	0.10	0.10
33.85	0.43	0.36	5.00	0.00	0.10	0.10
33.90	0.43	0.36	5.00	0.00	0.10	0.10
33.95	0.43	0.36	5.00	0.00	0.10	0.10
34.00	0.43	0.36	5.00	0.00	0.10	0.10
34.05	0.43	0.36	5.00	0.00	0.10	0.10

34.10	0.43	0.36	5.00	0.00	0.10	0.10
34.15	0.43	0.36	5.00	0.00	0.10	0.10
34.20	0.43	0.36	5.00	0.00	0.10	0.10
34.25	0.43	0.36	5.00	0.00	0.10	0.10
34.30	0.43	0.36	5.00	0.00	0.10	0.10
34.35	0.43	0.36	5.00	0.00	0.10	0.10
34.40	0.43	0.36	5.00	0.00	0.10	0.10
34.45	0.43	0.36	5.00	0.00	0.10	0.10
34.50	0.43	0.36	5.00	0.00	0.10	0.10
34.55	0.43	0.36	5.00	0.00	0.10	0.10
34.60	0.43	0.36	5.00	0.00	0.10	0.10
34.65	0.43	0.36	5.00	0.00	0.10	0.10
34.70	0.43	0.36	5.00	0.00	0.09	0.09
34.75	0.43	0.36	5.00	0.00	0.09	0.09
34.80	0.43	0.36	5.00	0.00	0.09	0.09
34.85	0.43	0.36	5.00	0.00	0.09	0.09
34.90	0.43	0.36	5.00	0.00	0.09	0.09
34.95	0.43	0.36	5.00	0.00	0.09	0.09
35.00	0.43	0.36	5.00	0.00	0.09	0.09
35.05	0.43	0.36	5.00	0.00	0.09	0.09
35.10	0.43	0.36	5.00	0.00	0.09	0.09
35.15	0.43	0.36	5.00	0.00	0.09	0.09
35.20	0.43	0.36	5.00	0.00	0.09	0.09
35.25	0.43	0.36	5.00	0.00	0.09	0.09
35.30	0.43	0.36	5.00	0.00	0.09	0.09
35.35	0.43	0.36	5.00	0.00	0.09	0.09
35.40	0.42	0.36	5.00	0.00	0.09	0.09
35.45	0.42	0.36	5.00	0.00	0.09	0.09
35.50	0.42	0.36	5.00	0.00	0.09	0.09
35.55	0.42	0.36	5.00	0.00	0.09	0.09
35.60	0.42	0.36	5.00	0.00	0.09	0.09
35.65	0.42	0.36	5.00	0.00	0.09	0.09
35.70	0.42	0.36	5.00	0.00	0.09	0.09
35.75	0.42	0.36	5.00	0.00	0.09	0.09
35.80	0.42	0.36	5.00	0.00	0.09	0.09
35.85	0.42	0.36	5.00	0.00	0.09	0.09
35.90	0.42	0.36	5.00	0.00	0.09	0.09
35.95	0.42	0.36	5.00	0.00	0.09	0.09
36.00	0.42	0.36	5.00	0.00	0.09	0.09
36.05	0.42	0.36	5.00	0.00	0.09	0.09
36.10	0.42	0.36	5.00	0.00	0.09	0.09
36.15	0.42	0.36	5.00	0.00	0.09	0.09
36.20	0.42	0.36	5.00	0.00	0.09	0.09
36.25	0.42	0.36	5.00	0.00	0.09	0.09
36.30	0.42	0.35	5.00	0.00	0.09	0.09
36.35	0.42	0.35	5.00	0.00	0.09	0.09
36.40	0.42	0.35	5.00	0.00	0.09	0.09
36.45	0.42	0.35	5.00	0.00	0.09	0.09
36.50	0.42	0.35	5.00	0.00	0.09	0.09
36.55	0.42	0.35	5.00	0.00	0.09	0.09
36.60	0.42	0.35	5.00	0.00	0.08	0.08
36.65	0.42	0.35	5.00	0.00	0.08	0.08
36.70	0.42	0.35	5.00	0.00	0.08	0.08
36.75	0.42	0.35	5.00	0.00	0.08	0.08
36.80	0.42	0.35	5.00	0.00	0.08	0.08
36.85	0.42	0.35	5.00	0.00	0.08	0.08
36.90	0.42	0.35	5.00	0.00	0.08	0.08
36.95	0.42	0.35	5.00	0.00	0.08	0.08
37.00	0.42	0.35	5.00	0.00	0.08	0.08

37.05	0.42	0.35	5.00	0.00	0.08	0.08
37.10	0.42	0.35	5.00	0.00	0.08	0.08
37.15	0.42	0.35	5.00	0.00	0.08	0.08
37.20	0.42	0.35	5.00	0.00	0.08	0.08
37.25	0.42	0.35	5.00	0.00	0.08	0.08
37.30	0.42	0.35	5.00	0.00	0.08	0.08
37.35	0.42	0.35	5.00	0.00	0.08	0.08
37.40	0.42	0.35	5.00	0.00	0.08	0.08
37.45	0.42	0.35	5.00	0.00	0.08	0.08
37.50	0.42	0.35	5.00	0.00	0.08	0.08
37.55	0.42	0.35	5.00	0.00	0.08	0.08
37.60	0.42	0.35	5.00	0.00	0.08	0.08
37.65	0.42	0.35	5.00	0.00	0.08	0.08
37.70	0.42	0.35	5.00	0.00	0.08	0.08
37.75	0.42	0.35	5.00	0.00	0.08	0.08
37.80	0.42	0.35	5.00	0.00	0.08	0.08
37.85	0.42	0.35	5.00	0.00	0.08	0.08
37.90	0.42	0.35	5.00	0.00	0.08	0.08
37.95	0.42	0.35	5.00	0.00	0.08	0.08
38.00	0.42	0.35	5.00	0.00	0.08	0.08
38.05	0.42	0.35	5.00	0.00	0.08	0.08
38.10	0.42	0.35	5.00	0.00	0.08	0.08
38.15	0.42	0.35	5.00	0.00	0.08	0.08
38.20	0.42	0.35	5.00	0.00	0.08	0.08
38.25	0.42	0.35	5.00	0.00	0.08	0.08
38.30	0.42	0.35	5.00	0.00	0.08	0.08
38.35	0.42	0.35	5.00	0.00	0.08	0.08
38.40	0.42	0.35	5.00	0.00	0.07	0.07
38.45	0.42	0.35	5.00	0.00	0.07	0.07
38.50	0.42	0.35	5.00	0.00	0.07	0.07
38.55	0.42	0.35	5.00	0.00	0.07	0.07
38.60	0.42	0.35	5.00	0.00	0.07	0.07
38.65	0.42	0.35	5.00	0.00	0.07	0.07
38.70	0.42	0.35	5.00	0.00	0.07	0.07
38.75	0.42	0.35	5.00	0.00	0.07	0.07
38.80	0.42	0.35	5.00	0.00	0.07	0.07
38.85	0.42	0.35	5.00	0.00	0.07	0.07
38.90	0.42	0.35	5.00	0.00	0.07	0.07
38.95	0.42	0.35	5.00	0.00	0.07	0.07
39.00	0.42	0.35	5.00	0.00	0.07	0.07
39.05	0.42	0.35	5.00	0.00	0.07	0.07
39.10	0.42	0.35	5.00	0.00	0.07	0.07
39.15	0.42	0.35	5.00	0.00	0.07	0.07
39.20	0.42	0.35	5.00	0.00	0.07	0.07
39.25	0.42	0.35	5.00	0.00	0.07	0.07
39.30	0.42	0.35	5.00	0.00	0.07	0.07
39.35	0.42	0.34	5.00	0.00	0.07	0.07
39.40	0.42	0.34	5.00	0.00	0.07	0.07
39.45	0.42	0.34	5.00	0.00	0.07	0.07
39.50	0.42	0.34	5.00	0.00	0.07	0.07
39.55	0.42	0.34	5.00	0.00	0.07	0.07
39.60	0.42	0.34	5.00	0.00	0.07	0.07
39.65	0.42	0.34	5.00	0.00	0.07	0.07
39.70	0.42	0.34	5.00	0.00	0.07	0.07
39.75	0.42	0.34	5.00	0.00	0.07	0.07
39.80	0.42	0.34	5.00	0.00	0.07	0.07
39.85	0.42	0.34	5.00	0.00	0.07	0.07
39.90	0.42	0.34	5.00	0.00	0.07	0.07
39.95	0.42	0.34	5.00	0.00	0.07	0.07

40.00	0.42	0.34	5.00	0.00	0.06	0.06
40.05	0.41	0.34	5.00	0.00	0.06	0.06
40.10	0.41	0.34	5.00	0.00	0.06	0.06
40.15	0.41	0.34	5.00	0.00	0.06	0.06
40.20	0.41	0.34	5.00	0.00	0.06	0.06
40.25	0.41	0.34	5.00	0.00	0.06	0.06
40.30	0.41	0.34	5.00	0.00	0.06	0.06
40.35	0.41	0.34	5.00	0.00	0.06	0.06
40.40	0.41	0.34	5.00	0.00	0.06	0.06
40.45	0.41	0.34	5.00	0.00	0.06	0.06
40.50	0.41	0.34	5.00	0.00	0.06	0.06
40.55	0.41	0.34	5.00	0.00	0.06	0.06
40.60	0.41	0.34	5.00	0.00	0.06	0.06
40.65	0.41	0.34	5.00	0.00	0.06	0.06
40.70	0.41	0.34	5.00	0.00	0.06	0.06
40.75	0.41	0.34	5.00	0.00	0.06	0.06
40.80	0.41	0.34	5.00	0.00	0.06	0.06
40.85	0.41	0.34	5.00	0.00	0.06	0.06
40.90	0.41	0.34	5.00	0.00	0.06	0.06
40.95	0.41	0.34	5.00	0.00	0.06	0.06
41.00	0.41	0.34	5.00	0.00	0.06	0.06
41.05	0.41	0.34	5.00	0.00	0.06	0.06
41.10	0.41	0.34	5.00	0.00	0.06	0.06
41.15	0.41	0.34	5.00	0.00	0.06	0.06
41.20	0.41	0.34	5.00	0.00	0.06	0.06
41.25	0.41	0.34	5.00	0.00	0.06	0.06
41.30	0.41	0.34	5.00	0.00	0.06	0.06
41.35	0.41	0.34	5.00	0.00	0.06	0.06
41.40	0.41	0.34	5.00	0.00	0.06	0.06
41.45	0.41	0.34	5.00	0.00	0.05	0.05
41.50	0.41	0.34	5.00	0.00	0.05	0.05
41.55	0.41	0.34	5.00	0.00	0.05	0.05
41.60	0.41	0.34	5.00	0.00	0.05	0.05
41.65	0.41	0.34	5.00	0.00	0.05	0.05
41.70	0.41	0.34	5.00	0.00	0.05	0.05
41.75	0.41	0.34	5.00	0.00	0.05	0.05
41.80	0.41	0.34	5.00	0.00	0.05	0.05
41.85	0.41	0.34	5.00	0.00	0.05	0.05
41.90	0.41	0.34	5.00	0.00	0.05	0.05
41.95	0.41	0.34	5.00	0.00	0.05	0.05
42.00	0.41	0.34	5.00	0.00	0.05	0.05
42.05	0.41	0.34	5.00	0.00	0.05	0.05
42.10	0.41	0.34	5.00	0.00	0.05	0.05
42.15	0.41	0.34	5.00	0.00	0.05	0.05
42.20	0.41	0.34	5.00	0.00	0.05	0.05
42.25	0.41	0.34	5.00	0.00	0.05	0.05
42.30	0.41	0.34	5.00	0.00	0.05	0.05
42.35	0.41	0.33	5.00	0.00	0.05	0.05
42.40	0.41	0.33	5.00	0.00	0.05	0.05
42.45	0.41	0.33	5.00	0.00	0.05	0.05
42.50	0.41	0.33	5.00	0.00	0.05	0.05
42.55	0.41	0.33	5.00	0.00	0.05	0.05
42.60	0.41	0.33	5.00	0.00	0.05	0.05
42.65	0.41	0.33	5.00	0.00	0.05	0.05
42.70	0.41	0.33	5.00	0.00	0.05	0.05
42.75	0.41	0.33	5.00	0.00	0.05	0.05
42.80	0.41	0.33	5.00	0.00	0.04	0.04
42.85	0.41	0.33	5.00	0.00	0.04	0.04
42.90	0.41	0.33	5.00	0.00	0.04	0.04

42.95	0.41	0.33	5.00	0.00	0.04	0.04
43.00	0.41	0.33	5.00	0.00	0.04	0.04
43.05	0.41	0.33	5.00	0.00	0.04	0.04
43.10	0.41	0.33	5.00	0.00	0.04	0.04
43.15	0.41	0.33	5.00	0.00	0.04	0.04
43.20	0.41	0.33	5.00	0.00	0.04	0.04
43.25	0.41	0.33	5.00	0.00	0.04	0.04
43.30	0.41	0.33	5.00	0.00	0.04	0.04
43.35	0.41	0.33	5.00	0.00	0.04	0.04
43.40	0.41	0.33	5.00	0.00	0.04	0.04
43.45	0.41	0.33	5.00	0.00	0.04	0.04
43.50	0.41	0.33	5.00	0.00	0.04	0.04
43.55	0.41	0.33	5.00	0.00	0.04	0.04
43.60	0.41	0.33	5.00	0.00	0.04	0.04
43.65	0.41	0.33	5.00	0.00	0.04	0.04
43.70	0.41	0.33	5.00	0.00	0.04	0.04
43.75	0.41	0.33	5.00	0.00	0.04	0.04
43.80	0.41	0.33	5.00	0.00	0.04	0.04
43.85	0.41	0.33	5.00	0.00	0.04	0.04
43.90	0.41	0.33	5.00	0.00	0.04	0.04
43.95	0.41	0.33	5.00	0.00	0.04	0.04
44.00	0.41	0.33	5.00	0.00	0.04	0.04
44.05	0.41	0.33	5.00	0.00	0.04	0.04
44.10	0.41	0.33	5.00	0.00	0.04	0.04
44.15	0.41	0.33	5.00	0.00	0.04	0.04
44.20	0.41	0.33	5.00	0.00	0.04	0.04
44.25	0.41	0.33	5.00	0.00	0.04	0.04
44.30	0.41	0.33	5.00	0.00	0.04	0.04
44.35	0.41	0.33	5.00	0.00	0.04	0.04
44.40	0.41	0.33	5.00	0.00	0.04	0.04
44.45	0.41	0.33	5.00	0.00	0.04	0.04
44.50	0.41	0.33	5.00	0.00	0.04	0.04
44.55	0.41	0.33	5.00	0.00	0.03	0.03
44.60	0.41	0.33	5.00	0.00	0.03	0.03
44.65	0.41	0.33	5.00	0.00	0.03	0.03
44.70	0.41	0.33	5.00	0.00	0.03	0.03
44.75	0.41	0.33	5.00	0.00	0.03	0.03
44.80	0.41	0.33	5.00	0.00	0.03	0.03
44.85	0.40	0.33	5.00	0.00	0.03	0.03
44.90	0.40	0.33	5.00	0.00	0.03	0.03
44.95	0.40	0.33	5.00	0.00	0.03	0.03
45.00	0.40	0.33	5.00	0.00	0.03	0.03
45.05	0.40	0.33	5.00	0.00	0.03	0.03
45.10	0.40	0.33	5.00	0.00	0.03	0.03
45.15	0.40	0.33	5.00	0.00	0.03	0.03
45.20	0.40	0.33	5.00	0.00	0.03	0.03
45.25	0.40	0.33	5.00	0.00	0.03	0.03
45.30	0.40	0.33	5.00	0.00	0.03	0.03
45.35	0.40	0.33	5.00	0.00	0.03	0.03
45.40	0.40	0.32	5.00	0.00	0.03	0.03
45.45	0.40	0.32	5.00	0.00	0.03	0.03
45.50	0.40	0.32	5.00	0.00	0.03	0.03
45.55	0.40	0.32	5.00	0.00	0.03	0.03
45.60	0.40	0.32	5.00	0.00	0.03	0.03
45.65	0.40	0.32	5.00	0.00	0.03	0.03
45.70	0.40	0.32	5.00	0.00	0.03	0.03
45.75	0.40	0.32	5.00	0.00	0.03	0.03
45.80	0.40	0.32	5.00	0.00	0.03	0.03
45.85	0.40	0.32	5.00	0.00	0.03	0.03

45.90	0.40	0.32	5.00	0.00	0.03	0.03
45.95	0.40	0.32	5.00	0.00	0.03	0.03
46.00	0.40	0.32	5.00	0.00	0.03	0.03
46.05	0.40	0.32	5.00	0.00	0.03	0.03
46.10	0.40	0.32	5.00	0.00	0.03	0.03
46.15	0.40	0.32	5.00	0.00	0.03	0.03
46.20	0.40	0.32	5.00	0.00	0.03	0.03
46.25	0.40	0.32	5.00	0.00	0.03	0.03
46.30	0.40	0.32	5.00	0.00	0.03	0.03
46.35	0.40	0.32	5.00	0.00	0.03	0.03
46.40	0.40	0.32	5.00	0.00	0.03	0.03
46.45	0.40	0.32	5.00	0.00	0.02	0.02
46.50	0.40	0.32	5.00	0.00	0.02	0.02
46.55	0.40	0.32	5.00	0.00	0.02	0.02
46.60	0.40	0.32	5.00	0.00	0.02	0.02
46.65	0.40	0.32	5.00	0.00	0.02	0.02
46.70	0.40	0.32	5.00	0.00	0.02	0.02
46.75	0.40	0.32	5.00	0.00	0.02	0.02
46.80	0.40	0.32	5.00	0.00	0.02	0.02
46.85	0.40	0.32	5.00	0.00	0.02	0.02
46.90	0.40	0.32	5.00	0.00	0.02	0.02
46.95	0.40	0.32	5.00	0.00	0.02	0.02
47.00	0.40	0.32	5.00	0.00	0.02	0.02
47.05	0.40	0.32	5.00	0.00	0.02	0.02
47.10	0.40	0.32	5.00	0.00	0.02	0.02
47.15	0.40	0.32	5.00	0.00	0.02	0.02
47.20	0.40	0.32	5.00	0.00	0.02	0.02
47.25	0.40	0.32	5.00	0.00	0.02	0.02
47.30	0.40	0.32	5.00	0.00	0.02	0.02
47.35	0.40	0.32	5.00	0.00	0.02	0.02
47.40	0.40	0.32	5.00	0.00	0.02	0.02
47.45	0.40	0.32	5.00	0.00	0.02	0.02
47.50	0.40	0.32	5.00	0.00	0.02	0.02
47.55	0.40	0.32	5.00	0.00	0.02	0.02
47.60	0.40	0.32	5.00	0.00	0.02	0.02
47.65	0.40	0.32	5.00	0.00	0.02	0.02
47.70	0.40	0.32	5.00	0.00	0.02	0.02
47.75	0.40	0.32	5.00	0.00	0.02	0.02
47.80	0.40	0.32	5.00	0.00	0.02	0.02
47.85	0.40	0.32	5.00	0.00	0.02	0.02
47.90	0.40	0.32	5.00	0.00	0.02	0.02
47.95	0.40	0.32	5.00	0.00	0.02	0.02
48.00	0.40	0.32	5.00	0.00	0.02	0.02
48.05	0.40	0.32	5.00	0.00	0.02	0.02
48.10	0.40	0.32	5.00	0.00	0.02	0.02
48.15	0.40	0.32	5.00	0.00	0.02	0.02
48.20	0.40	0.32	5.00	0.00	0.02	0.02
48.25	0.40	0.32	5.00	0.00	0.02	0.02
48.30	0.40	0.32	5.00	0.00	0.01	0.01
48.35	0.40	0.32	5.00	0.00	0.01	0.01
48.40	0.40	0.32	5.00	0.00	0.01	0.01
48.45	0.40	0.31	5.00	0.00	0.01	0.01
48.50	0.40	0.31	5.00	0.00	0.01	0.01
48.55	0.40	0.31	5.00	0.00	0.01	0.01
48.60	0.40	0.31	5.00	0.00	0.01	0.01
48.65	0.40	0.31	5.00	0.00	0.01	0.01
48.70	0.40	0.31	5.00	0.00	0.01	0.01
48.75	0.40	0.31	5.00	0.00	0.01	0.01
48.80	0.40	0.31	5.00	0.00	0.01	0.01

48.85	0.40	0.31	5.00	0.00	0.01	0.01
48.90	0.40	0.31	5.00	0.00	0.01	0.01
48.95	0.40	0.31	5.00	0.00	0.01	0.01
49.00	0.40	0.31	5.00	0.00	0.01	0.01
49.05	0.40	0.31	5.00	0.00	0.01	0.01
49.10	0.40	0.31	5.00	0.00	0.01	0.01
49.15	0.40	0.31	5.00	0.00	0.01	0.01
49.20	0.40	0.31	5.00	0.00	0.01	0.01
49.25	0.40	0.31	5.00	0.00	0.01	0.01
49.30	0.40	0.31	5.00	0.00	0.01	0.01
49.35	0.40	0.31	5.00	0.00	0.01	0.01
49.40	0.40	0.31	5.00	0.00	0.01	0.01
49.45	0.40	0.31	5.00	0.00	0.01	0.01
49.50	0.40	0.31	5.00	0.00	0.01	0.01
49.55	0.40	0.31	5.00	0.00	0.01	0.01
49.60	0.40	0.31	5.00	0.00	0.01	0.01
49.65	0.40	0.31	5.00	0.00	0.01	0.01
49.70	0.40	0.31	5.00	0.00	0.01	0.01
49.75	0.40	0.31	5.00	0.00	0.01	0.01
49.80	0.40	0.31	5.00	0.00	0.01	0.01
49.85	0.40	0.31	5.00	0.00	0.01	0.01
49.90	0.40	0.31	5.00	0.00	0.01	0.01
49.95	0.39	0.31	5.00	0.00	0.01	0.01
50.00	0.39	0.31	5.00	0.00	0.01	0.01
50.05	0.39	0.31	5.00	0.00	0.01	0.01
50.10	0.39	0.31	5.00	0.00	0.01	0.01
50.15	0.39	0.31	5.00	0.00	0.00	0.00
50.20	0.39	0.31	5.00	0.00	0.00	0.00
50.25	0.39	0.31	5.00	0.00	0.00	0.00
50.30	0.39	0.31	5.00	0.00	0.00	0.00
50.35	0.39	0.31	5.00	0.00	0.00	0.00
50.40	0.39	0.31	5.00	0.00	0.00	0.00
50.45	0.39	0.31	5.00	0.00	0.00	0.00
50.50	0.39	0.31	5.00	0.00	0.00	0.00
50.55	0.39	0.31	5.00	0.00	0.00	0.00
50.60	0.39	0.31	5.00	0.00	0.00	0.00
50.65	0.39	0.31	5.00	0.00	0.00	0.00
50.70	0.39	0.31	5.00	0.00	0.00	0.00
50.75	0.39	0.31	5.00	0.00	0.00	0.00
50.80	0.39	0.31	5.00	0.00	0.00	0.00
50.85	0.39	0.31	5.00	0.00	0.00	0.00
50.90	0.39	0.31	5.00	0.00	0.00	0.00
50.95	0.39	0.31	5.00	0.00	0.00	0.00
51.00	0.39	0.31	5.00	0.00	0.00	0.00

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* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2,CSR is limited to 2)

Units:Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

SOILS ENGINEERING, INC.

PRELIMINARY GEOLOGICAL HAZARD REPORT

For

THE CITY IN THE HILLS PROJECT

Portions of Sections 18 and 19 and all of Section 17, T29S, R29E
Bakersfield, California

Prepared For:

The Sky Company
1401 19th Street, Suite 200
Bakersfield, CA. 93301
Attn: Van Roberts

File No. 04-10597

Prepared By:

Soils Engineering, Inc.
4400 Yeager Way
Bakersfield, CA. 93313

June 2004

SOILS ENGINEERING, INC.

June 28, 2004

File No. 04-10597

The Sky Company
1401 19th St., Suite 200
Bakersfield, CA 93301
Attn: Van Roberts

Subject: Preliminary Geologic Hazard Report
for The City In The Hills Project
Portions Of Section 18 and 19 and All of 17, T29S, R29E
In Bakersfield, California

Gentleman:

In accordance with your request and authorization, Soils Engineering, Inc. (SEI) has performed a Geological Hazards Study for the above described subject property in Bakersfield, California (site). This study was conducted in compliance with the California Code of Regulations, Title 24, and Chapters 16, 18 and 33 of the 2001 California Building Code.

Our preliminary Geological Hazards Assessment indicates that there is a low probability for liquefaction to occur during a major earthquake at the site and that the maximum peak ground acceleration at the site would be 0.250g for a 7.2 magnitude earthquake on the White Wolf Fault approximately 25.6 kilometers away. The Design-Basis Earthquake ground-motion for this site is estimated at 0.325g for alluvium with a 10 percent chance of exceedance every 50 years and a statistical return period of 475 years. The computer-modeling program Eqsearchwin estimated that a ground motion of 0.393g occurred at the site from a 6.1 magnitude earthquake on the White Wolf Fault in July 1952. The proposed structures should be built to withstand this magnitude of an earthquake. The northeastern corner of the site is within an Alquist-Priolo Earthquake Fault Zone. No areas of potential surface faulting were confirmed in the 13 fault trenches conducted at the site and no setbacks within this AP zone are recommended.

No Seismic Source Type A or B earthquake faults are located within 15 or 10 kilometers respectively of the site. The Seismic Source Type for the site is C per the CBC.

There is a low potential for flooding, rock fall and landslides to impact the site in the event of a major earthquake. Minor settlement may occur at this site during a major earthquake.

A high-pressure petroleum pipeline is located along the southern border of the site. Appropriate setbacks required by local regulatory agencies should be maintained from these pipelines.

The accompanying report is an instrument of service of ***Soils Engineering, Inc.***. The report summarizes our findings and relates our opinions with respect to the potential for geological hazards to affect the site. Note that our findings and opinions are based on information that we obtained on given dates, through records review, site review, and related activities. It is possible that other information exists or subsequently has become known, just as it is possible for conditions we observed to have changed after our observation. No other warranty expressed or implied is made.

Please contact Soils Engineering, Inc. at (661) 831-5100 if you have any questions concerning this report.

Sincerely,
SOILS ENGINEERING, INC.

Robert J. Becker
R.G. 5076, CEG 2238, Expires 2/28/05

REGISTERED GEOLOGIST
ROBERT J. BECKER
No. 5076
REN 2-28-05
STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST
ROBERT J. BECKER
No. 2238
Exp. Date 2/28/05
STATE OF CALIFORNIA

Distribution: Addressee (3)

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SOILS ENGINEERING, INC.

PRELIMINARY GEOLOGICAL HAZARD STUDY

For

The City In The Hills Project

Section 17 & Portions of Sections 18 and 19, T29S, R29E

in

Bakersfield, California

June 2004

1.0 Introduction

Soils Engineering, Inc. (SEI) has conducted a Preliminary Geological Hazards Study for the City in the Hills Project located in all of Section 17 and portions of Sections 18 and 19, within Township 29 South, Range 29 East (site) in Bakersfield, California (see Location Map, Plate 1). The central site location coordinates are approximately 35.40464° north latitude and 118.88743° west longitude. The purpose of this report is to determine if any geologic conditions exist on the property or surrounding properties which might adversely affect the proposed development of the site. In general, the document "Minimum Requirements for Submittal of Geologic/Seismic Hazard Reports to Kern County Department of Planning and Development Services" (County of Kern, 1990) was followed in the preparation of this report. This investigation included an inspection of the property, research of available geological literature, geological reconnaissance of the general area, detailed examination of stereographic aerial photographs, geologic mapping of the site and immediate surroundings, soil borings, exploration fault trenching and logging, and the preparation of this report.

The geological investigation reported herein has been conducted in accordance with generally recognized and current state-of-the-art geological procedures and was based on the intended use of the land for which geological services were secured. The geological factors that were considered are outlined in this report. Other geological factors were not considered inasmuch as they were not deemed relevant to the intended land use. This investigation was conducted to the best of the investigative geologist's abilities in accordance with the foregoing limitations. The following is an Executive Summary of the investigation conducted between January 5 and June 22, 2004.

Multiple site reconnaissance's were conducted by SEI personnel consisting of walking the property and evaluating the surrounding geological features. The project site covers over 600 gross acres (consisting of multiple parcels) as shown on Plates 2 and 6 and is vacant land with minor vegetation. Barbwire fencing in various stages of repair is present along the northern, southern and eastern borders of the site. Adjacent off-site properties include a mixture of vacant land, residential properties, and a retail store (gas station). The property is bounded by vacant land on the west, by residential properties, and Paladino Drive (paved road) to the north, by Masterson Street (paved road) and vacant land to the east and by Highway 178, vacant land and a Chevron Gas Station to the

south.

1.1 High-Pressure Pipelines

According to field observations and representatives of the State Fire Marshals Office and the Mojave Pipeline Company there is a high-pressure petroleum pipeline (crude oil) traversing the southern portion of the site within a pipeline easement. Appropriate setbacks required by local regulatory agencies should be maintained from this pipeline. Plate 2 shows the approximate location of this high-pressure pipeline.

2.0 Geology and Hydrology

2.1.1 Geologic Setting

The site has an undulating topography with the majority of the eastern and northern portion of the site relatively flat and the western and southwestern portion with low lying hills and gullies. The total elevation change across the site is approximately 60 feet with an overall downward slope to the southwest. The highest elevation is in the northeastern corner of Section 17 and the lowest is in the southwestern portion of Section 17. The project site rests on slightly to moderately indurated sediments identified as Plio-Pleistocene non-marine deposits (Qp) on geologic maps within the southeastern portion of the San Joaquin Valley. See attached Geologic Map (Plate 2A) as interpreted from on-site soil boring logs, multiple fault investigation trenches, the Bakersfield Sheet of the Geologic Map of California (Smith, Department of Conservation Division of Mines and Geology (CDMG), 1964) and a regional geologic map by Bartow & Doukas (1976). Active faults within 50 miles include the Kern Front Fault approximately 14.1 kilometers to the northwest, the White Wolf Fault approximately 25.6 kilometers to the south, the Pleito Thrust Fault approximately 46.9 kilometers to the south, the Garlock Fault (west) approximately 56.4 kilometers to the east, the San Andreas Fault (1857 rupture and Carrizo) approximately 64.4 kilometers to the southwest, and the Big Pine Fault approximately 65.7 kilometers to the south. The State of California Alquist-Priolo Special Study Zone map of the Oil Center Quadrangle shows two (2) inferred fault lineations coming onto the site at the northeastern corner (See Plate 3B). The Seismic Hazard Atlas map of the Oil Center Quadrangle also shows a possible fault in the southeastern corner of Section 17 (See Plate 3A). Nearby active faults are shown on the Fault Activity Map of California and Adjacent Areas (Jennings, CDMG, 1994) within the general area of the site (Plate 5A) and on the EQFault California Fault Map (Plate 5).

Near surface soils within the zone of influence of future developments consist of interbedded silty sand, sandy clay, sandy silt, and clayey sand layers overlying crystalline bedrock, which is located approximately 4000 feet below the surface. These sediments were derived in the

Sierra Nevada Mountains to the east of the site and deposited by local drainage and the meandering Kern River north of the site.

2.1.2 Regional Faults

A brief description of the major regional faults within 50 miles of the site is included below:

White Wolf Fault

The White Wolf fault is located about 15.9 miles southeast of the site. It traverses the southeastern end of the San Joaquin Valley from Wheeler Ridge to just northeast of Caliente (over 33 miles long). The White Wolf fault is generally believed to be a high angle reverse fault with a left-lateral component. It is possible that the White Wolf fault might be part of a larger right-lateral fault system which includes the Breckenridge and Kern Canyon faults (Ross, 1986). Data from oil wells in the North Tejon area indicate total vertical displacement to be approximately 10,000 feet. The average slip rate of the fault is estimated to be between 3 and 8.5 mm/yr. The average recurrence interval between major ruptures is unknown (Southern California Earthquake Data Center, 2002). On July 21, 1952, the well-known Kern County earthquake occurred as a result of movement along the White Wolf fault. The initial shock was a 7.7 magnitude event with the epicenter near Wheeler Ridge, about 29 miles south of the site. The ground ruptured discontinuously along most of the length of the fault with a maximum vertical displacement of about 3 feet. Following the initial earthquake, 19 aftershocks of magnitude 5.0 or greater occurred from July 21, 1952 through August 22, 1952. Surface ruptures associated with these events occurred within 500' east of the site.

San Andreas Fault

The San Andreas fault, located about 40 miles southwest of the property, extends from the Gulf of California to at least as far north as Cape Mendocino. It has a northwest-southeast trend parallel to the crest of the Coast Ranges. This fault has been active in Historic time along this entire length. Movement along this fault is right-lateral, with the western block (Pacific Plate) being displaced northerly in relation to the eastern block (Continental Plate). The average slip rate of the fault is estimated to be between 20 and 35 millimeters per year (mm/yr) and the average recurrence interval between major ruptures is estimated at 140 years (Southern California Earthquake Data Center, 2002). In 1857 the historic "Fort Tejon" earthquake occurred along the San Andreas fault with an estimated magnitude of at least 7.9. Ground rupture occurred along the fault over a distance at least 200 miles with the maximum right-lateral displacement of approximately 30 feet. Destruction was total in the Fort Tejon area approximately 5 miles north of the fault.

Pond-Poso Creek Fault

The Pond-Poso Creek fault extends in a northwesterly direction from the Sierra Nevada foothills east of Bakersfield to north of the Kern-Tulare County line. It is an active fault which trends to within about 8 miles to the north of the site. It has a length of approximately 45 miles. Work in the Pond area by Fugro, Inc. (1974) indicates 9 inches of displacement along its trace at a depth of 10 feet, 35 feet at a depth of 250 feet, and approximately 1,000 feet at the top of the Acoustic Basement. It is a normal fault, downthrown to the southwest, and dips at about 70 degrees. Repairs to county roads crossing the trace of the fault indicate that creep movement is occurring on the fault.

Kern Front Fault

The Kern Front fault extends in a northerly direction starting approximately 1-mile northeast of the Kern County Airport (Meadows Field) in northern Bakersfield, extending north near Poso Creek. It is an active fault, which lies about 8.8 miles northwest of the site. It has a length of approximately 6 miles. It is a normal fault, downthrown to the west. Repairs to county roads crossing the trace of the fault indicate that creep movement is occurring on the fault, likely from oil withdrawal in the area.

Breckenridge-Kern Canyon Fault System

The Breckenridge-Kern Canyon fault system is located in the southern Sierra Nevada mountains about 17 miles east of the site. It trends northerly from the south end of Walker Basin to north of Mount Whitney, a distance of almost 100 miles. It is a high angle fault system with a total vertical displacement of probably as much as 4,000 feet. Basement rock correlations indicate right-lateral offset of up to 15 kilometers (Ross, 1986). Latest surface movement on the Kern Canyon segment was more than 3.5 million years ago (Norris and Webb, 1976). However, historic seismic activity attributed to this system suggests that it may be active at depth. A recent publication of the California Division of Mines and Geology (Jennings, 1994a) shows a band of accurately located earthquake epicenters associated with the fault system.

Sierra Nevada Fault

The Sierra Nevada fault is located about 51.6 miles east of the site. It intersects the Garlock fault near the southern end of the Sierra Nevada Mountains and shows a vertical displacement of more than 10,000 feet (Norris and Webb, 1976). It trends northerly along the eastern face of the mountain range. Evidence for active fault movement consists of recent escarpments in alluvium and damage in an abandoned aqueduct tunnel along the trace of the fault. The average slip rate of the fault is estimated to be less than 1 mm/yr. The average recurrence interval between major ruptures is uncertain (Southern California Earthquake Data Center, 2002).

Garlock Fault

The Garlock fault is situated about 35 miles southeast of the site. The Garlock fault extends for a distance of about 150 miles to the northeast from its intersection with the San Andreas fault by the town of Lebec. An apparent offset of dike swarms along the zone indicates left-lateral displacement of as much as 40 miles (Smith, 1962). The average slip rate of the fault is estimated to be between 2 to 11 mm/yr and the average recurrence interval between major ruptures is estimated to be between 200 and 3000 years (Southern California Earthquake Data Center, 2002).

Big Pine Fault

The Big Pine fault is located about 40.8 miles south of the site. It joins the San Andreas just east of Cuddy Valley and has been mapped for a distance of approximately 50 miles in a southwesterly direction. Poyner (1960) suggests left-lateral displacement of approximately 12 to 15 miles. Surface rupture in 1852 was attributed to movement at the eastern end of the Big Pine fault. However, more recent data indicate that the rupture reported in 1852 was probably caused by landslides (Southern California Earthquake Data Center, 2002). The average slip rate of the fault is estimated to be between 1 to 4 mm/yr (Southern California Earthquake Data Center, 2002). Stream offsets of up to 3,000 feet during Quaternary time have been estimated (Norris and Webb, 1976).

Pleito Fault

The Pleito thrust fault, located about 29 miles south of the site, delineates the northern base of the San Emigdio Range at the south edge of the San Joaquin Valley. It extends from Live Oak Canyon east of Interstate Route 5 to two miles west of Pleito Creek, a distance of approximately 18 miles. It dips at a low angle to the south beneath the San Emigdio Range. The Pleito fault was recognized as a south dipping thrust fault of probable low angle dip by Hoots (1930), who also postulated displacement of 10,000+ feet along the fault. South of Wheeler Ridge, the average recurrence interval for moderate to large earthquakes has been estimated to be about 500 years (Hall, 1987). Hall (1984) estimated an average uplift rate of 0.5 mm/yr.

San Gabriel Fault

The San Gabriel fault, located about 47.7 miles south of the site, is unconformably overlapped by the Pliocene age Hungry Valley formation. The fault may extend to the northwest at depth. From the point of surface exposure it can be traced for about 90 miles to the southeast. It is a right-lateral fault with a displacement of 21 miles since Miocene time. Vertical displacement is as much as 14,000 feet (Norris and Webb, 1976). The San Gabriel fault shows evidence of Quaternary displacement (Jennings, 1975), but apparently has not been active in Holocene time (Norris and Webb, 1976). The average slip rate of the fault is

estimated to be between 1 and 5 mm/yr. The average recurrence interval between major ruptures is unknown (Southern California Earthquake Data Center, 2002).

2.2 Surface Lithology

Earth materials identified in thirty-three (33) onsite soil borings conducted by SEI in July 2003 consist generally of clayey sand (SC), sandy clay (CL) or sandy silt (ML) in the top few feet underlain by intervals of silty sand (SM), clayey sand (SC), poorly and well-graded sand (SP & SW) with interbedded zones of sandy clay (CL), silty sand (SM) and gravel (GW) to as deep as 41' below ground surface (bgs). These soils are classified as SC, CL, ML, SM, SP, SW and GW respectively, in the Unified Soils Classification System. Cobbles and boulders of decomposed granite (DG) were encountered at a depth of approximately 10' bgs in soil boring B-1, at a depth of 6' bgs. in soil boring B-7 and at a depth of 11' bgs in boring B-22. In the thirteen (13) fault investigation trenches conducted at the site the upper 1' to 2' of soil (Zone A) was generally loose or slightly indurated sandy silt (ML) or silty sand (SM) underlain by a slightly to very calcareous reddish brown silty sand (SM), identified as Zone B, to a depth of approximately 4'. A clayey sand (SC), identified as Zone C, was usually encountered beneath Zone B with occasional gravel to the bottom of the trenches (6' bgs). Zone D was first encountered in trench T-1 between 690' to 100' consisting of Sand with silt and gravel with a thickness of approximately 1' to 1.5'. In the deeper trenches a layer of well-sorted sand (SW), identified as Zone E, with occasional pebbles and cobbles was observed. Zone F was encountered between zones A and C in Trench T-9, between 155' to 230' and consisted of a light brown Clayey Sand with trace gravel and calcareous. Animal borings were encountered from the surface to 6' bgs at various locations within the trenches which created alluvium filled pockets or voids. In trenches T-4 & T-5, located in the northeastern corner of the site, an interval of pebbles and cobbles was encountered from a depth of approximately 2' down to a depth of at least 12', extending at least 30' along theses two (2) trenches. This cobble layer appears to be an old stream channel running through the northeastern corner of the site. See attached boring logs and trench logs in Appendix B for more detail.

2.3 Hydrology

Unconfined Aquifer - The depth to the unconfined aquifer as shown on maps prepared by the Kern Water Agency, and dated Fall 2000, is over 400 feet below the ground surface. See Plate 4 for a Depth to Groundwater map.

Perched Water, Ground Water or Seepage - No shallow ground water beneath the site is shown on groundwater maps dated Summer 1999. The nearest surface water is approximately 1 mile northeast of the site (Lake Ming). No groundwater was encountered in the 33 soil borings conducted at the site to depths up to 41'.

3.0 Seismic and Fault Hazards

3.1 Seismic History

There have been a number of historic earthquakes that may have affected the Bakersfield area. The following is a short summary of the major known events:

- 1/9/1857 - Fort Tejon Earthquake- San Andreas Fault, Estimated Magnitude 7.9 to 8.2+, 30 feet of slippage over a 200 mile area, widespread damage.

- 7/21/1952 - Arvin/Tehachapi - White Wolf Fault, Magnitude 7.7, Extensive damage to buildings and highways.

- 8/22/1952 - Bakersfield Quake (Aftershock of Arvin/Tehachapi) - 6 miles ESE of Bakersfield, Magnitude 5.8. Closest aftershock to Bakersfield causing extensive damage to already weakened buildings.

  Multiple surface fissures were created from the 1952 earthquakes including some within 500' to the east of the site in Section 16, T29S, R29E with a northwestern trend. No surface fissures were identified on-site, but may have been covered by agricultural processes prior to field inspection.

SEI utilized the software program EQSEARCHWIN vers. 3.0 (Thomas F. Blake) to evaluate historical earthquakes in the area of the site over the last 200 years. The Earthquake Epicenter Map (Plate 3) shows earthquake magnitudes and the epicentral distance from the site. The majority of the seismic activity in the area of the site has been along the White Wolf Fault and the San Andreas Fault. The closest earthquake of at least 4.0 magnitude to the site was 4.1 kilometers away at a magnitude of 6.1 in July 1952. The largest magnitude earthquake within 100 miles was a minimum of 7.9 on the San Andreas Fault in 1857. The largest estimated site acceleration is 0.393g from a 6.1 magnitude earthquake on the White Wolf Fault in July 1952. Surface fractures were present within 500' east of the site following the 1952 earthquakes on the White Wolf Fault leading to the Alquist-Priolo (AP) Special Study Zones designation in the vicinity of the site. This AP designation was apparently extended onto the northeastern corner of the site following an evaluation of the general area by Smith (FER-145, 1984). The EQSEARCHWIN estimation of Peak Acceleration from California Earthquake Catalogs Table, Earthquake Recurrence Curve, Earthquake Epicenter Map and a graph of the Number of Earthquakes (N) above Magnitude (M) are presented in Appendix A.

3.2 Seismic Evaluation

The site is located within the Oil Center Quadrangle within portions of Sections 17, 18 and 19 of Township 29 South, Range 29 East and has an Alquist-Priolo special study zone designated in the northeastern corner of the site (see Plate 3B for Alquist-Priolo Map). Local faults and general geology are also shown on the Oil Center Quadrangle Seismic Hazard Atlas Maps prepared for the Kern County Council of Governments (Plate 3A).

According to the Oil Center Quadrangle Seismic Hazard Atlas map, an inferred fault is indicated within the southeastern corner of the site. The two (2) faults shown on the Alquist-Priolo Map in the northeastern corner of the site are not shown on the Seismic Hazard Atlas Map. The nearest active fault as indicated by the computer-modeling program EQFault version 2.01, is the Kern Front Fault, which is approximately 14.1 kilometers to the northwest. The White Wolf fault is approximately 25.6 kilometers to the south. The Pleito Fault is located approximately 46.9 kilometers south of the site. The Garlock Fault (west) is approximately 56.4 kilometers east of the site, the San Andreas Fault zone (1857 rupture and Carrizo segments) is approximately 64.4 kilometers southwest of the site, and the Big Pine Fault is approximately 65.7 to the south. Regional faults in relation to the site location are presented on Plate 5A and are from the Fault Activity Map of California and Adjacent Areas (Jennings, CDMG, 1994).

3.2.1 Aerial Photo Review

SEI has reviewed historical aerial photos for the site area to interpret geological features. This included aerial photos for the years 1952, 1956, 1975, 1981, 1991, 2000 and 2003. Potential lineaments trending to the north and northwest were identified along the eastern border of the site in some of the aerial photos. These potential fault lineaments correspond to some of the geologic features identified historically by Bartow & Doukas (1976), Smith (1984) and Bruer (1952). Interpretation of aerial photos and surface reconnaissance by others historically in the vicinity of the site are shown on Plate 6A. Unmarked copies of the 1975 aerials are included in Appendix B.

3.2.2 Historical Geologic Investigations

The following are summaries of geological investigations conducted by others in the vicinity of the site.

Investigation by Bruer and Others

Surface ruptures were mapped by Bruer and others (1952) after the 1952 Kern County earthquake. Some of these ruptures, trend northwest-southeast within 500' east of the site in Section 16. Bruer and others (1952) mapped "Group A" fissure which Bruer (1952) defined as "fissures which apparently cannot be explained by simple slumping, surface settling, or fracturing by 'ground roll' alone at boundaries of different types of ground surfaces;

probably closely related to subsurface movement." The map by Bruer and others (1952) is at a scale of 1:62,500. Bruer (1952) notes that the detail and accuracy of the field investigation varied depending on land access, work by road crews and farmers that obliterated evidence of some of the ruptures, available time, etc. Therefore, the accuracy of the mapped location of the surface ruptures is uncertain. Bruer (1952) discussed many of the individual ruptures and also included 31 photographs of ruptures, but the nearby ruptures in Section 16 were not specifically noted. According to Bruer (1952) the site area (Section 17) had been recently plowed obscuring surface features.

Investigation by Bartow & Doukas

Bartow & Doukas (1976) prepared a geologic map of the "Geology of the Lamont, Edison, Oil Center and Rio Bravo Ranch Quadrangles". On this map potential faults were identified traversing across portions of Section 17.

Investigation by T.C. Smith

Smith (1984) prepared a Fault Evaluation Report (FER-145) of the "Faults East of Bakersfield, Kern County" that had previously been zoned as AP Earthquake Fault Zones (EFZs), including the surface ruptures mapped by Bruer and others (1952) and the potential faults identified by Bartow & Doukas (1976) and Wood and Dale (1964). Smith (1984) noted that the ruptures in the vicinity of the site were first observed after the initial earthquake of July 21, 1952 and before the large aftershock of July 29, 1952. Smith (1984) indicated that the ruptures may have been associated with more than one earthquake. Multiple scarps and tonal lineaments were mapped by Smith (1984) within portions of Section 17 as shown on Plate 6A. A note stating that "All of Section 17 has been recently plowed and any diagnostic geomorphic features obliterated" is part of Figure 3A of the FER-145. In Figure 2A of FER-145 Smith (1984) has a note that the potential faults of Bartow & Doukas "Cuts Pleistocene alluvium". In Figure 2A of FER-145, plotted on the State of California Special Studies Zones Oil Center Quadrangle dated January 1, 1976, there is no EFZ designation within the northeastern corner of Section 17. In Figure 5A of FER-145 Smith (1984) recommends narrowing the EFZ zone within the northeastern corner of Section 17. So it appears that between 1976 and 1984 the EFZ was extended into the northeastern corner of Section 17. See Plate 6A for some of these historical geologic maps which include the site area.

No other site-specific investigations were found on file with the State Geologist at the time of this investigation. Multiple geologic investigations within Section 16 to the east of the site were reviewed as part of this investigation (Park & Smith, and Smith and Gutcher 1975 to 2004).

3.2.3 Site-Specific Fault Evaluation Trenching

Based on aerial photo interpretation, historical geological maps and the Alquist-Priolo Special Studies Zone map of the site area, a total of thirteen (13) fault investigation trenches were conducted in areas of potential faulting at the site. This included twelve (12) trenches (T1 to T8, T10 to T13) within the northeastern corner of the site and one (1) trench (T9) in the southeastern corner of the site. These trenches were dug with a backhoe to a minimum depth of 6' below ground surface (bgs) and approximately 2' to 3' wide and aligned perpendicular to the anticipated trend of faulting. An SEI geologist described the lithology encountered and any potential evidence of faulting within these trenches. Trench logs are presented in Appendix B showing the lithology encountered, approximate locations of stratigraphic contacts, potential fault zones, animal borings, and the surface elevation along the trenches. The following is a summary of each trench conducted:

Trench T1: This trench started near the northeastern corner of the site within the northern extent of the AP zone and extended approximately 1000' to the southwest and ending near the southern border of the AP zone. The trend of trench T1 began at S12W with multiple bends throughout this trench ending at a S28W trend and aligned near perpendicular to the expected faulting in the area. The general lithology encountered in this trench consisted of mainly three (3) stratigraphic zones A, B & C. Zone A is topsoil which is generally loose or slightly indurated sandy silt (ML) or silty sand (SM) extending to a depth of 1' to 2' bgs. Zone A was underlain by a slightly to very calcareous reddish brown silty sand (SM), identified as Zone B, to a depth of approximately 4' bgs. Zone B was underlain by a clayey sand (SC) identified as zone C with occasional gravel to the bottom of the trench (6' bgs). Multiple animal borings were present in a few areas of the trench with fill material evident at depths deeper then 2' bgs in these areas. A number of potential fault zones were encountered within trench T1. This included a 5' wide area of fill from 33' to 38' extending to the bottom of the trench. Trench T3 was conducted parallel to this trench approximately 16' to the west, which did not confirm this potential fault zone. Between 210' and 214' an area of fill extending to 4' deep was observed. Portions of Zone B were missing in this interval, but the disturbance did not extend into zone C. Trench T10 was placed approximately 15' west and parallel to trench T1 between 180' to 250'. Potential faulting was observed in trench T10 between 32' to 43', with a soft clayey silt zone A extending to at least 8' bgs. Additional trenches T11 placed 15' west of trench T10 and Trench T12 placed 15' east of Trench T1 within this area did not encounter the same potential faulting in this area as observed in trench T10. Other suspicious areas were observed between 335' to 355', 367' to 380', 420' to 432'. Trench T8 was placed parallel to trench T1 approximately 20' to the west between 320' to 390', in which no potential faults were confirmed. Trench T13 was placed parallel to trench T1 between 400' to 480', which did encounter disturbance of Zone B in two areas (413' to 433' and 454' to 466'). Zone C was not disturbed in these areas. In these two disturbed intervals of trench T13, numerous animal borings were observed on the surface

and within the trenches creating some of the fill at depth. A 1-foot thick Zone D, lying between Zone B and C, consisting of a silty sand (SM) with gravel and pebbles was identified starting at 690' extending to the southern end of trench T1. A Zone E consisting of well-sorted sand (SW) with occasional pebbles was encountered in the bottom of the deeper trench areas beginning at 720' and extending to 875'. See Appendix B for copies of trench logs.

Trench T2: This trench started approximately 1230' south of the Paladino Drive centerline and 35' west of Masterson Street centerline and extended approximately 240' to the southwest near the southern extent of the AP zone. The trend of trench T2 was S32W approximately perpendicular to the expected faulting in the area of the site. The general lithology encountered in this trench consisted mainly of three (3) stratigraphic zones A, B & C as stated above. A massive B & C zone was logged between 30' and 140' with occasional pebbles and cobbles. Zone E (sand with occasional gravel and pebbles) was observed at a depth of 7.5' bgs between 87' to 110'. Multiple animal borings were present in a few areas of the trench with fill material evident at depths deeper then 2' bgs. A number of suspicious areas were encountered within trench T2. This included an area of fill from 82' to 88' extending to the 4.5' bgs. Trench T6 was conducted parallel to trench T2 approximately 12' to the west from 70' to 125', which did not confirm any faulting along this trench. Between 210' and 213' an area of fill extending to 5' deep was observed. Trench T7 was placed 15' west and parallel to T2 between 185' to 230' with no potential fault confirmed. See Appendix B for copies of trench logs.

Trench T3: To evaluate potential faulting observed near the northern end of trench T—1, trench T3 was dug at a trend of S32W beginning 6' south and 16' west and parallel to trench T1 extending 50' to the southwest. The lithology encountered was similar to trench T1 with zones A, B and C observed to a depth of 6' bgs. No potential faulting was observed in this trench. See Appendix B for copies of trench logs.

Trench T4: To evaluate the northern end of the AP zone Trench T4 began approximately 123' south of Paladino Drive centerline and 46' west of Masterson Street centerline extending 155' to the southwest (trend was S35W). In this trench an apparent stream channel deposit was encountered between 0' to 40' with a convex shape. This stream channel deposit consisted of pebble to cobble size rock slightly to moderately cemented. A 1 to 1.5-foot A zone lies on top of this stream channel deposit with a small portion of the B zone on the northern end and beginning again at 20'. Zone C was observed after 40' along the trench. Leached zones were observed at 85' to 92' and 106' to 111' where the calcareous streaks within zone B were not present. See Appendix B for copies of trench logs.

Trench T5: To further evaluate the stream channel deposit observed in trench T-4, Trench T5 was placed approximately 10' west and 6' north of the NE end of trench T4 with a trench of S30W extending 45'. The stream channel zone was encountered in this trench from 0 to 40' in a convex pattern extending to a depth of at least 11' bgs thinning out to the southwest. A zone of fill (A zone) was observed between 18' to 23' extending to approximately 3.5' bgs. with no obvious zone B. Zones A, B, and C were present after 30' along the trench. No potential faulting was observed in this trench. See Appendix B for copies of trench logs.

Trench T6: Trench T6 was conducted parallel to trench T2 approximately 12' to the west from 70' to 125', to evaluate potential faulting observed in Trench T-2. No faulting was confirmed in this trench. Multiple animal borings with fill material are present on the surface and to a depth of 3' bgs between 12' and 20' in this trench. See Appendix B for copies of trench logs.

Trench T7: Trench T7 was conducted parallel to trench T2 approximately 15' to the west from 185' to 230', which did not encounter potential faulting. A softer digging zone between 12' and 25' was encountered, but no significant fill at depth or offset bedding was observed. A few animal borings with fill material are present near the surface around 36' in this trench. See Appendix B for copies of trench logs.

Trench T8: Trench T8 was conducted parallel to trench T1, approximately 20' to the west from 320' to 390', which did not confirm any faulting in this area. Lithologic zones A, B and C were observed within this trench as described in trench T1. See Appendix B for copies of trench logs.

Trench T9: Trench T9 was conducted in the southeastern portion of Section 17 in an area where an inferred fault zone is located on the Oil Center Quadrangle Seismic Hazard Atlas Map. Trench 9 was approximately 475' long with a trend of N35E placed perpendicular to the expected faulting in this area of the site. This trench had some minor to moderate elevation changes throughout its trend as shown on the attached trench log in Appendix B. On the southwestern end of trench T9 zones A, B and C were present along with zone E at the base of the trench. Zone B graded out into a massive zone C at 20' along the trench. Multiple animal borings (AB's) with fill material were present at the surface and at depths up to 6' bgs. between 52' to 57' and 260' to 266'. In the lower elevation area between 70' to 90' an increase in moisture and a decrease in calcareous streaks were observed within zone C. Very calcareous zones were observed at 103' to 115', 213' to 219', 312' to 335', and 439' to 443' with some gravel and pebbles. A thin zone F was encountered between 155' to 230' consisting of a light brown clayey sand (SC) with coarser sand and gravel between layers A and C. Between 273' to 280' a zone of fill material was encountered on the north side of the trench, but did not continue on the south side of the trench. Lithologic zone B was logged

between 280' to 335' in the higher elevation area of Trench T9 before grading into a massive C zone at a lower elevation. No potential fault zones were identified in trench T9. See Appendix B for copies of trench logs.

Trench T10: Trench T10 was conducted parallel to trench T1 approximately 15' to the west from 165' to 240' along Trench T1, which did encounter possible faulting between 47' to 59' within this trench. Within this possible fault zone a soft clayey silt with multiple animal borings is present to at least 9' bgs. cutting both zones B and C. On either side of this potential fault zone lithologic zones A, B and C were observed as described above in trench T1. Another smaller zone of fill material was encountered near the southwestern end of this trench between 77' and 79' extending to a depth of approximately 5' bgs.. See Appendix B for copies of trench logs.

Trench T11: Trench T11 was placed approximately 15' west and parallel to trench T10 beginning at 15' along trench T10 to evaluate the presence of the possible fault zone observed in trench T10 from 47' to 59'. Only minor disturbances of zones A and B were identified in Trench T11, which did not line up with the expected trend of faulting in this area. A small zone of fill extending to a depth of 4' was encountered between 56' to 58' but only on the western side of the trench. The potential faulting observed in Trench T-10 was not confirmed in Trench T-11. See Appendix B for copies of trench logs.

Trench T12: Trench T12 was placed approximately 15' east and parallel to trench T1 beginning at 180' along trench T1 to confirm the presence of the possible fault zone observed in trench T1 and T10. The only disturbance of zones A, B and C identified in Trench T12 occurred between 21' and 22' with a 1-foot slot of looser material extending to at least 6' bgs.. On the west side of the trench this 1' slot was encountered between 24' and 25'. This 1' wide zone was not encountered in Trench T10 along this trend. The potential fault zone observed in Trench T10 and T1 was not observed in Trench T12. See Appendix B for copies of trench logs.

Trench T13: Trench T13 was placed approximately 15' west and parallel to trench T1 beginning at 400' along trench T1, to evaluate the presence of the possible fault zone observed in trench T1 at 420' to 430'. Two (2) disturbance of zone B were identified in Trench T13 occurring between 15' and 33' and between 54' and 66" with looser material extending to at least 5' bgs in these areas. Zone C was not disturbed in either of these areas of Trench T-13. Multiple animal borings were present in both zones at depths up to 5' bgs. The disturbance of zone B between 54' to 66' in trench T13 was not observed previously in trench T1 indicating that this disturbance of zone B was not caused by faulting. The disturbance between 15' and 33' in Trench T13 is most likely related to multiple animal borings, since zone C was not disturbed at depth. See Appendix B for copies of trench logs.

3.3 Seismic Source Type

In accordance with the 2001 California Building Code (CBC) Table 16A-U the Seismic Source Type for the subject site is a C based on the Kern Front Fault having a maximum moment magnitude ≤6.5 (6.3) and a slip rate of <5mm/year. The Kern Front Fault is approximately 14.1 kilometers northwest of the site. The other major faults (seismic source types B or A) are all greater than 10 and 15 kilometers, respectively away from the nearest proposed building site. The nearest seismic source type B fault is the White Wolf Fault approximately 25.6 kilometers to the southeast. The nearest seismic source type A fault is the Garlock Fault (west) which is approximately 56.4 kilometers to the east. Based on this information the following seismic data has been determined for the site location utilizing the computer-modeling program UBCSeis vers. 1.03 by Thomas Blake:

Seismic Zone = 4, Z = 0.40
Soil Profile = $S_{D\ or}\ S_2$
Seismic Source = C, Kern Front Fault
Maximum Magnitude = 6.3
Seismic Coefficient C_a = 0.44 Na
Seismic Coefficient C_v = 0.64 Nv
Near Source Factor N_a = 1.0
Near Source Factor N_v = 1.0

These values are from the 2001 California Building Code (CBC). See attached UBCSeis calculations and design response spectrum in Attachment A.

3.4 Possible Earthquake Effects

A number of active faults are located within a 50-mile radius of the subject site. To evaluate the affect a major earthquake might have on the site, the computer modeling programs EQFaultwin vers. 3.0 (Thomas Blake) and FRISKSPWIN vers. 4.0 (Thomas Blake) were utilized. Site-specific parameters were utilized and the programs computed the maximum peak site ground accelerations resulting from a specified earthquake. Because ground accelerations are based largely on fault distance and magnitude, we have focused our analysis on those faults which are close to the site, or that have large maximum credible magnitudes, or a combination of the two. The result of this analysis is presented below in Table A.

This analysis estimates that a maximum peak ground acceleration of 0.250g would be felt at the site as a result of a maximum earthquake of magnitude 7.2 on the White Wolf Fault approximately 25.6 kilometers away. A maximum probable earthquake of magnitude 6.3 on the Kern Front Fault approximately 14.1 kilometers away would create a peak site ground acceleration of 0.238g at the site. See attached Deterministic Site Parameters for a full

listing of computed values for faults within a 100-mile radius of the site in Attachment A. Also attached is a California Fault Map showing nearby faults in relationship to the site (Plate 5). The Design-Basis Earthquake (DBE) ground-motion for soft rock at this site is 0.288g and 0.325g for alluvium based on a return period estimated at every 475 years (10% probability of occurring every 50 years). This DBE ground-motion was calculated on the California Geological Survey Probabilistic Seismic Hazards Mapping Ground Motion Page.

TABLE A

FAULT	Approximate Distance (Km)	Maximum Earthquake Magnitude (Mw)	Maximum Peak Ground Acceleration (g)	Estimated Site Intensity (MM)	Seismic Source Type UBC
Kern Front	14.1	6.3	0.238	IX	C
White Wolf	25.6	7.2	0.250	IX	B
Pleito Thrust	46.9	7.2	0.158	VIII	B
Garlock (West)	56.4	7.1	0.107	VII	A
San Andreas (1857 Rupture & Carrizo)	64.4	7.2 to 7.8	0.102 to 0.139	VII to VIII	A
Big Pine	65.7	6.7	0.077	VII	B
San Gabriel	76.8	7.0	0.080	VII	B

3.5 Potential For Ground Rupture, Ground Shaking, Ground Failure

Ground rupture may occur along a fault trace in a major earthquake. It is possible that ground rupture could occur near the northeastern corner of this site, since it is located within 500 feet of suspected active surface fractures last observed in 1952. Some ground shaking is likely at this site in the event of a major earthquake on one of the nearby faults. Based on the predicted maximum horizontal accelerations at the site and the soil types identified in this investigation ground failure is not expected at the site.

3.6 Potential for Earthquake-Induced Flooding

The potential for earthquake-induced flooding at the site appears to be very low since there is no shallow groundwater beneath the surface and the nearest surface water features are at lower elevations.

3.7 Liquefaction Potential

Shallow groundwater was not encountered in the top 41 feet below ground surface in the site area during SEI's geotechnical drilling. Groundwater is not expected to be less then 100 feet below ground surface at the site based on information from the Kern County Water Agency, although limited perched water can be present in areas of heavy irrigation, septic systems and recharge areas. Based on the lithology encountered, the blowcounts recorded in the top 40 feet and the lack of shallow groundwater the liquefaction potential at this site appears to be very low.

3.8 Slope Stability

The site is located in an area with gentle rolling slopes across the site. No evidence of historic landslides or creep was observed in this area. There is a low potential for rockfalls or landslides to impact the site in the event of a major earthquake. Overall the site appears to be very stable.

3.9 Settlement

Some minor settlement could occur at this site during a major earthquake.

3.10 Expansive Soil

A total of 23 expansion index tests were conducted on the soil samples collected in the top 3-feet from soil borings B-1 to B-23 during the geotechnical investigation. The expansion index results ranged from 6 (very low) to 85 (medium) in the soil samples tested.

4.0 Conclusions & Recommendations

Our preliminary Geological Hazards Assessment indicates that there is a low probability for liquefaction to occur during a major earthquake at the site and that the maximum peak ground

acceleration at the site would be 0.250g for a 7.2 magnitude earthquake on the White Wolf Fault approximately 25.6 kilometers away. The Design-Basis Earthquake ground-motion for this site is estimated at 0.325g for alluvium with a 10 percent chance of exceedance every 50 years and a statistical return period of 475 years. The computer-modeling program Eqsearchwin estimated that a ground motion of 0.393g occurred at the site from a 6.1 magnitude earthquake on the White Wolf Fault in July 1952. The proposed structures should be built to withstand this magnitude of an earthquake. The northeastern corner of the site is within an Alquist-Priolo Earthquake Fault Zone. No areas of potential surface faulting were confirmed in the 13 fault trenches conducted at the site and no setbacks within this AP zone are recommended.

No Seismic Source Type A or B earthquake faults are located within 15 or 10 kilometers respectively of the site. The Seismic Source Type for the site is C per the CBC.

There is a low potential for flooding, rock fall and landslides to impact the site in the event of a major earthquake. Minor settlement may occur at this site during a major earthquake.

A high-pressure petroleum pipeline is located along the southern border of the site. Appropriate setbacks required by local regulatory agencies should be maintained from these pipelines.

5.0 Attachments

5.1 Location Map- Plate 1 , "Location Map" shows the location of the site with relationship to roads and land features.

5.2 Plot Plan - Plate 2 , "PLOT PLAN" shows the location and lot configuration of the property.

5.2.1 Plate 2A, Geologic Map shows the site geology related to local topography, streets and nearby surficial features.

5.3 Earthquake Epicenter Map - Plate 3, Shows the site location on an earthquake epicenter map of historical earthquakes with magnitudes >5.0, from the Eqsearchwin computer modeling program.

5.3.1 Seismic Hazard Atlas Map- Plate 3A, Shows local geology and faults within the Oil Center Quadrangle near the site.

5.3.2 Alquist-Priolo Special Studies Zone Map- Plate 3B, Shows the site in relation to Alquist-Priolo Special Studies Zones indicated on the Oil Center and Rio Bravo Ranch Quadrangles.

5.4 Depth To Groundwater Map - Plate 4, Shows the site location in relation to a Depth To Water Map of the regional area prepared by the Kern County Water Agency.

5.5 Fault Location Map- Plate 5, Shows the site in relation to the nearest active faults within 100 miles based on the EQFault program.

5.5.1 Plate 5A shows the Regional Faults based on the Fault Activity Map of California and Adjacent Areas, Jennings, 1994.

5.6 Plate 6 shows the location of fault trenching conducted at the site in relation to the proposed site layout and the designated AP zone.

5.6.1 Plate 6A shows the potential faults at the site as identified in historic geologic investigations in this area.

5.7 Appendix A - Deterministic Site Parameters - EQFAULTWIN data determined for the site for faults within 100 miles. EQSEARCHWIN data concerning the distance and magnitude of earthquakes within 100 miles of the site is attached. UBCSeis data is attached showing fault characteristics per UBC. FRISKSPWIN data is also attached showing predicted return periods vs. acceleration and probability of exceedance vs. acceleration. California Geological Survey Probabilistic Seismic Hazards Mapping Ground Motion Page results.

5.8 Appendix B - Presents Trench Log cross-sections T1 to T13 showing the lithology and geologic features encountered in the fault trenching conducted at the site. Copies of 33 on-site boring logs are included. Copies of the 1975 aerial photos covering the site area are included.

6.0 References

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- Liquefy 2, vers 1.5, Thomas Blake.
- Blake, Thomas, Empirical Prediction of Earthquake Induced Liquefaction Potential.
- Seismic Hazard Atlas Map, Oil Center Quadrangle, Kern County
- California Fault Parameters, 1996 Draft, California Department of Conservation, Division of Mines and Geology.
- N. Bolton Seed, Kotiji Tokimatsu, A..M.., A.S.C.E, Evaluation of Settlement in Sands Due to Earthquake Shaking; Journal of Geotechnical Engineering A.S.C.E. Vol. 113, No. 8, August, 1987.
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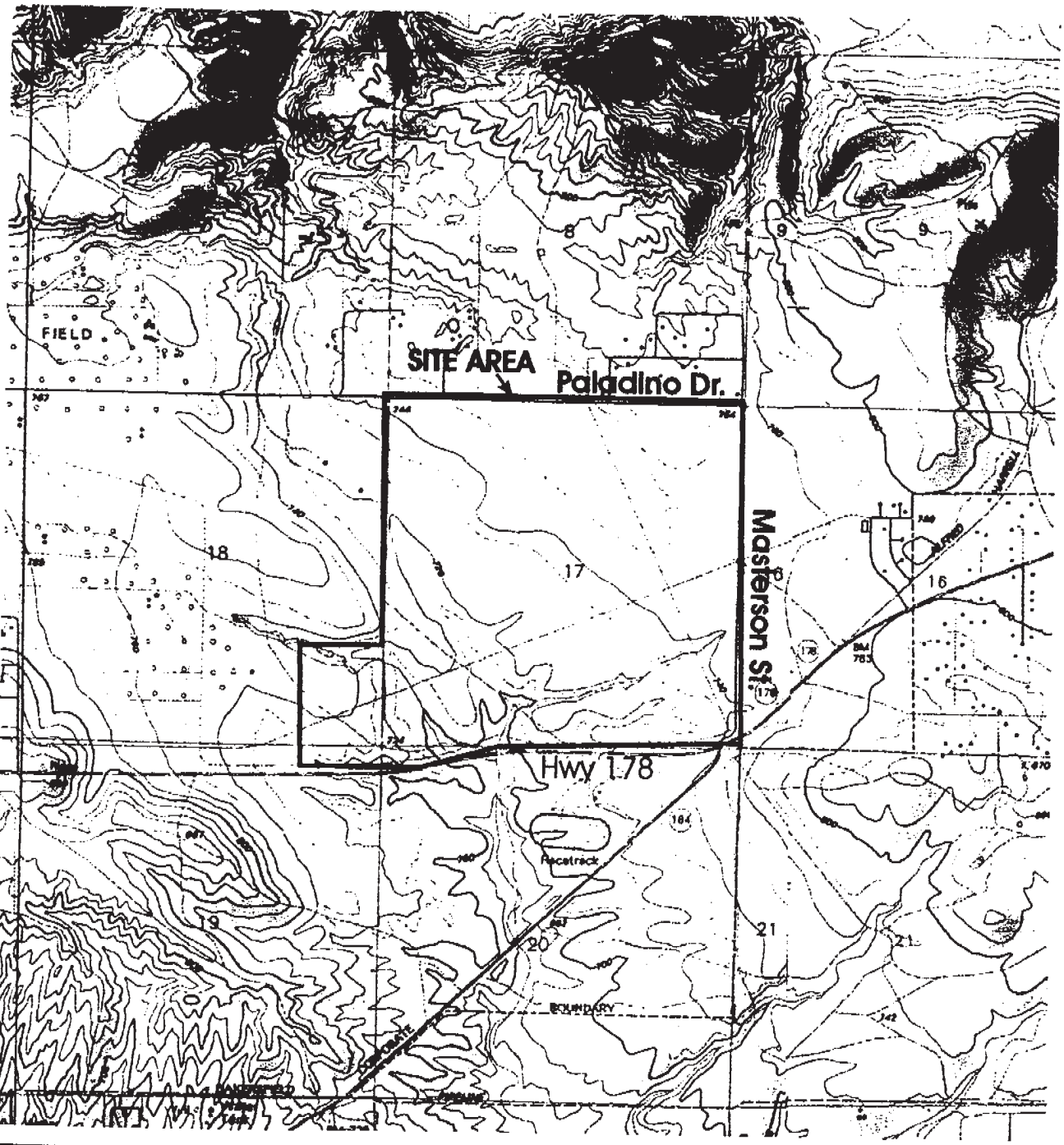
- Smith, T. C, California Division of Mines and Geology, Fault Evaluation Report FER-145, Faults East of Bakersfield, Kern County, February 6, 1984.
- Park and Smith, and Smith and Gutcher, Various fault investigation in the vicinity of the site, 1975 to 2004.



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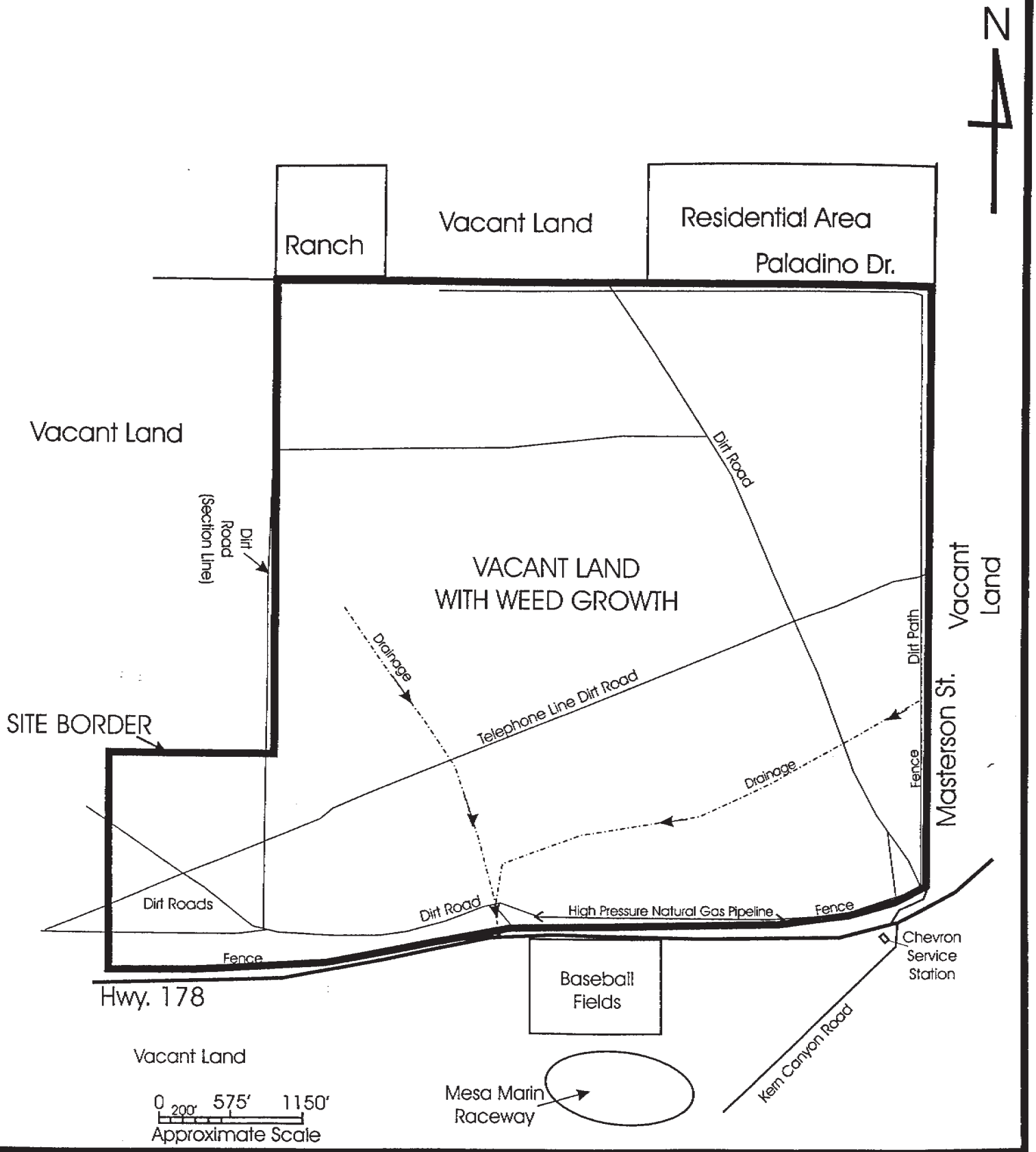
Date: 5/17/04
Project No.: 04-10597

City in The Hills
Section 17, 18 & 19, T29S, T29E
Bakersfield, CA.

LOCATION MAP

PLATE
1



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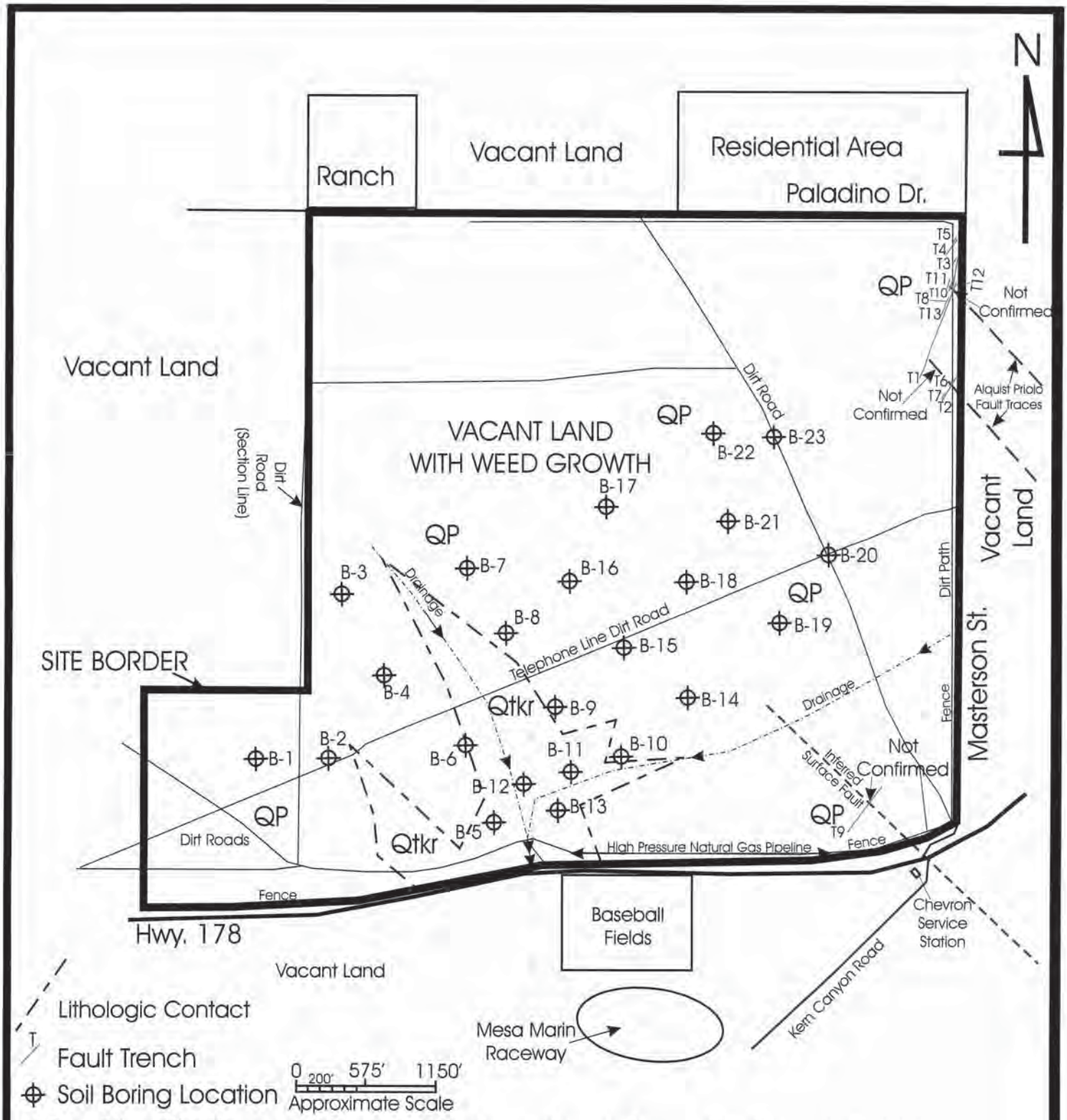
PLOT PLAN

PLATE
2



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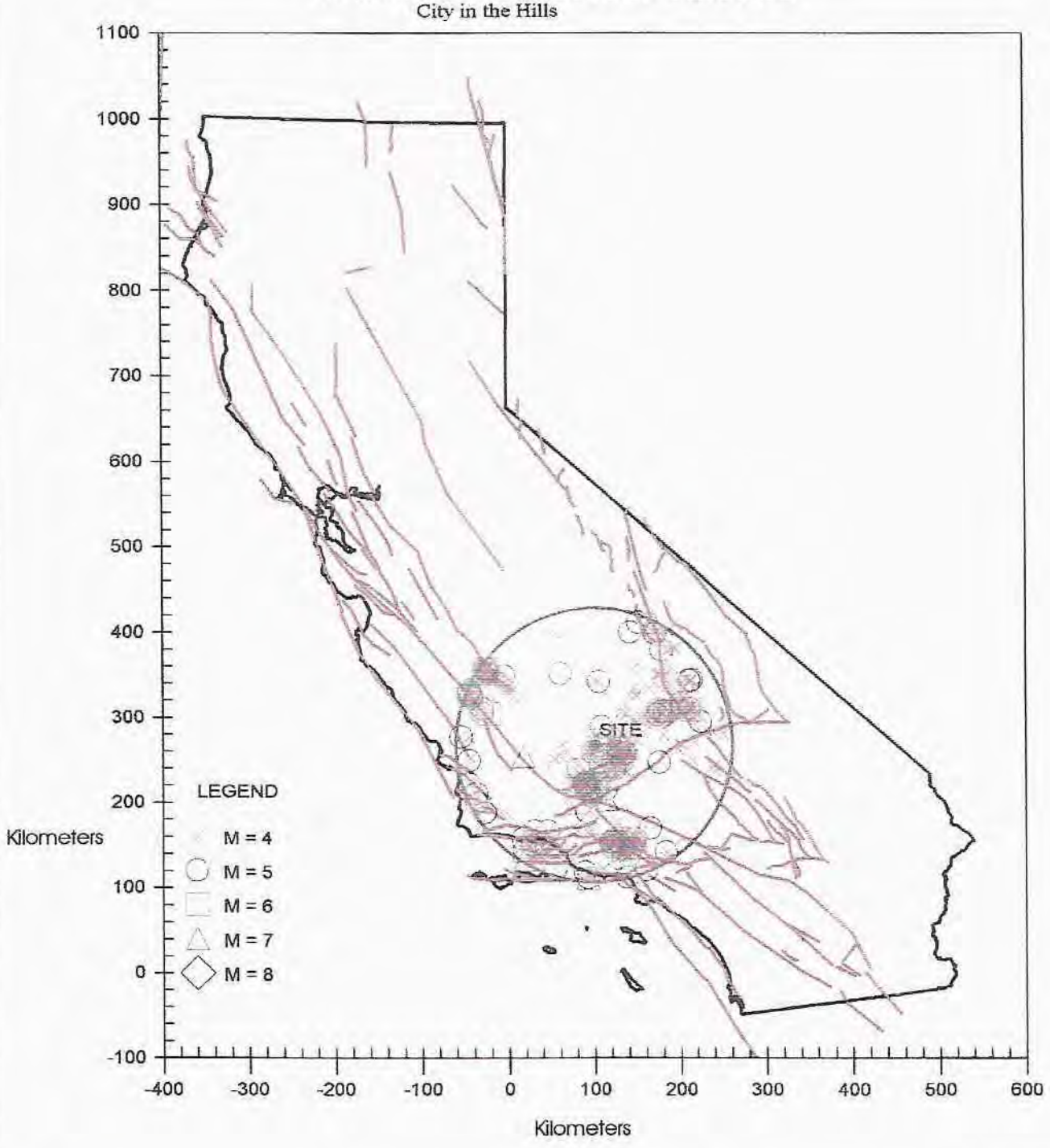
Geologic Map

PLATE
2A

EARTHQUAKE EPICENTER MAP

City in the Hills



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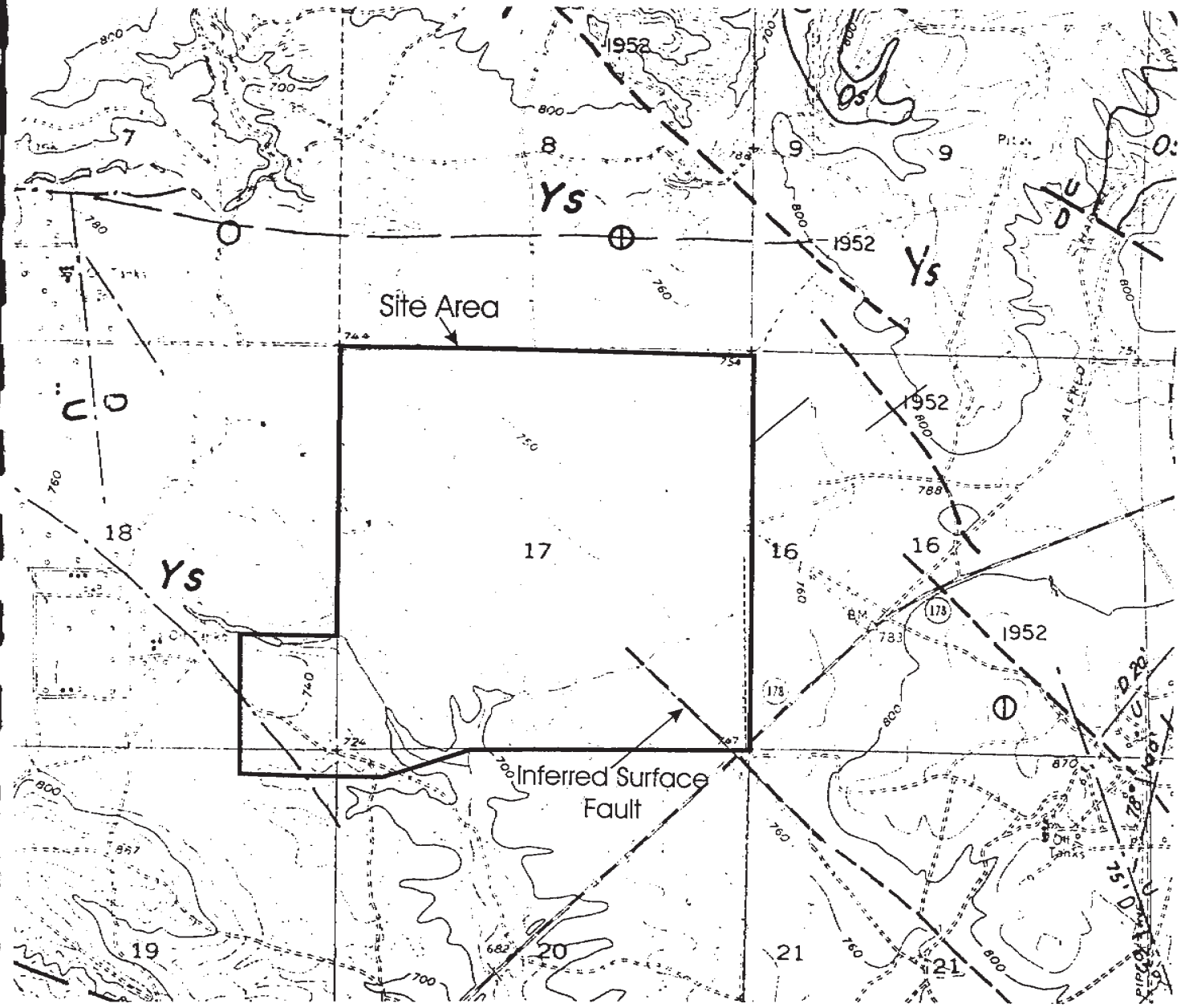

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City in The Hills
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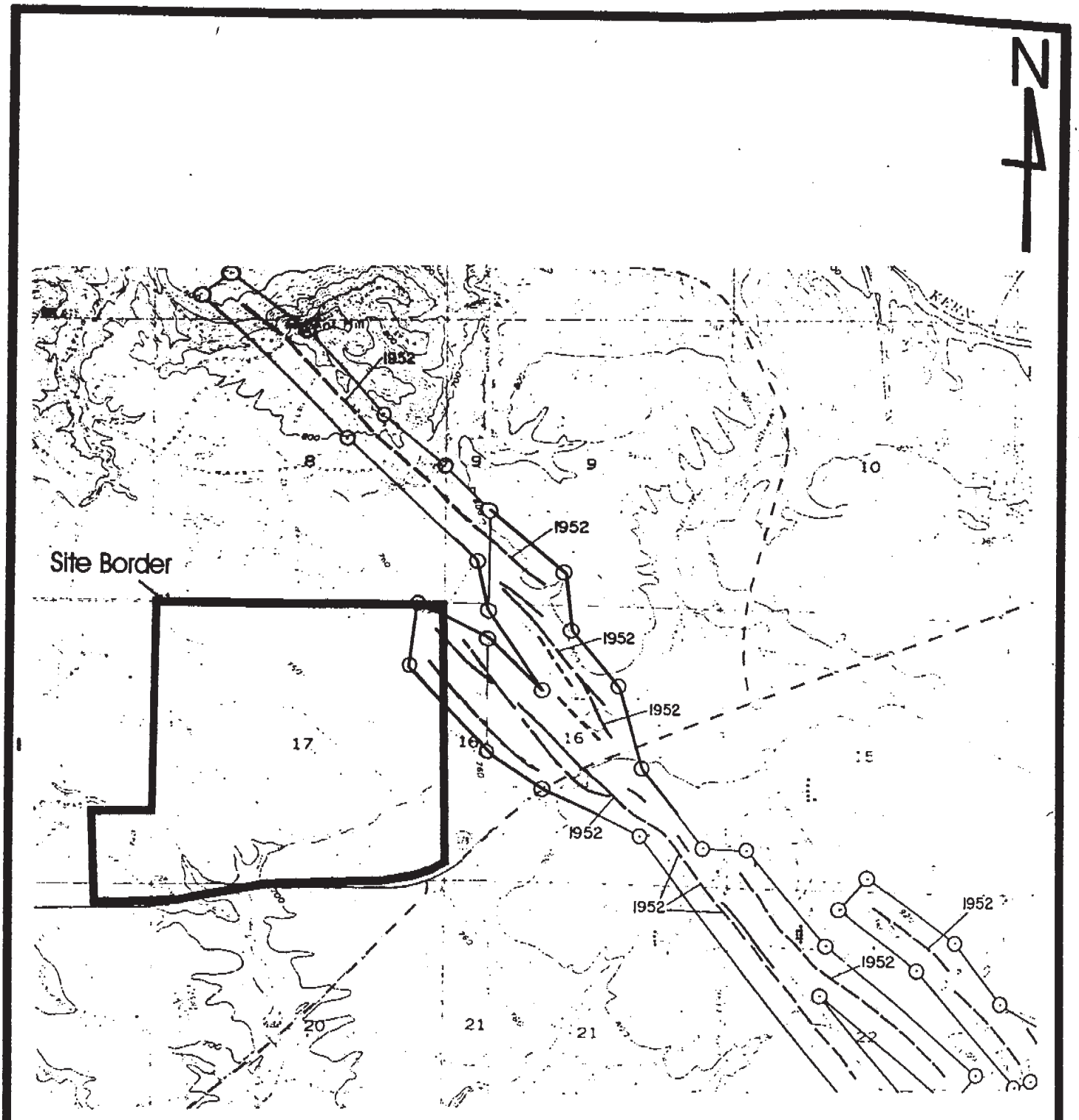
Seismic Hazard Atlas Map

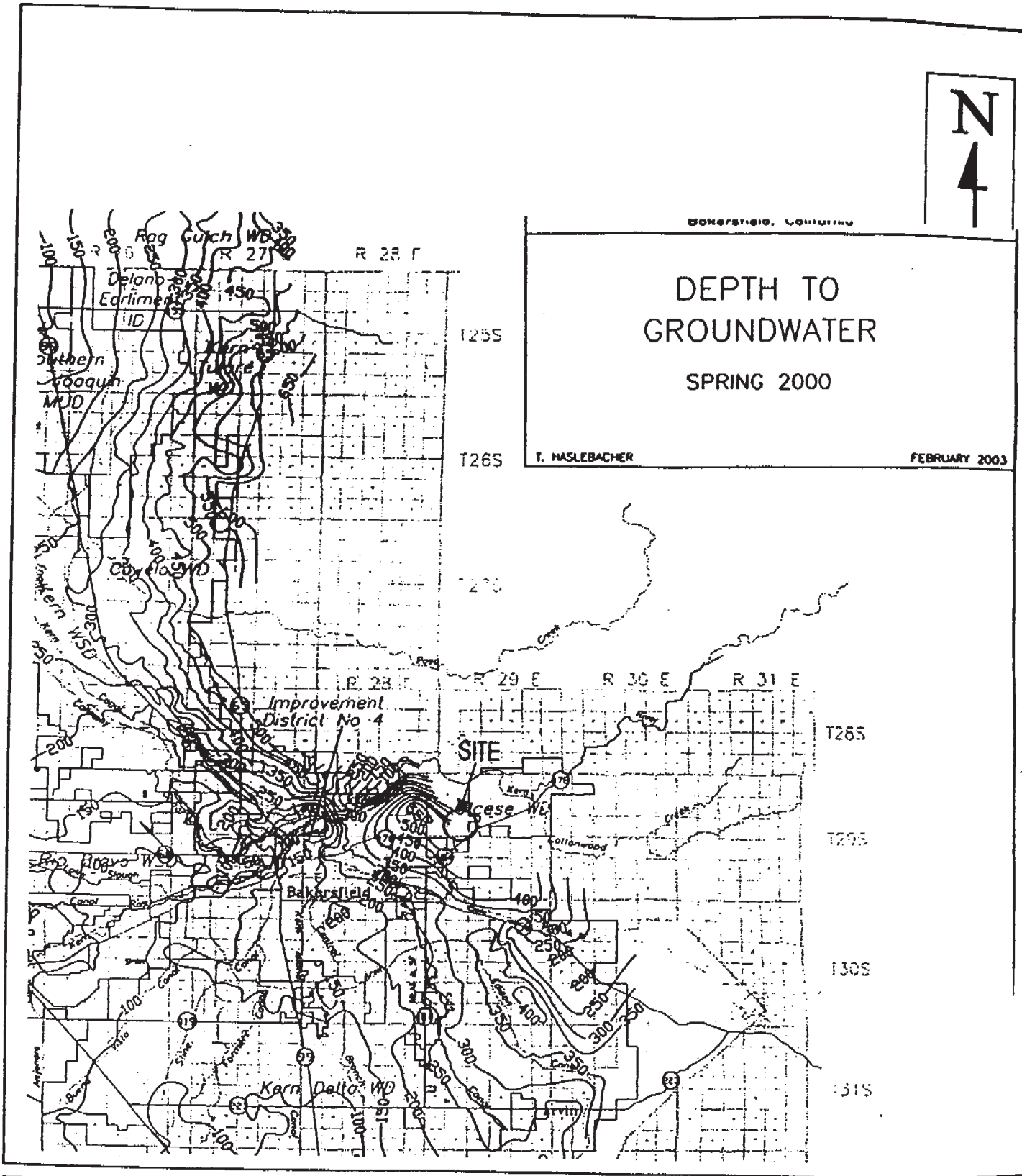
PLATE
3A

Date: 5/17/04
Project No.: 04-10597



rom: State of California Special Studies Zones, Rio Bravo Ranch Quadrangle & Oil Center Quadrangle, 1985

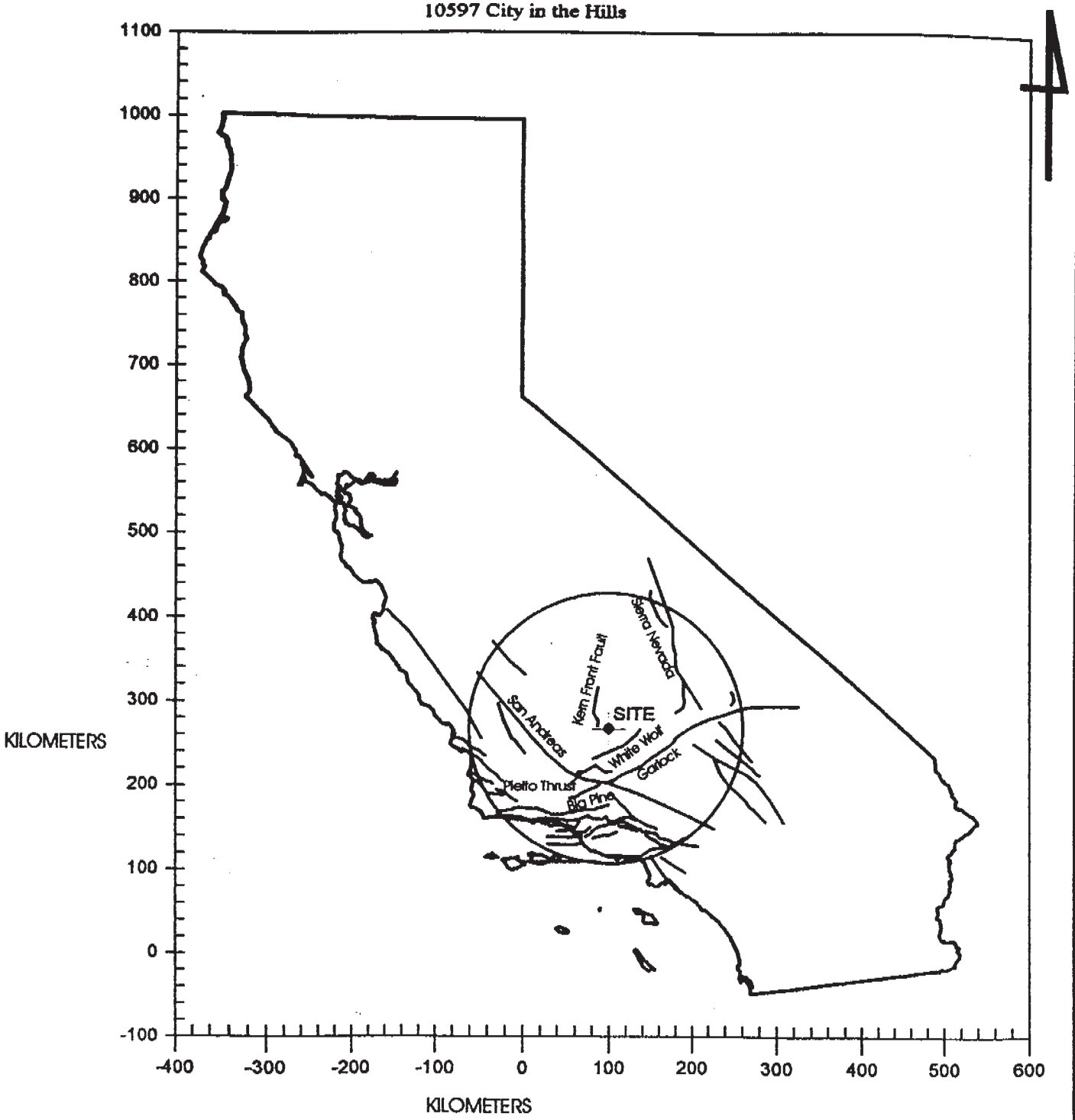
SOILS ENGINEERING, INC 4400 Yeager Way BAKERSFIELD, CA 93313 Date: 5/17/04 Project No.: 04-10597	City in The Hills Section 17, 18 & 19, T29S, T29E Bakersfield, CA. **Alquist-Priolo Special Studies Zone**	PLATE 3B



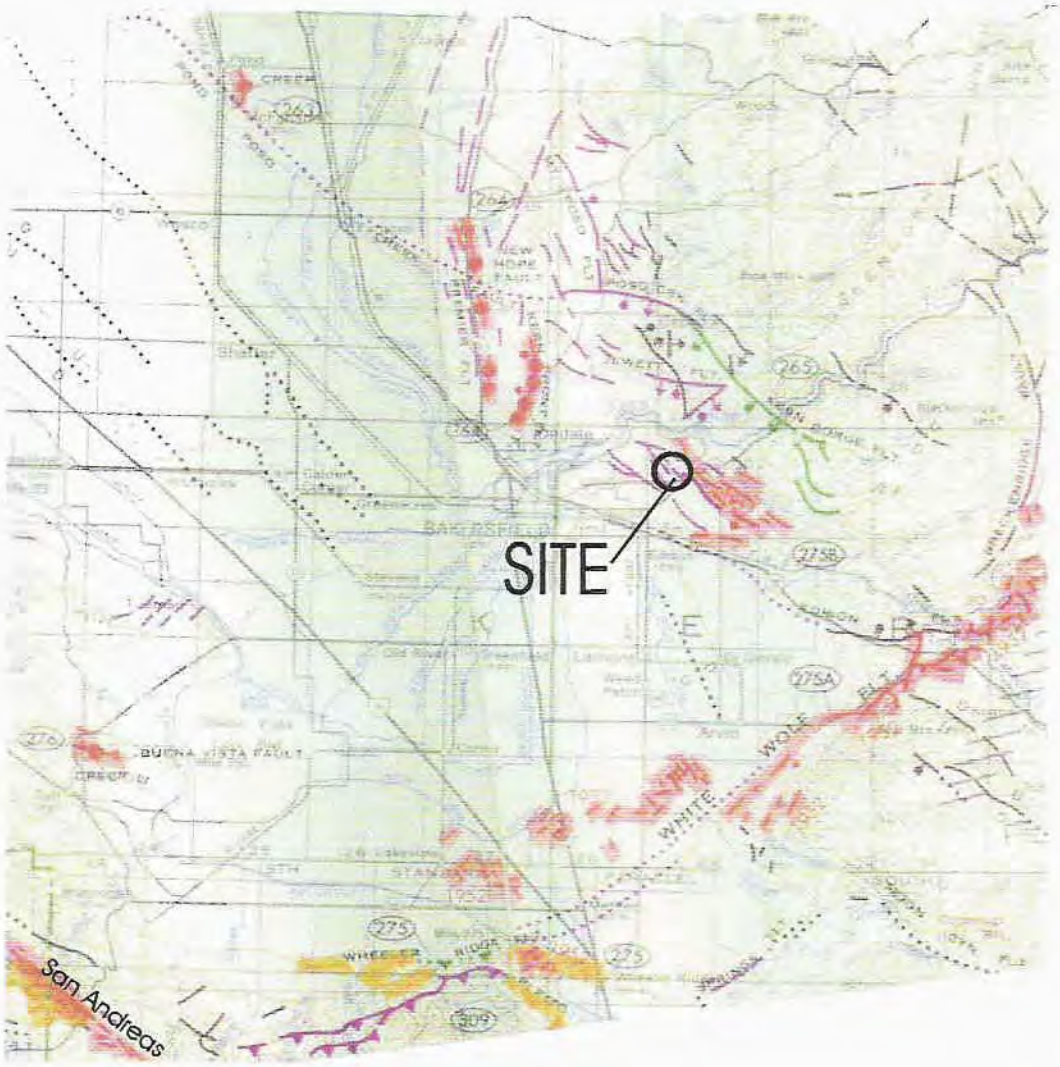
SOILS ENGINEERING, INC **4400 Yeager Way** **Bakersfield, CA 93313** **(661) 831 - 5100** Date: 5/17/04 Project No.: 04-10597	**City in The Hills** Section 17, 18 & 19, T29S, T29E Bakersfield, CA. DEPTH TO GROUNDWATER MAP	**PLATE** **4**

CALIFORNIA FAULT MAP

10597 City in the Hills

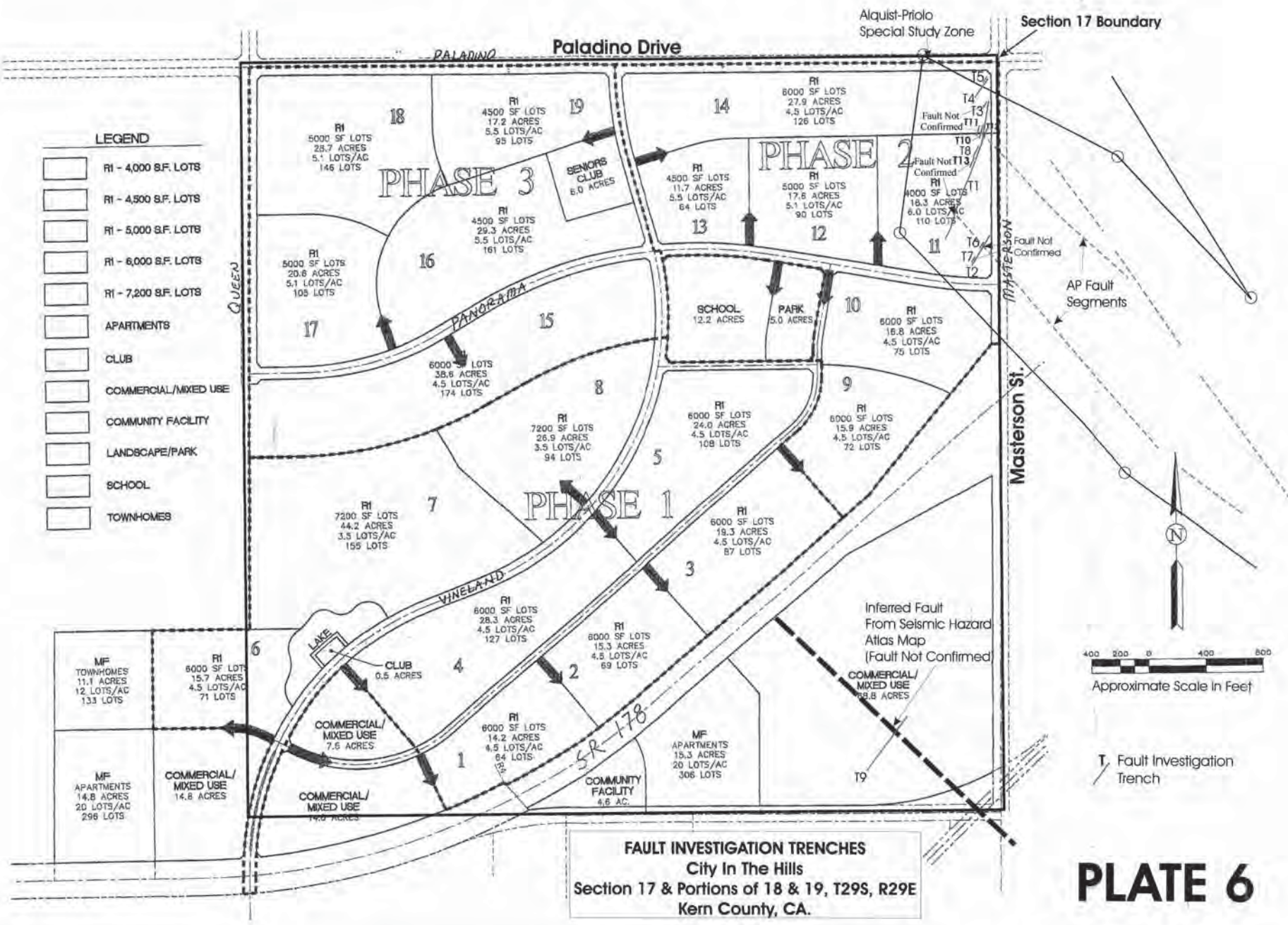


SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 Date: 5/17/04 Project No.: 04-10597	City in The Hills Section 17, 18 & 19, T29S, T29E Bakersfield, CA FAULT LOCATION MAP	PLATE 5



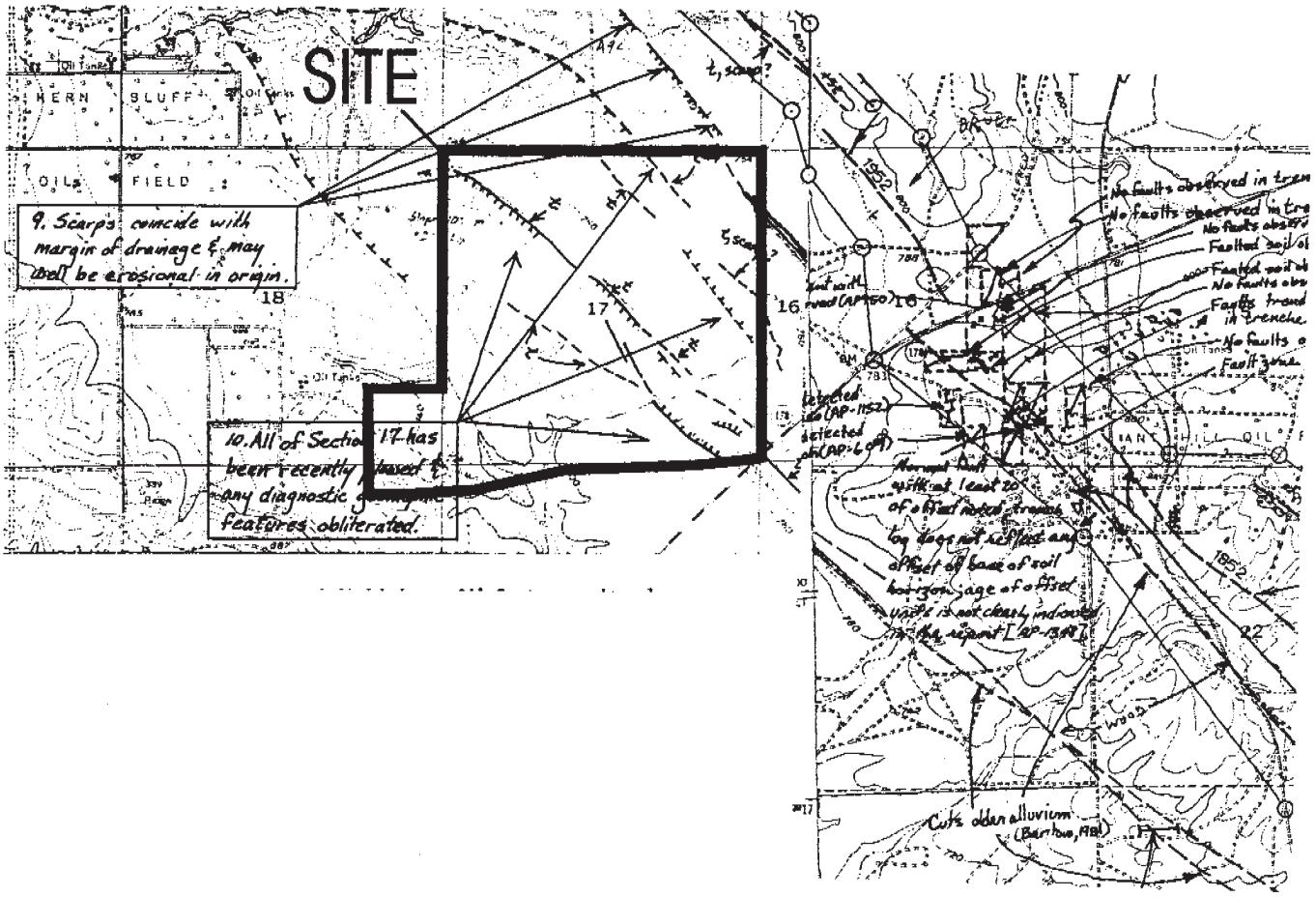
Source: Fault Activity Mao of California and Adjacent Areas, Jennings, Charles, CDMG 1994.

SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313	City in The Hills Section 17, 18 & 19, T29S, T29E Bakersfield, CA.	PLATE
Date: 5/17/04 Project No.: 04-10597	Regional Faults From Fault Activity Map Of California	5A



FAULT INVESTIGATION TRENCHES
City In The Hills
Section 17 & Portions of 18 & 19, T29S, R29E
Kern County, CA.

PLATE 6



From FER-145, Smith (1984)

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Date: 5/17/04
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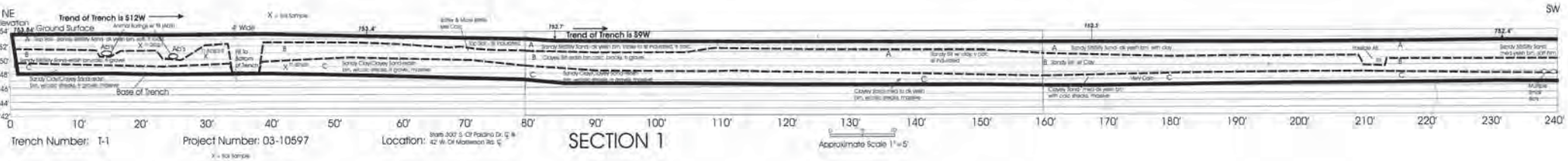
City in The Hills
Section 17, 18 & 19, T29S, T29E
Bakersfield, CA.

Historical Geologic Maps

PLATE 6A

Appendix B

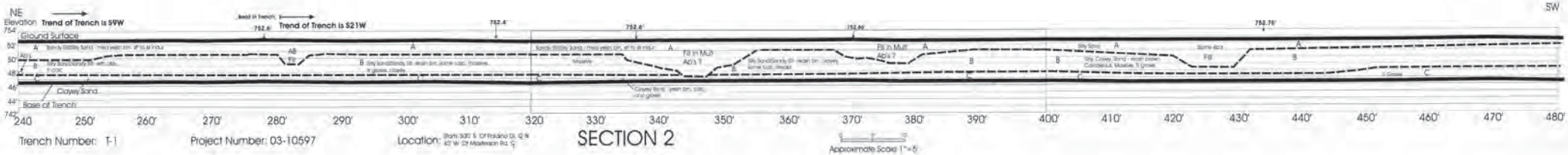
Trench Logs T1 to T13, Boring Logs, and 1975 Aerial Photos near site.



Trench Number: T-1 Project Number: 03-10597 Location: Starts 300' S. Of Paloma Dr. & 42' W. Of Matheson Rd.

SECTION 1

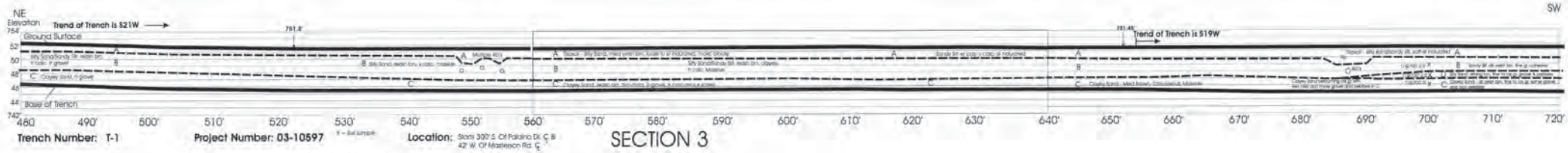
Approximate Scale 1"=5'



Trench Number: T-1 Project Number: 03-10597 Location: Starts 300' S. Of Paloma Dr. & 42' W. Of Matheson Rd.

SECTION 2

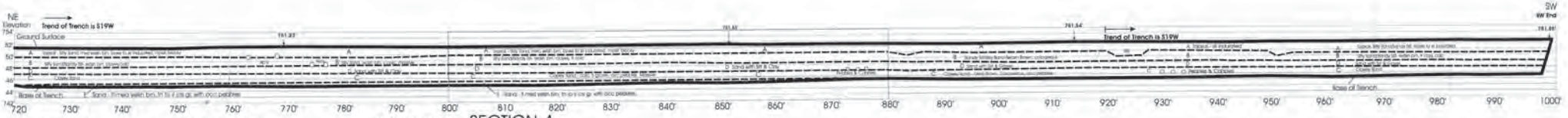
Approximate Scale 1"=5'



Trench Number: T-1 Project Number: 03-10597 Location: Starts 300' S. Of Paloma Dr. & 42' W. Of Matheson Rd.

SECTION 3

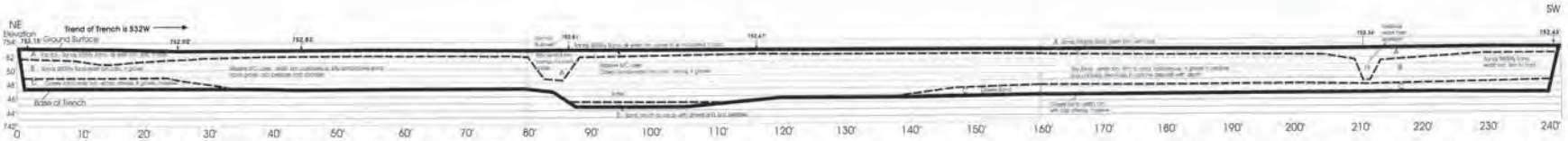
Approximate Scale 1"=5'



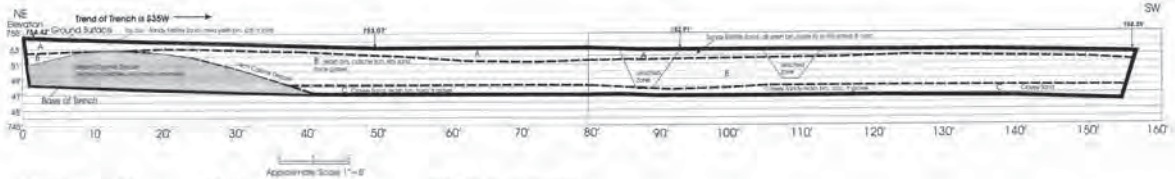
Trench Number: T-1 Project Number: 03-10597 Location:

SECTION 4

Approximate Scale 1"=5'

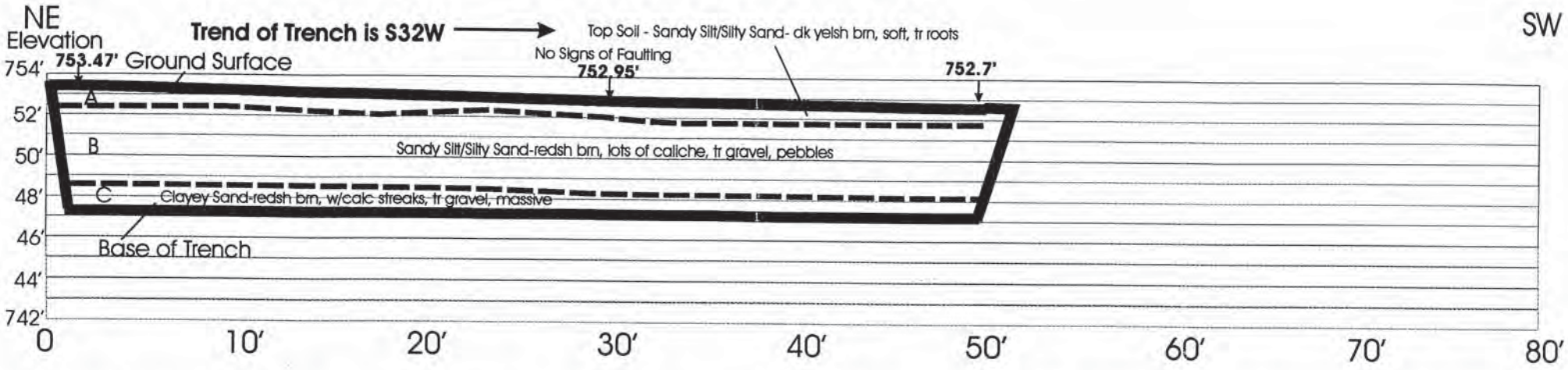


Trench Number: T-2 Project Number: 03-10597 Location:



Approximate Scale 1"=5'

Trench Number: T-4 Project Number: 03-10597 Location:



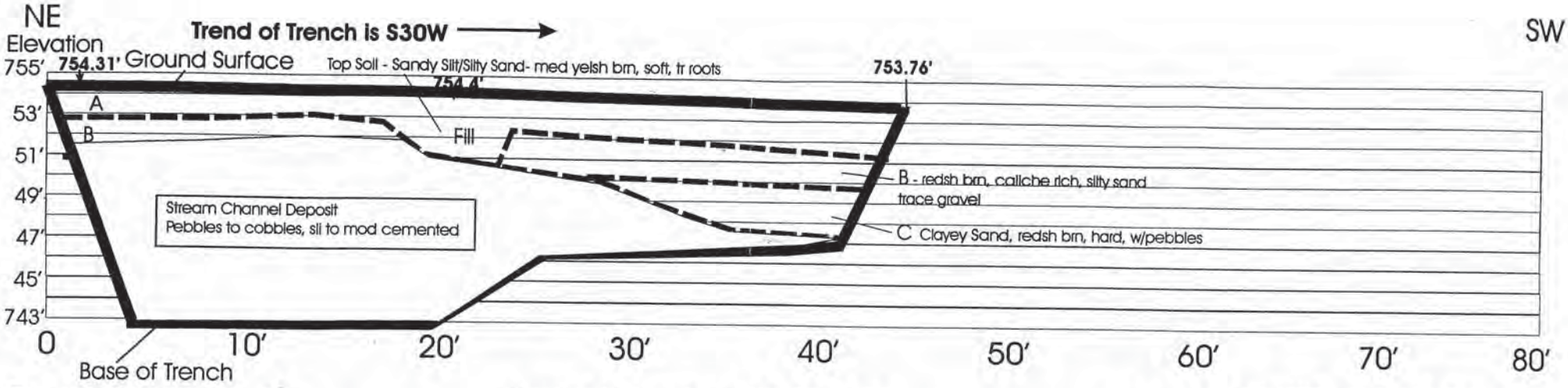
Trench Number: T-3

Project Number: 03-10597

Location: Starts 6' S. & 16' W. Of Trench T1 NE End

0 5' 10'

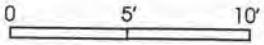
Approximate Scale 1"=5'



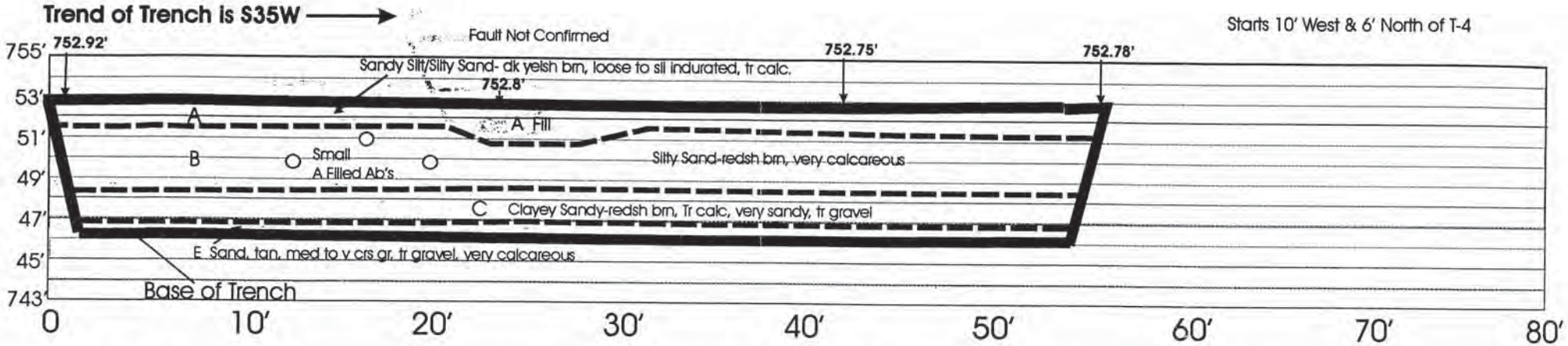
Trench Number: T-5

Project Number: 03-10597

Location: Starts 120' S. Of Paldino Dr. ℄ & 52' W. Of Masterson Rd. ℄



Approximate Scale 1"=5'



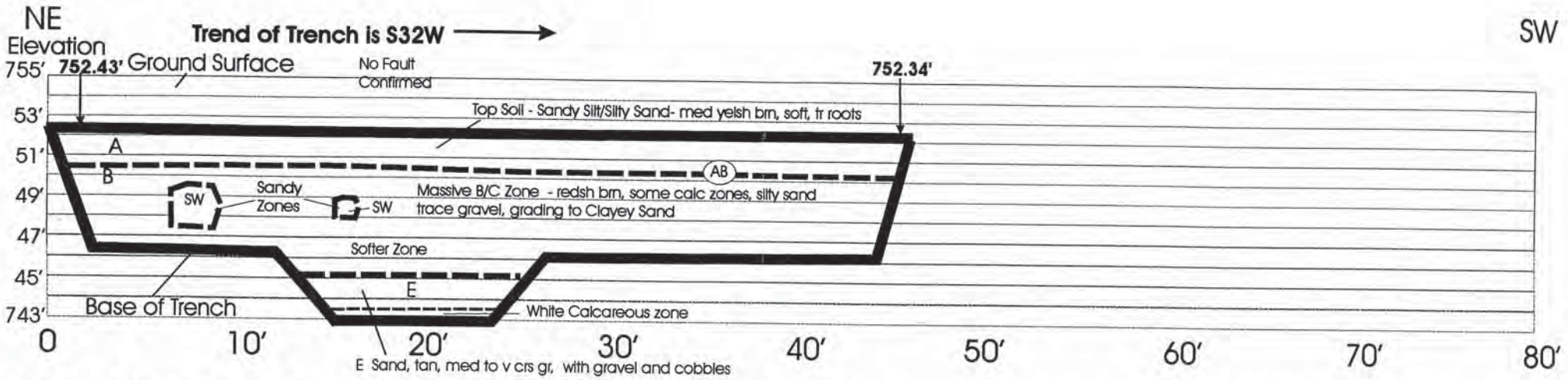
Trench Number: T-6

Project Number: 03-10597

Location: 12' West & Paralell to Trench T-2, Starting @ 70' & Ending @ 125' along T-2

0 5' 10'

Approximate Scale 1"=5'



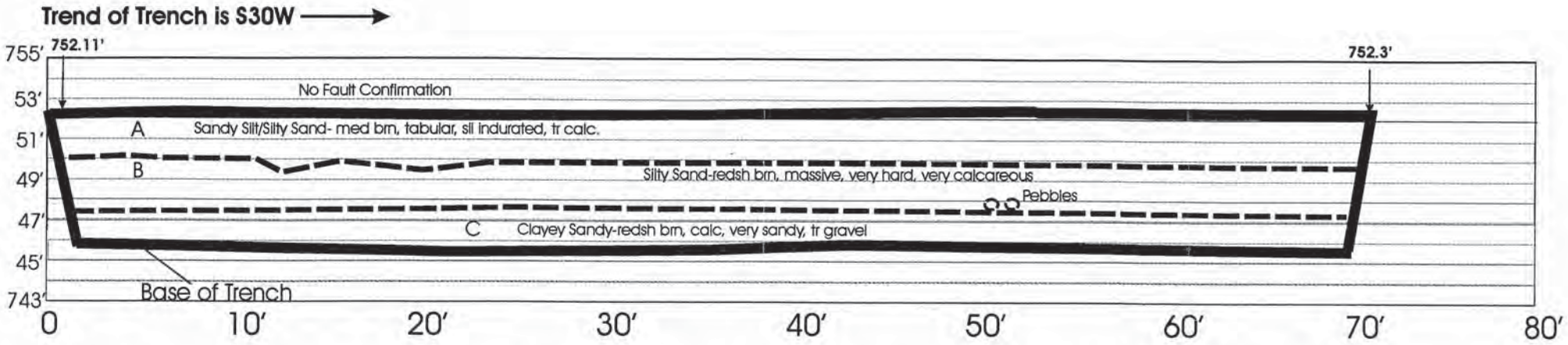
Trench Number: T-7

Project Number: 03-10597

Location: Starts 15' W. & Parallel To Trench T-2 Between 185' to 230' of T-2

0 5' 10'

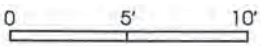
Approximate Scale 1"=5'



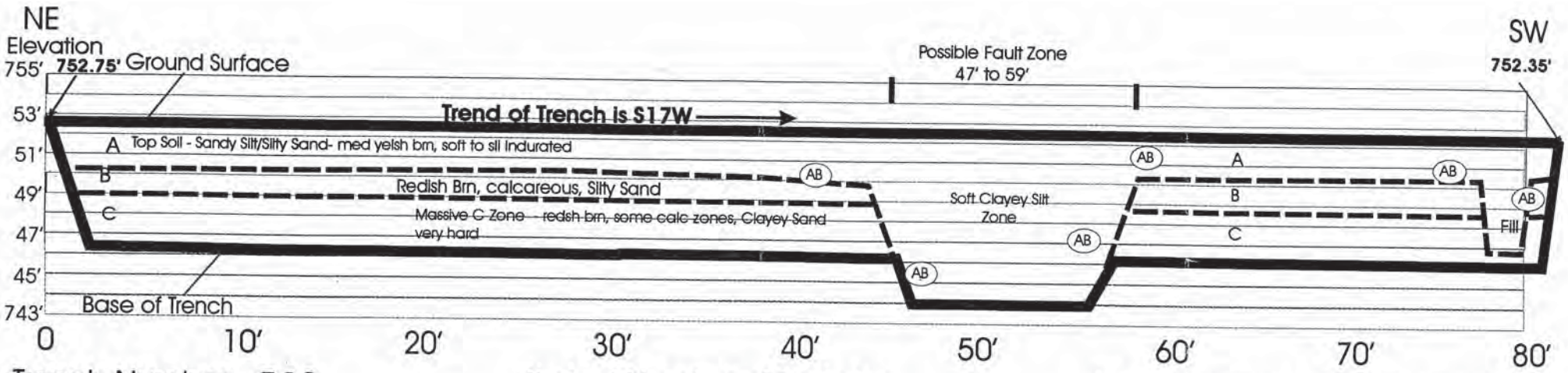
Trench Number: T-8

Project Number: 03-10597

Location: 20' West & Paralell to Trench T-1, Starting @ 320' & Ending @ 390' along T-1



Approximate Scale 1"=5'



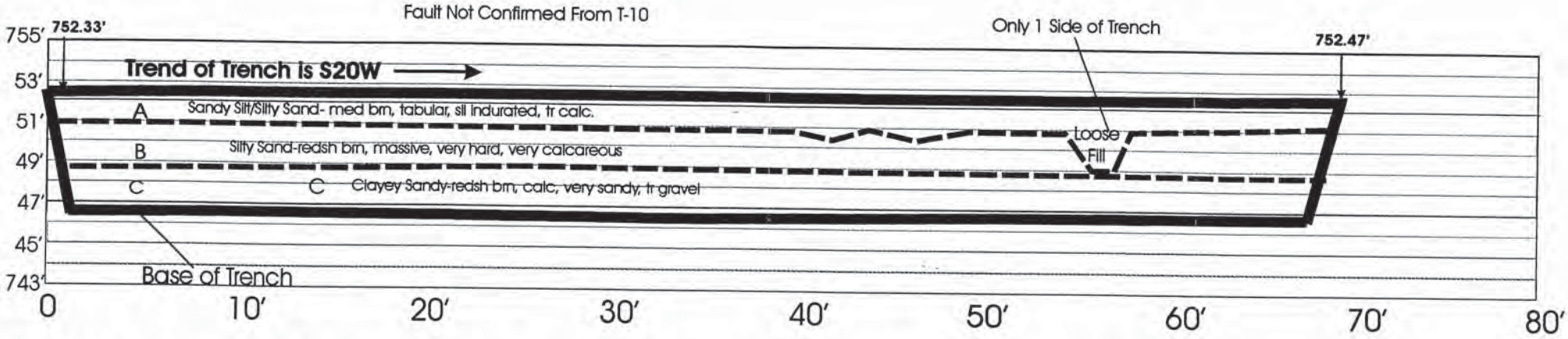
Trench Number: T-10

Project Number: 03-10597

Location: Starts 15' W. & Parallel To Trench T-1 Between 165' to 240' of T-1

0 5' 10'

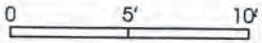
Approximate Scale 1"=5'



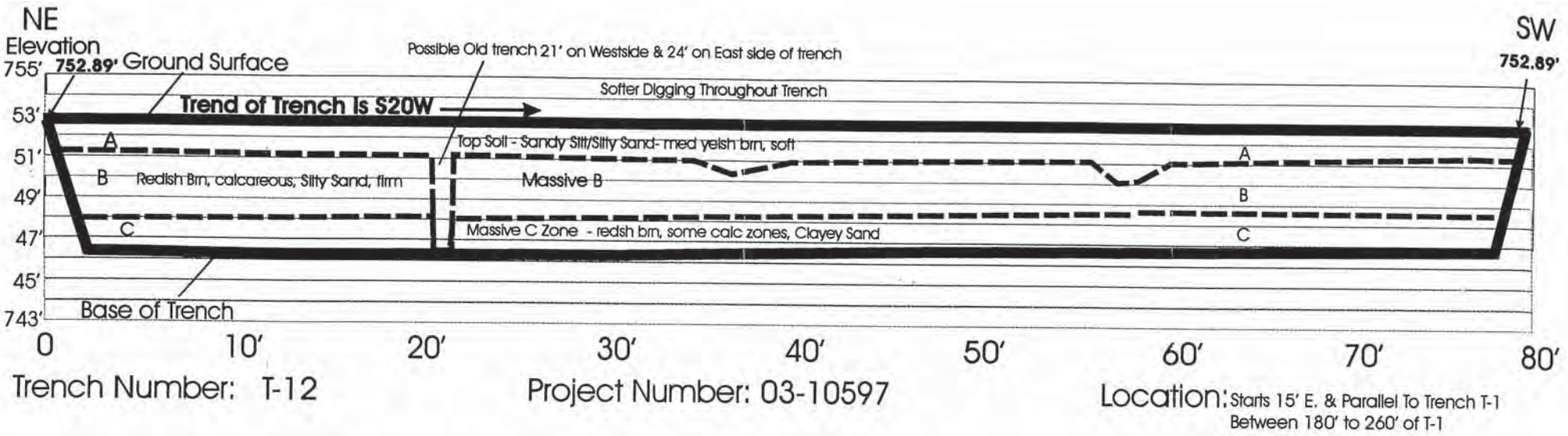
Trench Number: T-11

Project Number: 03-10597

Location: 15' West & Parallel to Trench T-10, Starting @ 15' & Ending @ 82' along T-10



Approximate Scale 1"=5'



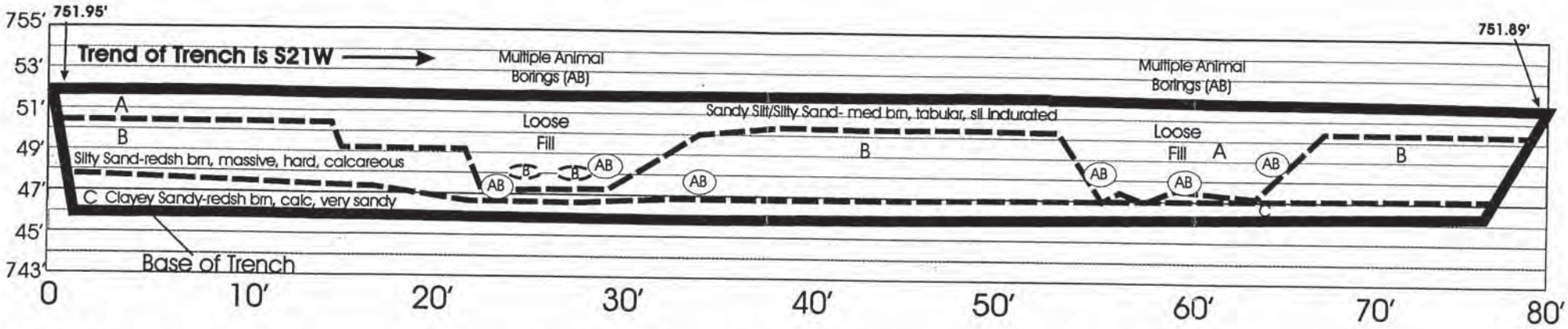
Trench Number: T-12

Project Number: 03-10597

Location: Starts 15' E. & Parallel To Trench T-1 Between 180' to 260' of T-1

0 5' 10'

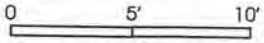
Approximate Scale 1"=5'



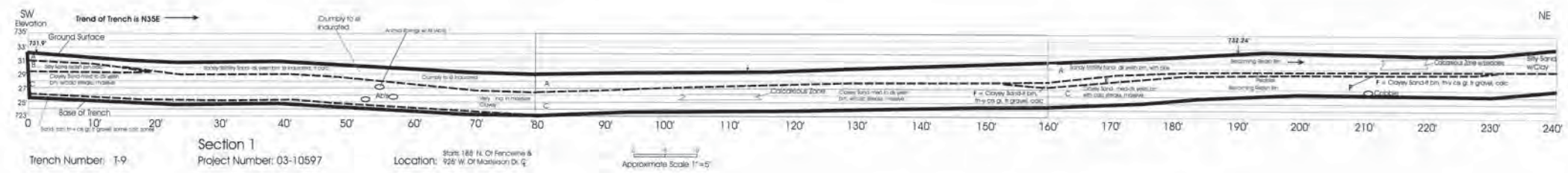
Trench Number: T-13

Project Number: 03-10597

Location: 15' West & Parallel to Trench T-1, Starting @ 400' & Ending @ 480' along T-1



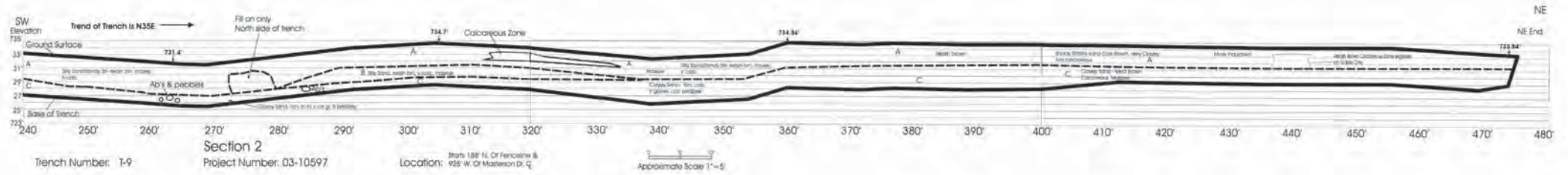
Approximate Scale 1"=5'



Section 1

Trench Number: T-9 Project Number: 03-10597 Location: Starts 188' N. Of Fenceline & 926' W. Of Masterson Dr. ℄

Approximate Scale 1"=5'



Section 2

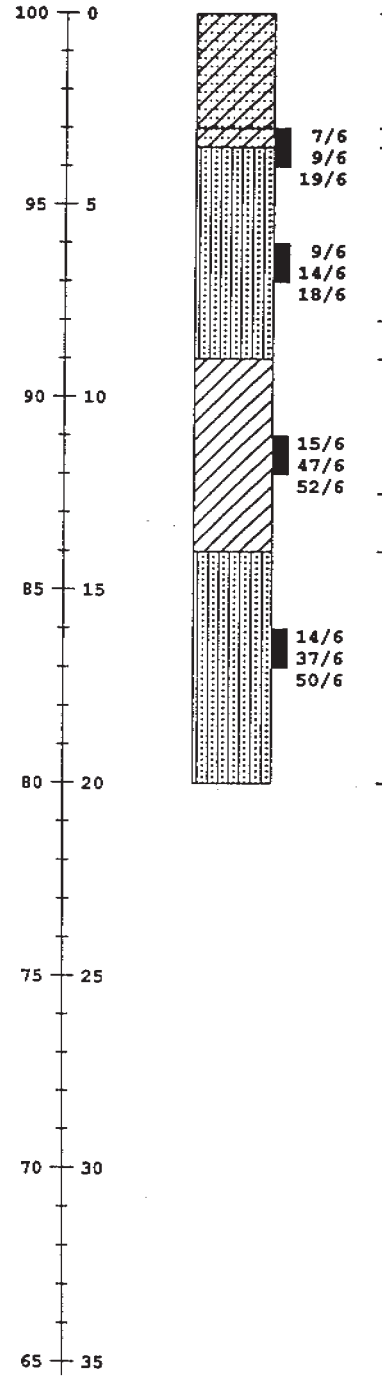
Trench Number: T-9 Project Number: 03-10597 Location: Starts 188' N. Of Fenceline & 926' W. Of Masterson Dr. ℄

Approximate Scale 1"=5'

LOG OF TEST BORING
BORING B-1

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/08/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➧ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/08/03*
FINISH: *07/08/03*
LOGGER: *B. CAROLINA*



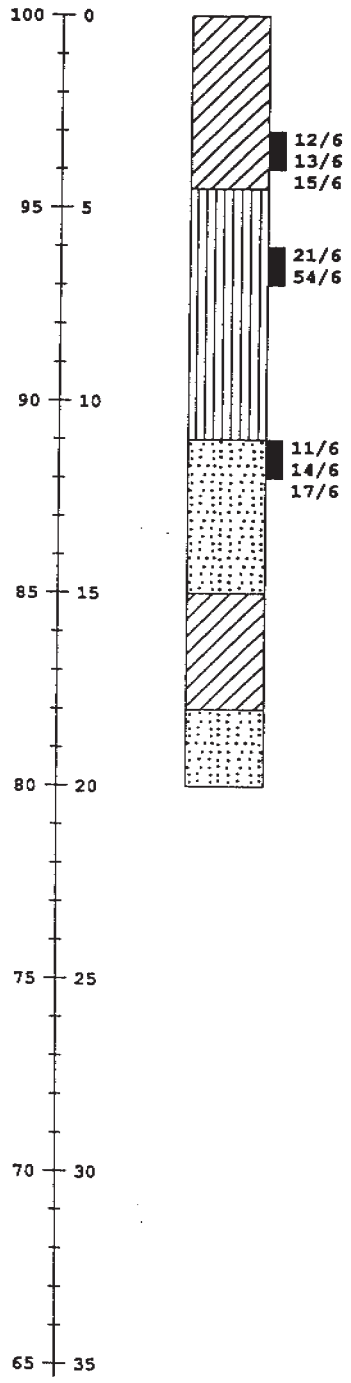
ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	SC	CLAY SAND: dark reddish brown; slightly moist; fine to medium; medium plastic;			
	SC	medium dense.			
	SM	CLAYEY SAND			
		SILTY SAND: light grayish brown; slightly moist; fine to medium; slightly cohesive fines; medium dense;			
	CL	decomposed granite.			
		cobbles			
		SANDY CLAY: yellowish brown; moist; fine to coarse; plastic fine; slight gravel.			
	SM	very moist; olive brown			
		SILTY SAND: light grayish brown; slightly moist; fine to medium; cohesive fines; decomposed granite.			
		BOTTOM			

Figure Number 2

LOG OF TEST BORING
BORING B-2

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/08/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/08/03*
FINISH: *07/08/03*
LOGGER: *B. CAROLINA*



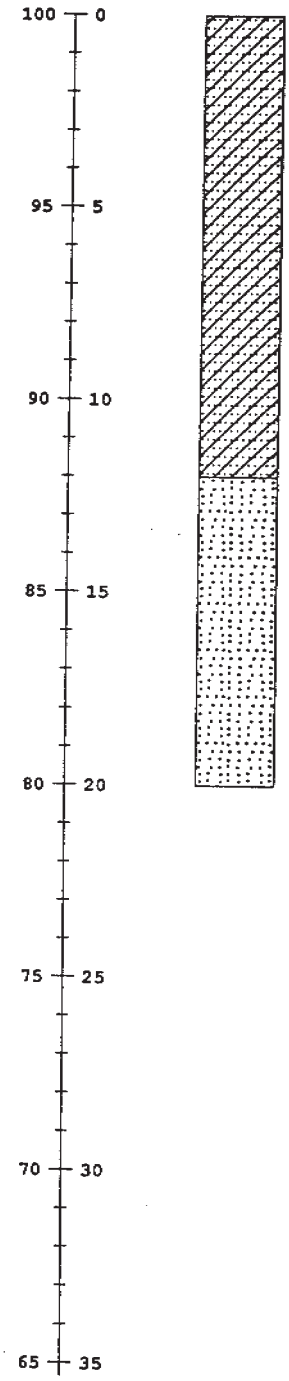
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY: reddish brown; slightly moist; fines; plastic; firm.			
		ML	CLAY SILT: yellowish brown; slightly moist; fines; medium plastic; very stiff.			
		SP	POORLY-GRADED SAND: light grayish brown; slightly moist; clean; medium dense.			
		CL	SANDY CLAY: yellowish brown; mosit; fines; plastic; firm.			
		SP	POORLY-GRADED SAND: light grayish brown; slightly moist; clean; medium dense.			
			BOTTOM			

Figure Number 3

LOG OF TEST BORING
BORING B-3

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/08/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/08/03*
FINISH: *07/08/03*
LOGGER: *B. CAROLINA*



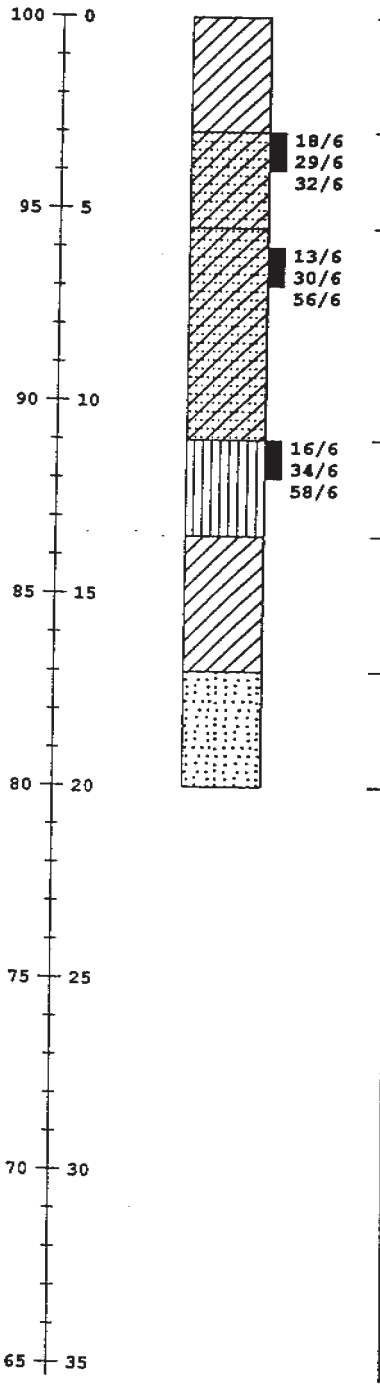
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAY SAND: yellowishb rown; slightly moist; fine to medium; meidum plastic fines.			
			moist			
		SP	POORLY-GRADED SAND: light yellowish brown; slightly moist; clean.			
			BOTTOM			

Figure Number 4

LOG OF TEST BORING
BORING B-4

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/08/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/08/03*
FINISH: *07/08/03*
LOGGER: *B. CAROLINA*



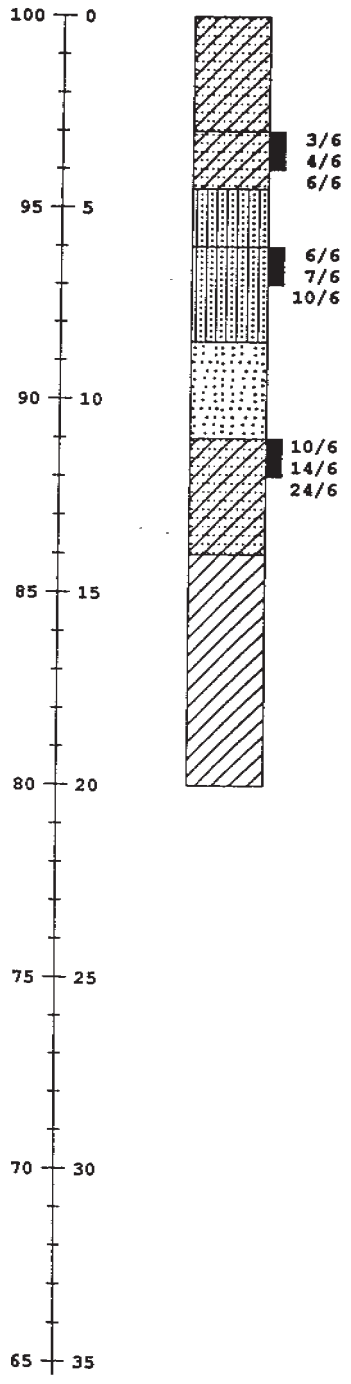
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY: reddish brown; slightly moist; fine to medium; plastic fines; stiff.			
		CL	SANDY CLAY			
		SC	CLAY SAND: light orangish brown; slightly moist; fine to coarse; medium plastic fine; very dense.			
		ML	SANDY SILT: yellowish brown; moist; fines; medium plastic; hard.			
		CL	SANDY CLAY: dark yellowish brown; moist; fines; plastic; hard.			
		SP	POORLY-GRADED SAND: light yellowish brown; slightly moist; clean.			
			BOTTOM			

Figure Number 5

LOG OF TEST BORING
BORING B-5

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/08/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/08/03*
FINISH: *07/08/03*
LOGGER: *B. CAROLINA*



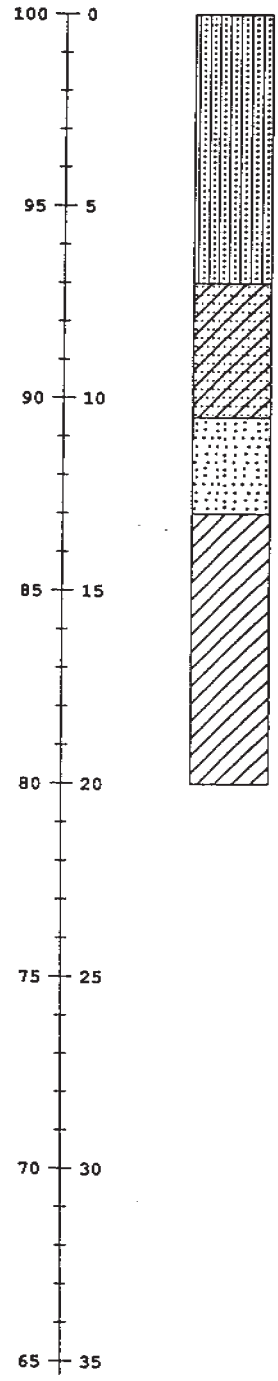
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND: yellowish brown; slightly moist; fines; medium plastic; firm.			
		SC	CLAYEY SAND		104.8	6.0
		SM	SILTY SAND: yellowish brown; slightly moist; fine to medium; slightly cohesive fines.		124.0	4.6
		SP	POORLY-GRADED SAND: light yellowish brown; slightly moist; clean; medium dense.			
		SC	CLAY SAND: light grayish brown; moist; fine; slightly plastic.		112.9	14.5
		CL	SANDY CLAY: slightly moist; fines; medium plastic.			
			Cobbles			
			BOTTOM			

Figure Number 6

LOG OF TEST BORING
BORING B-6

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/08/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/08/03*
FINISH: *07/08/03*
LOGGER: *B. CAROLINA*



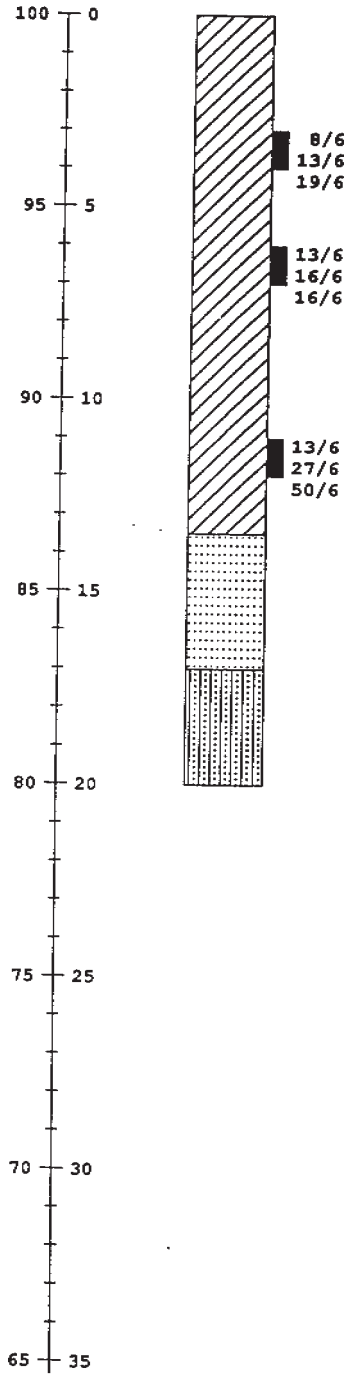
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SM	SILTY SAND: yellowish brown; slightly moist; poorly-graded; cohesive fines.			
		SC	CLAY SAND: yellowish brown; moist; poorly-graded; medium plastic fines.			
		SP	POORLY-GRADED SAND: light yellowish brown; slightly moist; clean.			
		CL	SANDY CLAY: yellowish brown; very moist; fines; plastic.			
			BOTTOM			

Figure Number 7

LOG OF TEST BORING
BORING B-7

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/08/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/08/03*
FINISH: *07/08/03*
LOGGER: *B. CAROLINA*



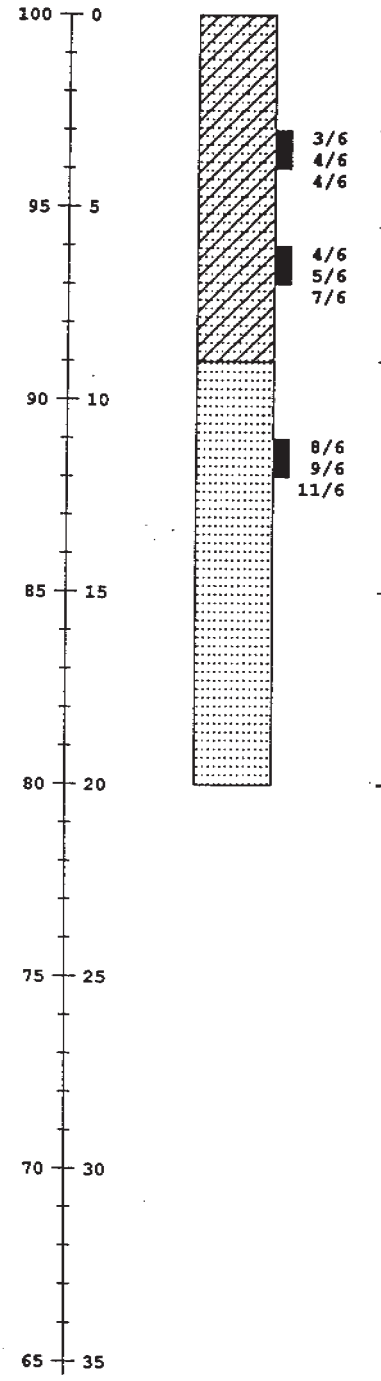
ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	CL	SANDY CLAY: orangish brown; slightly moist; fine to medium; plastic fines; stiff.			
	SM	SILTY SAND		112.6	8.2
		Decomposed granite		116.9	9.2
				124.4	2.7
		Cobbles			
	SW	WELL-GRADED SAND; light yellowish brown; slightly moist; fine to coarse; clean; slight gravel.			
	SM	SILTY SAND: yellowish brown; moist; poorly-graded; slightly cohesive fines.			
		BOTTOM			

Figure Number 8

LOG OF TEST BORING
BORING B-8

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/08/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/08/03*
FINISH: *07/08/03*
LOGGER: *B. CAROLINA*



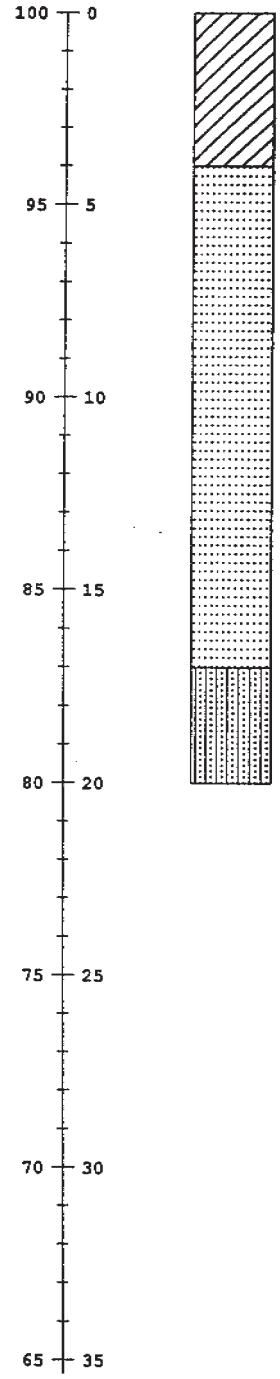
ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	SC	CLAY SAND: dark yellowish brown; slightly moist; fine to coarse; medium plastic			
	ML	fine; very loose. CLAYEY SILT		113.0	11.9
		dark olive brown; moist		110.8	11.2
	SW	WELL-GRADED SAND: light olive brown; slightly moist; fine to coarse; clean; medium dense; slight gravel.		124.1	6.8
		light yellowish brown; slightly moist			
		BOTTOM			

Figure Number 9

LOG OF TEST BORING
BORING B-9

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/08/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/08/03*
FINISH: *07/08/03*
LOGGER: *B. CAROLINA*



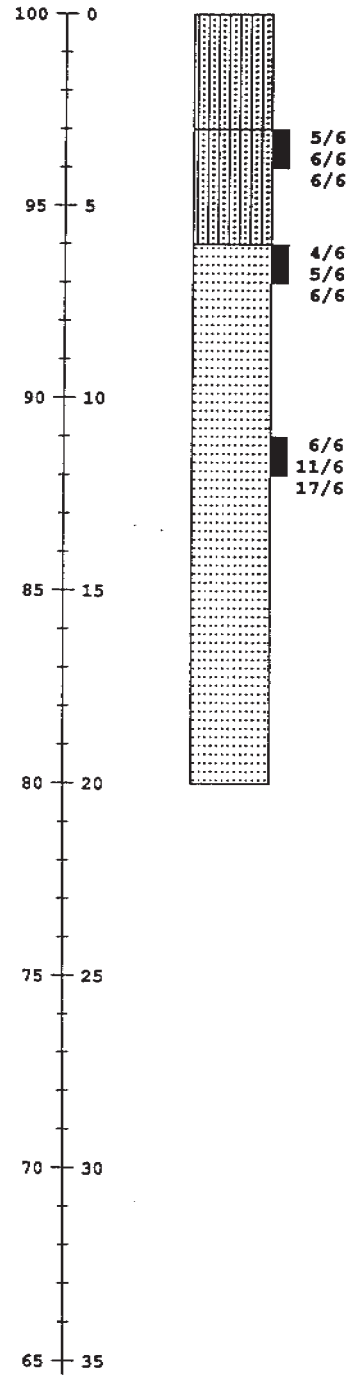
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY: orangish brown; slightly moist; fine to medium; plastic fines.			
		SW	WELL-GRADED SAND: yellowish brown; slightly moist; fine to coarse; clean; slight gravel.			
		SM	SILTY SAND: yellowish brown; slightly moist; fine to medium; cohesive fines.			
			BOTTOM			

Figure Number 10

LOG OF TEST BORING
BORING B-10

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/09/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/09/03*
FINISH: *07/09/03*
LOGGER: *B. CAROLINA*



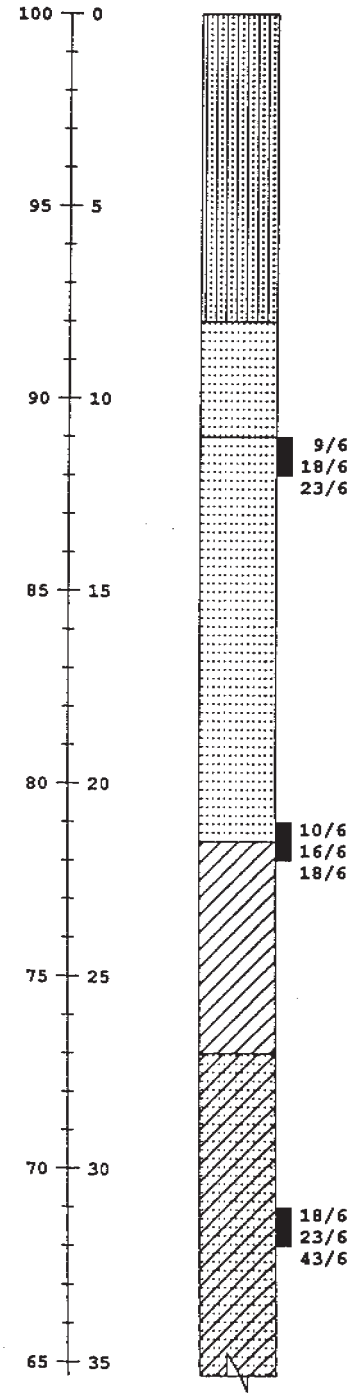
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SM	SILTY SAND: light reddish brown; slightly moist; fine to medium; slightly cohesive.			
		SM	SILTY SAND		118.3	3.9
		SW	WELL-GRADED SAND: yellowish brown; slightly moist; fine to medium; clean; medium dense.		117.3	3.4
			light grayish brown		124.9	1.9
			BOTTOM			

Figure Number 11

LOG OF TEST BORING
BORING B-11

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/09/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/09/03*
FINISH: *07/09/03*
LOGGER: *B. CAROLINA*



ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	SM	SILTY SAND: light orangish brown; slightly moist; fine to medium; slightly cohesive fines.			
	SW	WELL-GRADED SAND: light yellowish brown; slightly moist; fine to coarse; clean;			
	SW	medium dense; slight gravel. WELL-GRADED SAND		117.4	2.2
	SM	SILTY SAND		114.8	5.3
	CL	SANDY CLAY: yellowish brown; slightly moist; fines; plastic; firm.			
	SC	CLAY SAND: yellowish brown; slightly moist; fine to medium; medium plastic fines; very dense.		129.0	5.3

Figure Number 12

LOG OF TEST BORING
BORING B-11

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/09/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/09/03*
FINISH: *07/09/03*
LOGGER: *B. CAROLINA*

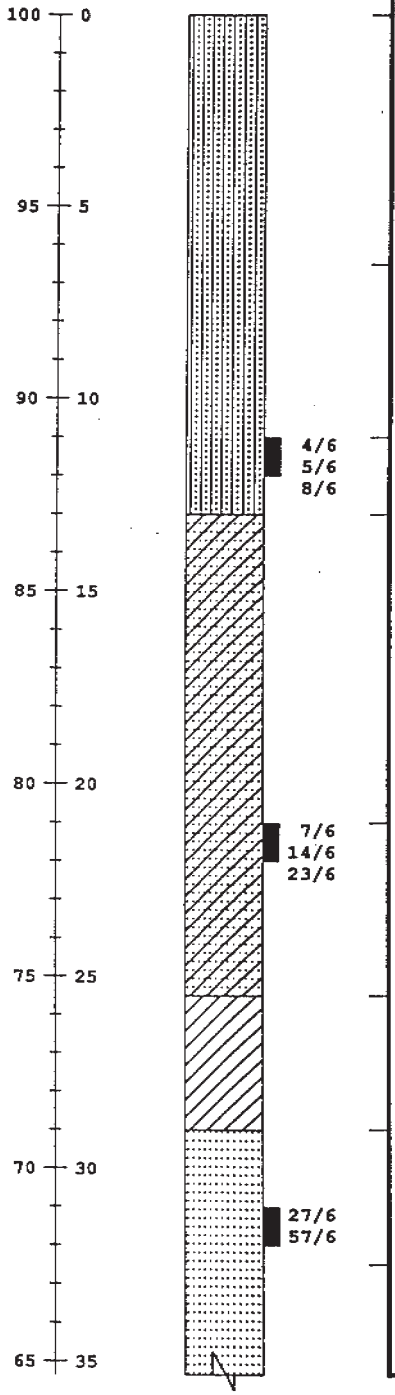
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
60 — 40	57/6	SW	WELL-GRADED SAND: light yellowish brown; slightly moist; fine to coarse; clean; dense; gravel.			
			No Recovery BOTTOM			
55 — 45						
50 — 50						
45 — 55						
40 — 60						
35 — 65						
30 — 70						

Figure Number 12

LOG OF TEST BORING
BORING B-12

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/09/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/09/03*
FINISH: *07/09/03*
LOGGER: *B. CAROLINA*



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SM	SILTY SAND: yellowish brown; slightly moist; slightly cohesive fines.			
			moist; cohesive fines			
	4/6 5/6 8/6	ML	CLAYEY SILT		105.8	12.3
		SC	CLAY SAND: yellowish brown; moist; fines; medium plastic.			
	7/6 14/6 23/6	CL	CLAYEY SILT		109.8	12.3
		CL	SANDY CLAY: yellowish brown; moist; fine to coarse; plastic fines; slight gravel.			
		SW	WELL-GRADED SAND: light yellowish brown; slightly moist; fine to coarse; clean; dense.		127.1	1.9
	27/6 57/6		Rock			

Figure Number 13

LOG OF TEST BORING
BORING B-12

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/09/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/09/03*
FINISH: *07/09/03*
LOGGER: *B. CAROLINA*

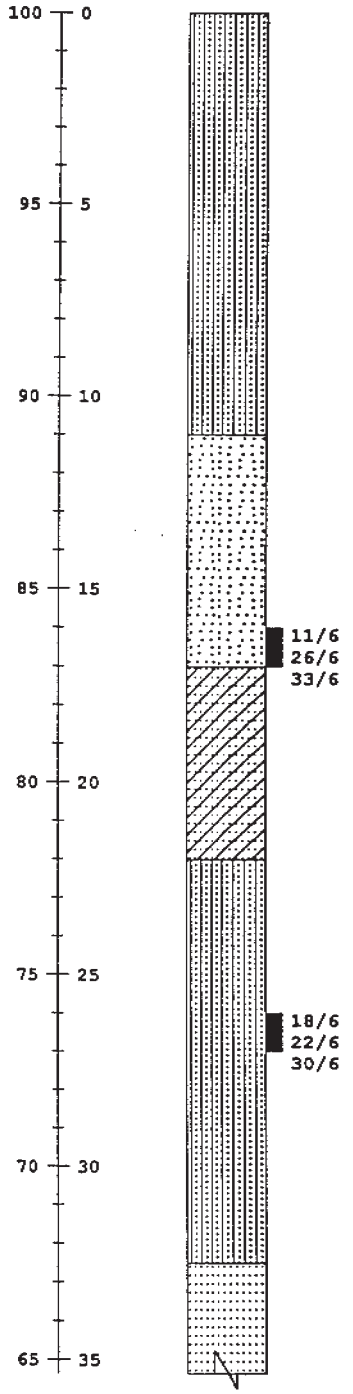
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
60 — 40	36/6 36/6 36/6		BOTTOM		116.0	2.0
55 — 45						
50 — 50						
45 — 55						
40 — 60						
35 — 65						
30 — 70						

Figure Number 13

LOG OF TEST BORING
BORING B-13

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/09/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/09/03*
FINISH: *07/09/03*
LOGGER: *B. CAROLINA*



USCS	Description	Remarks	Density pcf	Moisture %
SM	SILTY SAND: yellowish brown; slightly moist; fine to medium; slightly cohesive fines.			
	light orangish brown; moist; cohesive			
SP	POORLY-GRADED SAND: light yellowish brown; slightly moist; clean; medium dense.			
SC	CLAYEY SAND		114.4	6.2
SC	CLAY SAND: yellowish brown; slightly moist; fine to medium; medium plastic fines.			
SM	SILTY SAND: yellowish brown; slightly moist; fine to medium; cohesive fines; dense.		123.4	5.6
	gravel			
SW	WELL-GRADED SAND: light yellowish brown; slightly moist; fine to coarse; clean;			

Figure Number 14

LOG OF TEST BORING
BORING B-13

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/09/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/09/03*
FINISH: *07/09/03*
LOGGER: *B. CAROLINA*

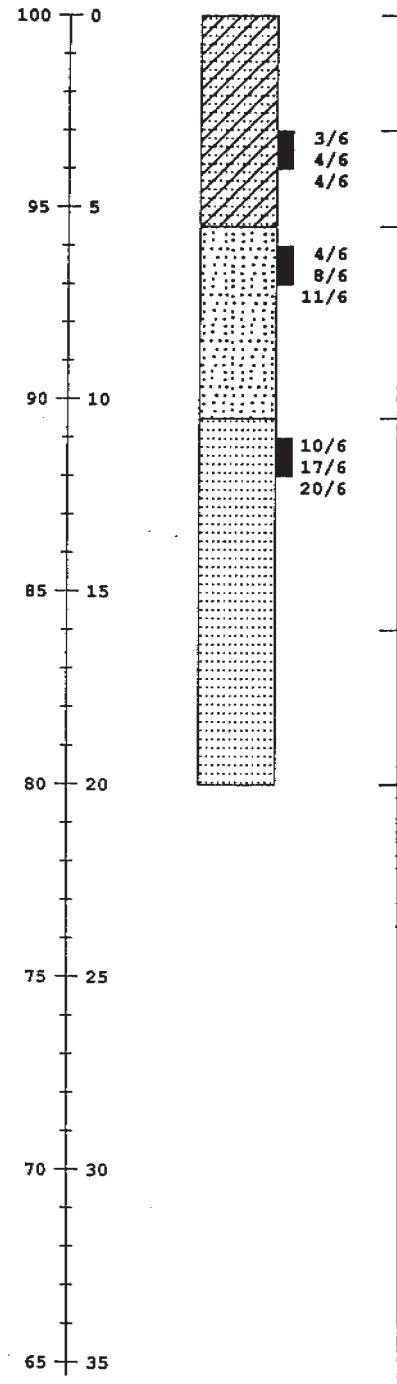
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
60 — 40	26/6 50/6		gravel; dense.		116.6	4.4
			BOTTOM			
55 — 45						
50 — 50						
45 — 55						
40 — 60						
35 — 65						
30 — 70						

Figure Number 14

LOG OF TEST BORING
BORING B-14

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➧ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

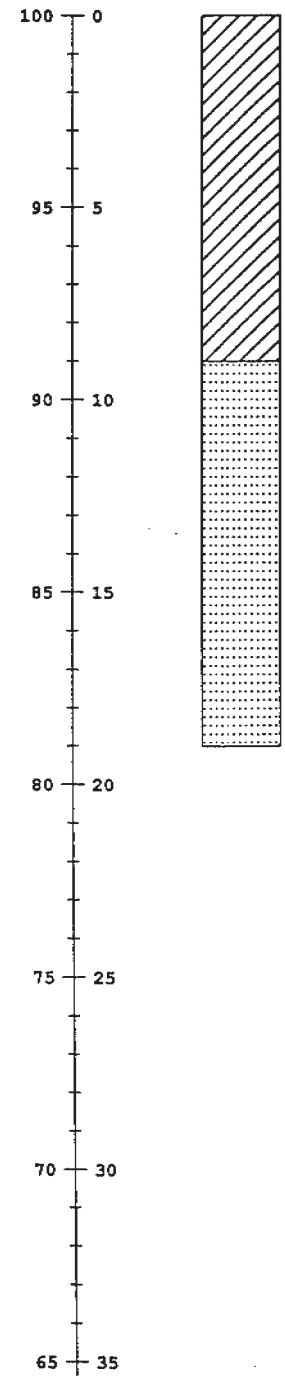


ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAYEY SAND: reddish brown; slightly moist; fine to medium; medium plastic fines; loose.			
		SC	CLAYEY SAND		101.8	7.8
		SP	POORLY-GRADED SAND: light yellowish brown; slightly moist; clean; medium dense.		115.1	3.2
		SW	WELL-GRADED SAND: light yellowish brown; slightly moist; fine to coarse; clean; medium dense.		124.4	2.7
			slight gravel			
			BOTTOM			

Figure Number 15

LOG OF TEST BORING
BORING B-15

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
FILE NO: *03-10370*
BORING DATE: *07/10/03*
ELEV.: *100' ASSUMED*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
START: *07/10/03*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
FINISH: *07/10/03*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*
LOGGER: *B. CAROLINA*

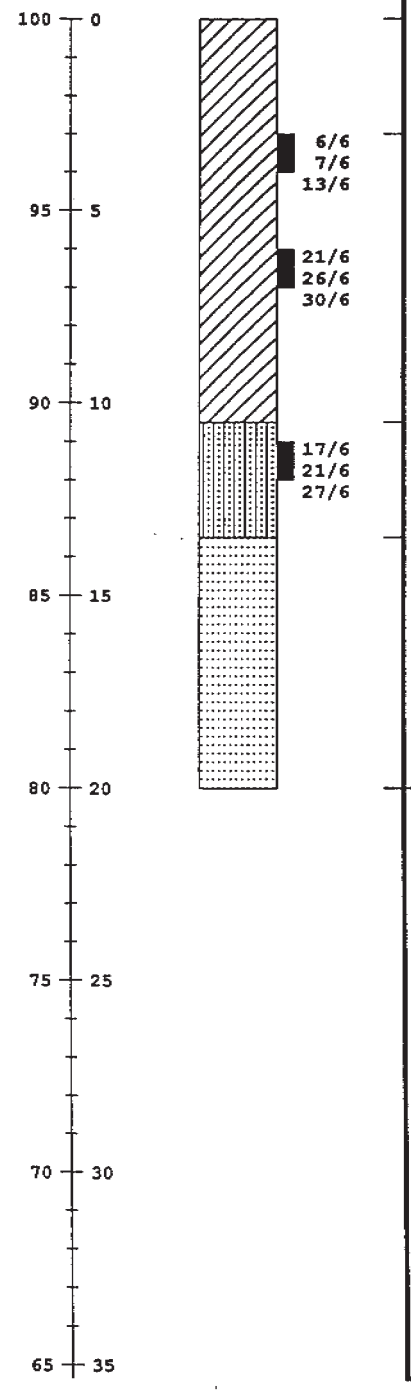


ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY: reddish brown; slightly moist; fines; plastic.			
			rock			
		SW	WELL-GRADED SAND: orangish brown; slightly moist; fine to medium; clean; slight gravel.			
			yellowish brown			
			BOTTOM			

Figure Number 16

LOG OF TEST BORING
BORING B-16

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
FILE NO: *03-10370*
BORING DATE: *07/10/03*
ELEV.: *100' ASSUMED*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
START: *07/10/03*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
FINISH: *07/10/03*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*
LOGGER: *B. CAROLINA*



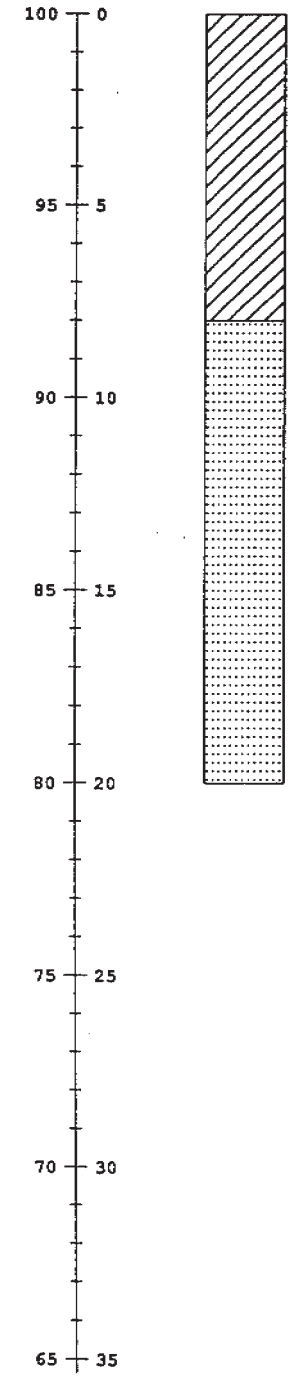
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY: reddish brown; slightly moist; fine to coarse; plastic fines; very stiff.			
		SM	SILTY SAND		115.7	6.1
					110.9	3.4
		SM	SILTY SAND: yellowish brown; slightly moist; fine to coarse; cohesive fines;		123.8	4.5
		SW	medium dense; slight gravel. WELL-GRADED SAND: yellowish brown; slightly moist; fine to coarse; clean; slight gravel.			
			BOTTOM			

Figure Number 17

LOG OF TEST BORING
BORING B-17

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*



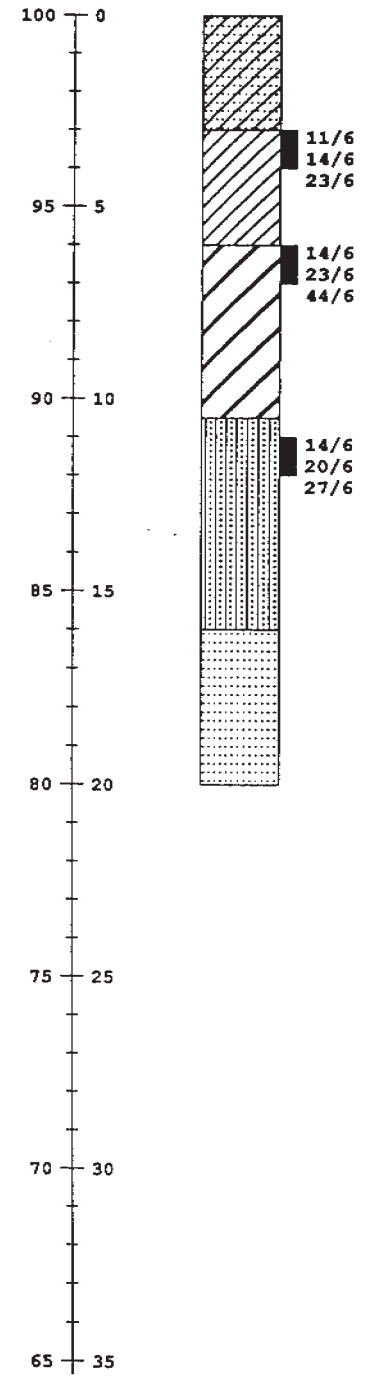
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY: reddish brown; slightly moist; fine to medium; plastic fines.			
		SW	WELL-GRADED SAND: light orangish brown; slightly moist; fine to coarse; clean; slight gravel.			
			BOTTOM			

Figure Number 18

LOG OF TEST BORING
BORING B-18

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*



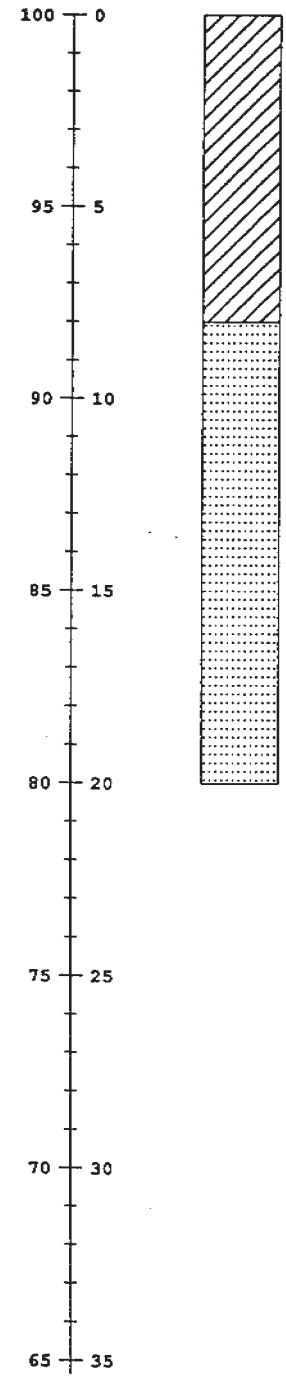
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		SC	CLAY SAND: orangish brown; slightly moist; fine to coarse; medium plastic fines; medium dense.			
		SM	SILTY SAND		94.7	16.0
		CH	CLAY: dark reddish brown; slightly moist; high plastic; very hard.		102.6	11.8
		SM	SILTY SAND: reddish brown; slightly moist; fine to coarse; cohesive fines; medium dense; slight gravel.		127.3	4.3
		SW	WELL-GRADED SAND: yellowish brown; slightly moist; fine to coarse; clean; slight gravel.			
			BOTTOM			

Figure Number 19

LOG OF TEST BORING
BORING B-19

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*



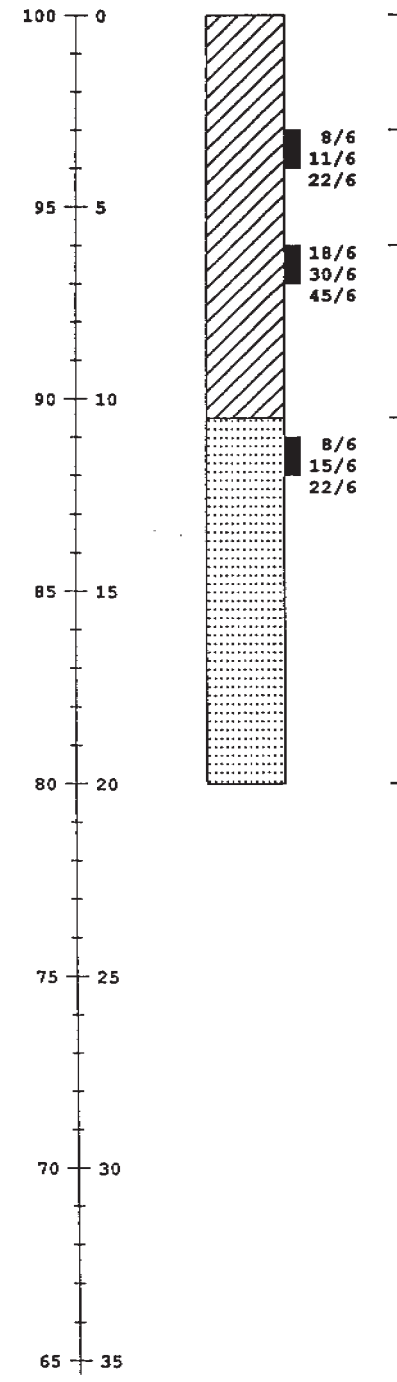
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY: orangish brown; slightly moist; fine to medium; plastic; fines.			
		SW	WELL-GRADED SAND: light orangish brown; slightly moist; fine to coarse; clean; slight gravel.			
			yellowish brown			
			slight gravel			
			BOTTOM			

Figure Number 20

LOG OF TEST BORING
BORING B-20

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

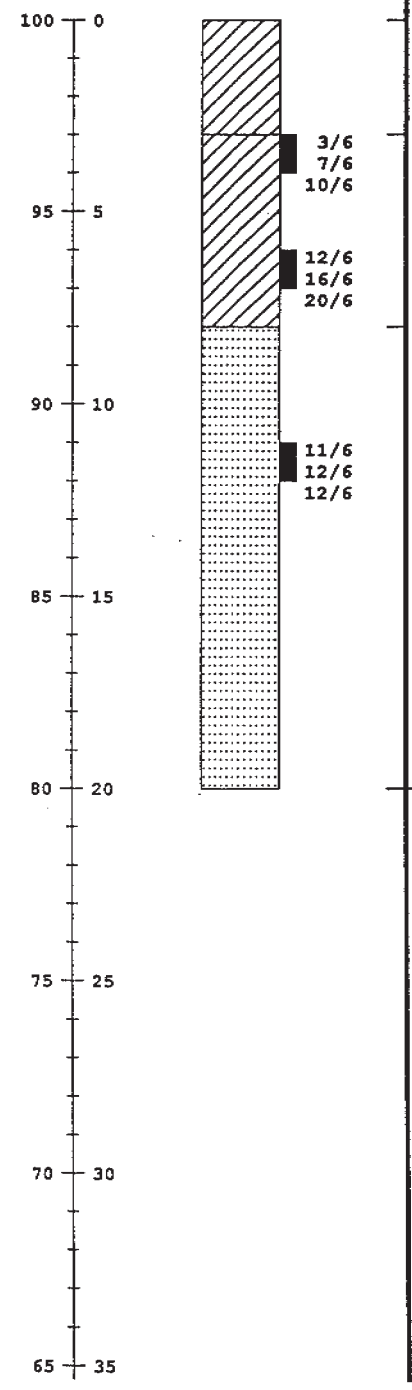


ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	CL	SANDY CLAY: orangish brown; slightly moist; fine to coarse; plastic fines; stiff.			
	SM	SILTY SAND		107.7	11.3
		hard		126.2	7.1
	SW	WELL-GRADED SAND: light yellowish brown; slightly moist; fine to coarse; clean; medium dense; slight gravel.		118.7	1.9
		BOTTOM			

Figure Number 21

LOG OF TEST BORING
BORING B-21

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
FILE NO: *03-10370*
BORING DATE: *07/10/03*
ELEV.: *100' ASSUMED*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
START: *07/10/03*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
FINISH: *07/10/03*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*
LOGGER: *B. CAROLINA*



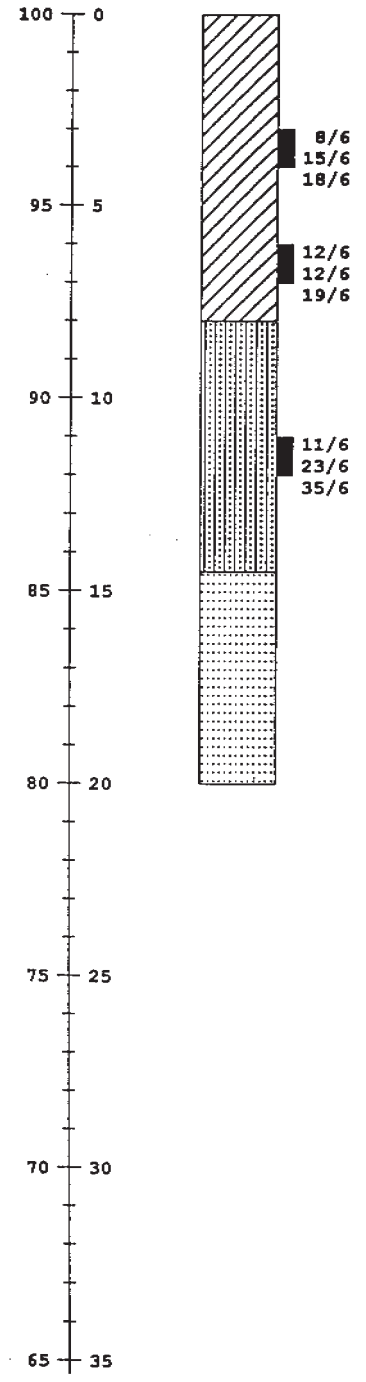
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY: reddish brown; slightly moist; fine to medium; plastic fines; firm.			
		CL	SANDY CLAY		101.9	7.4
					119.4	5.2
		SW	WELL-GRADED SAND: light orangish brown; slightly moist; fine to coarse; clean; slight gravel; medium dense.		101.9	2.3
			BOTTOM			

Figure Number 22

LOG OF TEST BORING
BORING B-22

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*



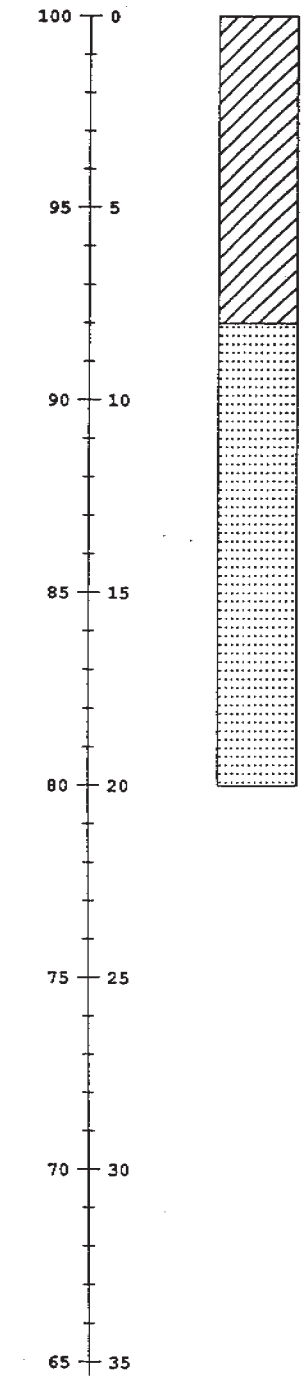
ELEVATION/ DEPTH (feet)	USCS	Description	Remarks	Density pcf	Moisture %
	CL	SANDY CLAY: reddish brown; slightly moist; fine to medium; plastic; stiff.			
	SM	SILTY SAND		121.3	5.8
				125.5	5.1
	SM	SILTY SAND: yellowish brown; slightly moist; fine to coarse; cohesive fines; dense; rock.		120.5	3.7
		decomposed granite			
	SW	WELL-GRADED SAND: light yellowish brown; slightly moist; fine to coarse; clean; gravel.			
		BOTTOM			

Figure Number 23

LOG OF TEST BORING
BORING B-23

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, FIGURE NO. 1*
DRILL METHOD: *4 1/4 INCH I.D. HOLLOW-STEM AUGER*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➧ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
		CL	SANDY CLAY: orangish brown; slightly moist; fines; plastic.			
		SW	WELL-GRADED SAND: light orangish brown; slightly moist; fine to coarse; clean; slight gravel.			
			rock			
			BOTTOM			

Figure Number 24

LOG OF TEST BORING
BORING B-24

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-1*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		SC	CLAYEY SAND; light yellowish brown, fine to med. grade, cohesive, semi plastic			
95 — 5			BOTTOM			
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 25

LOG OF TEST BORING
BORING B-25

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-2*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		SC	CLAYEY SAND; yellowish brown, very fine to fine grade, cohesive, plastic			
95 — 5			BOTTOM			
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 26

LOG OF TEST BORING
BORING B-26

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-3*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		SC	CLAYEY SAND; light yellowish brown, fine to med grade, plastic			
			BOTTOM			
95 — 5						
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 27

LOG OF TEST BORING
BORING B-27

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-4*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

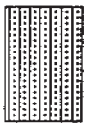
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		SM	SILTY SAND; light yellowish brown, fine to med grade, cohesive			
			BOTTOM			
95 — 5						
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 28

LOG OF TEST BORING
BORING B-28

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-5*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

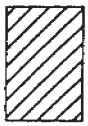
ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		CL	SANDY CLAY; dark yellowish brown, fine to med. grade, plastic			
			BOTTOM			
95 — 5						
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 29

LOG OF TEST BORING
BORING B-29

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-6*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		SC	CLAYEY SAND; strong brown, fine to med grade, cohesive, semi plastic			
			BOTTOM			
95 — 5						
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 30

LOG OF TEST BORING
BORING B-30

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-7*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		CL	CLAYEY SAND; dark yellowish brown, very fine to fine grade, highly plastic			
			BOTTOM			
95 — 5						
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 31

LOG OF TEST BORING
BORING B-31

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-8*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		CL	SANDY CLAY; yellowish brown, very fine to fine, cohesive, plastic			
95 — 5			BOTTOM			
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 32

LOG OF TEST BORING
BORING B-32

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-9*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ▶ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		CL	SANDY CLAY; yellowish brown, fine to med. grade, plastic			
			BOTTOM			
95 — 5						
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 33

LOG OF TEST BORING
BORING B-33

PROJECT: *PRELIMINARY SOILS INVESTIGATION*
BORING DATE: *07/10/03*
BORING LOCATION: *SEE BORING LOCATION MAP, R-10*
DRILL METHOD: *Hand Excavated Sample for R-Value Test*
DESCRIPTION: *CITY IN THE HILLS, PHASE 1*
DEPTH TO WATER - ▼ : *N/A* **CAVING - ➡ :** *N/A*

FILE NO: *03-10370*
ELEV.: *100' ASSUMED*
START: *07/10/03*
FINISH: *07/10/03*
LOGGER: *B. CAROLINA*

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks	Density pcf	Moisture %
100 — 0		SC	CLAYEY SAND; yellowish brown, fine to med grade, plastic			
			BOTTOM			
95 — 5						
90 — 10						
85 — 15						
80 — 20						
75 — 25						
70 — 30						
65 — 35						

Figure Number 34

KEY TO SYMBOLS

Symbol Description

Strata symbols


Clayey sand


Silty sand


Low plasticity clay


Silt


Poorly graded sand


Well graded sand


High plasticity clay

Misc. Symbols


Boring continues

Soil Samplers


California sampler

Notes:

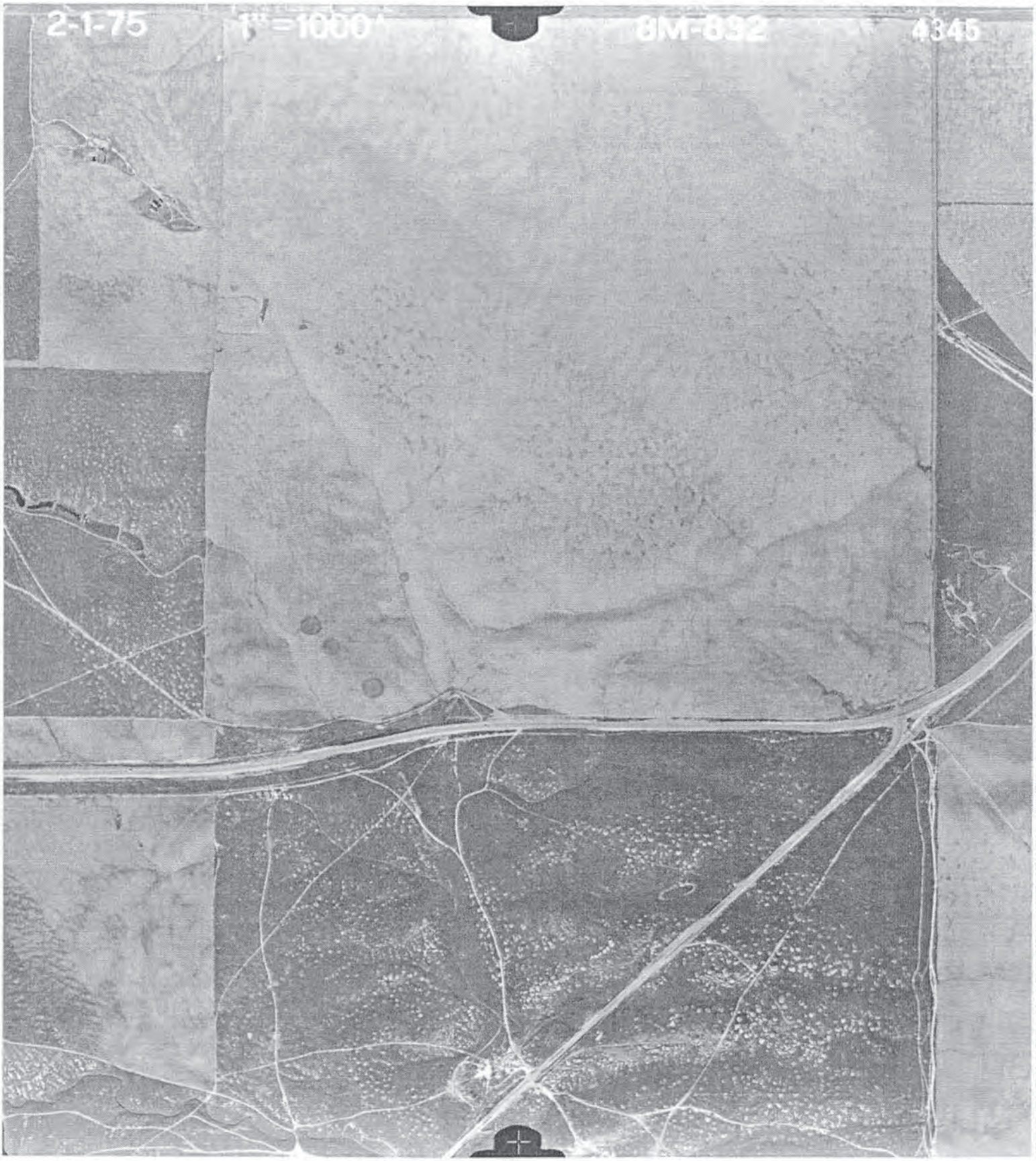
1. Twenty-three (23) Exploratory borings were drilled on 07/10/03 , 07/09/03, and 07/10/03 using a 4-inch diameter continuous flight power auger. And ten (10) bulk samples were recovered for R-value tests.

2. No free water was encountered in any of our boring to the maximum depth drilled of 41.5 feet.

3. Boring locations are shown on the Boring Location Map, Figure No. 1.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests for moisture and density conducted on samples recovered are reported on the logs.



Center

East

SOILS ENGINEERING, INC.

ADDENDUM #1 TO
PRELIMINARY GEOLOGICAL HAZARD REPORT

For

THE CITY IN THE HILLS PROJECT
Portions of Sections 18 and 19 and all of Section 17, T29S, R29E
Bakersfield, California

Prepared For:

Pinnacle Engineering
1712 19th Street, Suite 101
Bakersfield, CA. 93301
Attn: Matt VoVilla

File No. 04-10597

Prepared By:

Soils Engineering, Inc.
4400 Yeager Way
Bakersfield, CA. 93313

April 2005

SOILS ENGINEERING, INC.

April 5, 2005

File No. 04-10597

Mr. Matt VoVilla
Pinnacle Engineering
1712 18th St., Suite 101
Bakersfield, CA 93301

Subject: Addendum #1 To
Preliminary Geologic Hazard Report
for The City In The Hills Project, Vesting Tentative Tract 6444
Portions Of Section 18 and 19 and All of 17, T29S, R29E
In Bakersfield, California

Mr. VoVilla:

Soils Engineering, Inc. (SEI) has prepared this Addendum #1 to the Preliminary Geological Hazards Study dated June 28, 2004 for City in the Hills Project in Bakersfield, California (site). This study includes the area designated as Tentative Tract 6444.

SEI is providing the following information that BSK & Associates requested in a peer review letter dated March 15, 2005:

1) SEI has included copies of all of the aerial photos utilized for this investigation. This includes the years 1952 (3), 1981 (3), 1990 (2) and 2003 (2 color) aerial photos of the site area. The 1975 aerials were included in the original report.

2) Plate 6A has been revised to include the legend from Figure 3A from FER-145.

3) SEI conducted additional fault trenching near the southeastern corner of the AP Zone on March 31, 2005. This included a 320' long trench T14 beginning approximately 100' east of the southwestern end of trench T2 on a trend of S35W. This trench was approximately 6' deep and was logged by an SEI Certified Engineering Geologist. One (1) additional 30' long parallel trench T15 was conducted starting approximately 30' west and 10' north of the northeastern end of trench T14 to evaluate an anomaly identified between 7' and 17' along trench T14. This parallel trench T15 did not encounter the same anomaly (lack of the calcareous zone B) as in Trench T14, thus not confirming the presence of a fault in this area. See attached Plates 2A and 6 for the new and historical trench locations. The Trench Logs T14 and T15 are also attached showing the lithologic zones and any anomalies identified along the trenches.

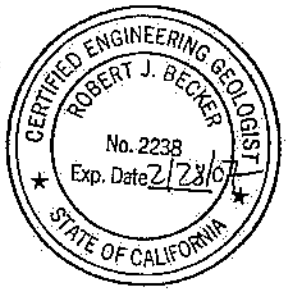
The complete AP Zone in the northeastern portion of the site has now been investigated by trenching with no active faults confirmed on-site.

The additional trenching conducted in the southeastern portion of the AP zone did not reveal any new faulting on-site. Therefore the conclusions and recommendations in the original Preliminary Geologic Hazard Report have not changed.

Please contact Soils Engineering, Inc. at (661) 831-5100 if you have any questions concerning this letter.

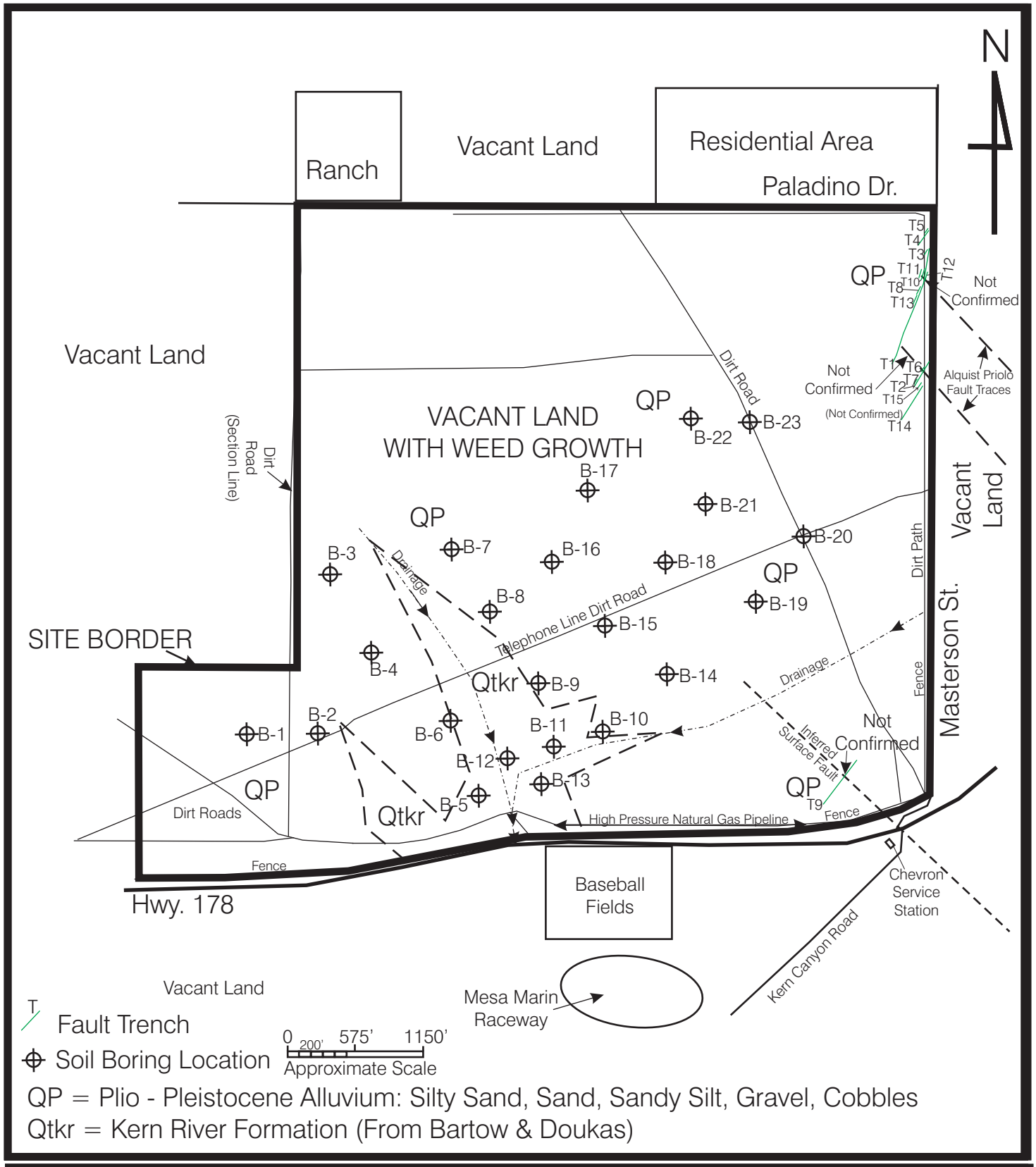
Sincerely,
SOILS ENGINEERING, INC.

Robert J. Becker
R.G. 5076, CEG 2238, Expires 2/28/07



Attachments: Plate 2A, Geologic Map
Plate 6, Fault Investigation Trenches
Plate 6A, Historical Geologic Maps
Trench Logs T-14 & T-15
Aerial Photos, 1952, 1981, 1990, 2003

Distribution: Matt VoVilla, Pinnacle Engineering (4)



QP = Plio - Pleistocene Alluvium: Silty Sand, Sand, Sandy Silt, Gravel, Cobbles

Qtkr = Kern River Formation (From Bartow & Doukas)

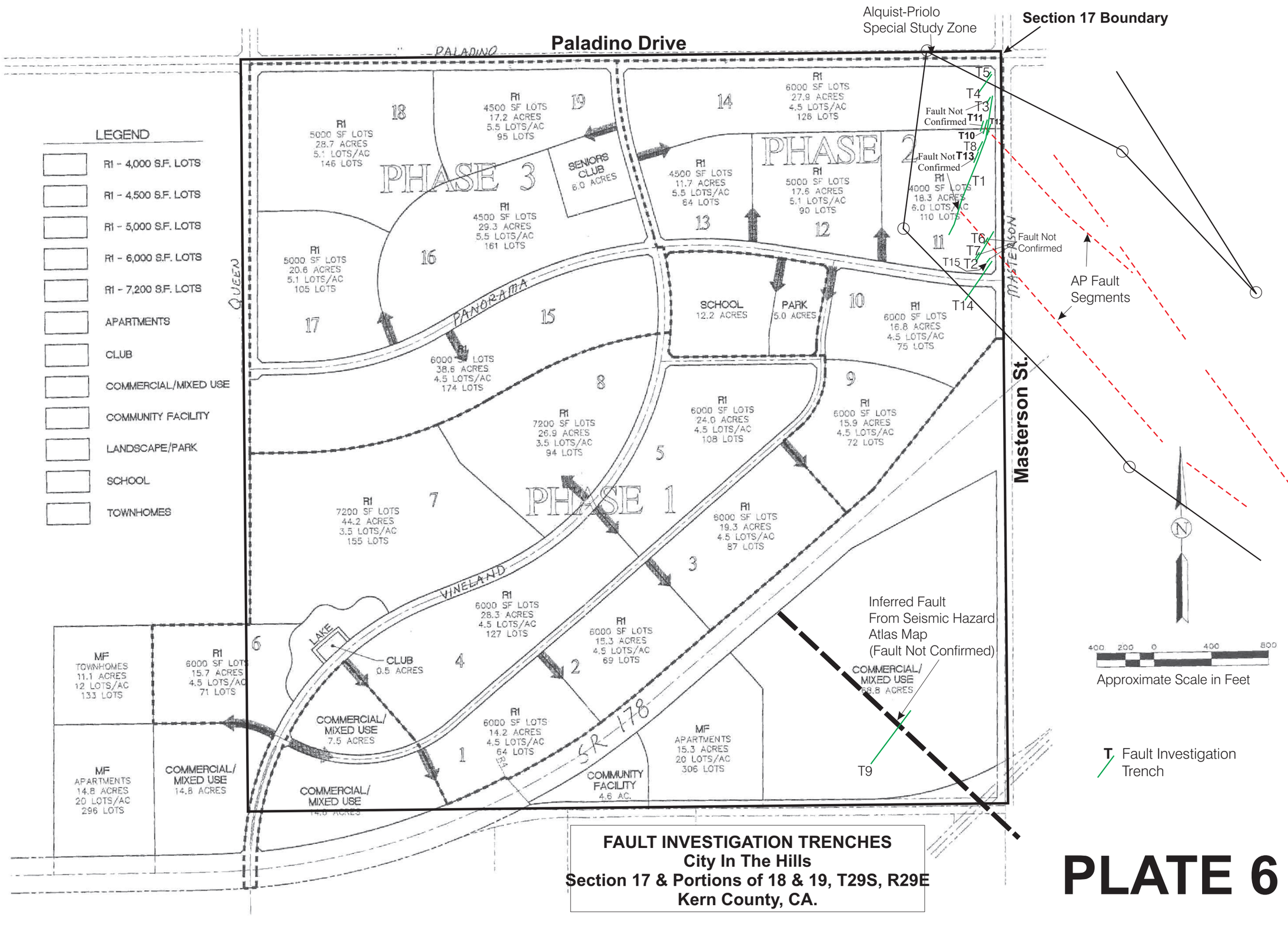
SOILS ENGINEERING, INC.
4400 Yeager Way
BAKERSFIELD, CA 93313

Date: 5/17/04
Project No.: 04-10597

City in The Hills
Section 17, 18 & 19, T29S, T29E
Bakersfield, CA.

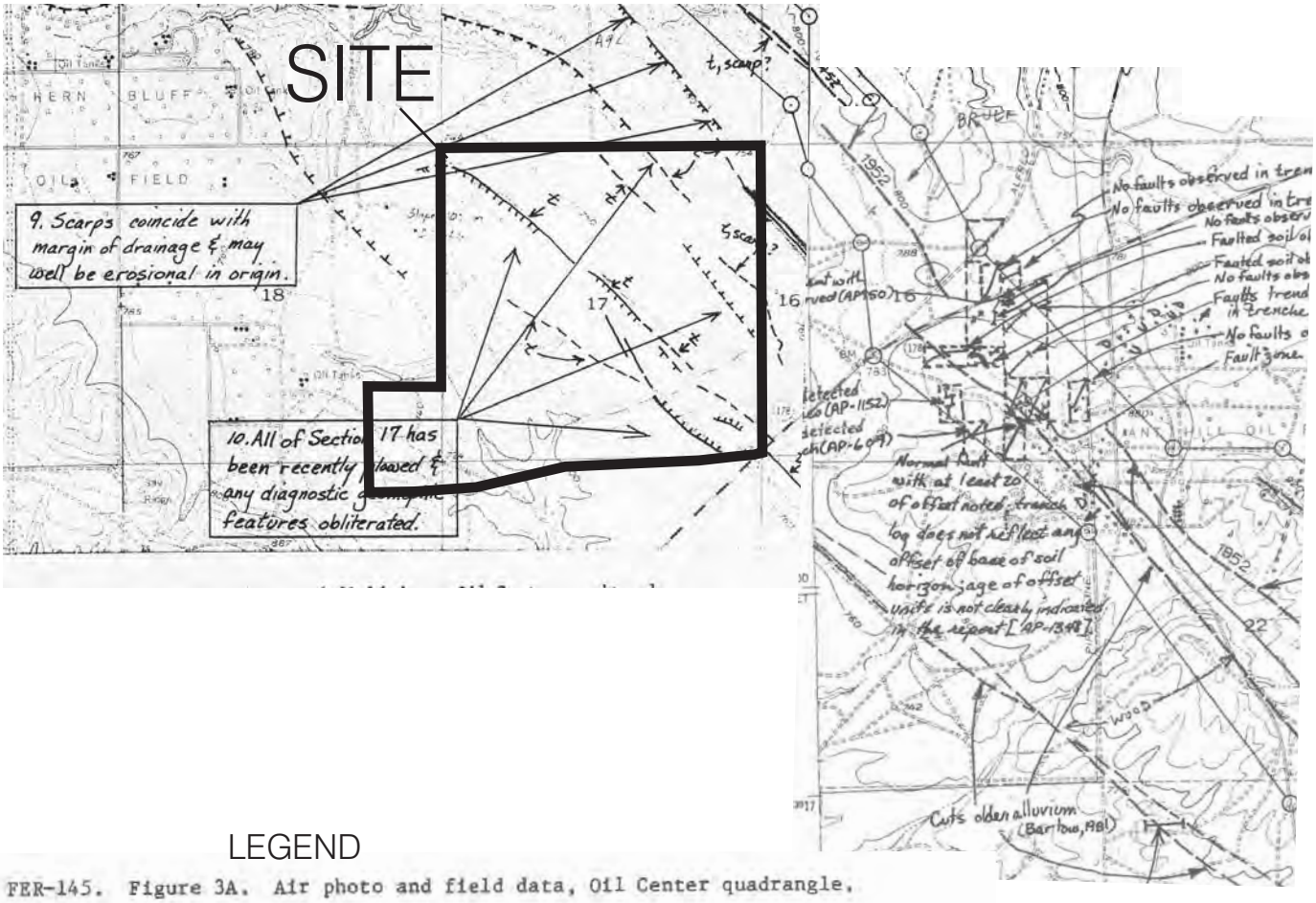
Geologic Map

PLATE
2A



FAULT INVESTIGATION TRENCHES
City In The Hills
Section 17 & Portions of 18 & 19, T29S, R29E
Kern County, CA.

PLATE 6



LEGEND

FER-145. Figure 3A. Air photo and field data, Oil Center quadrangle.

= scarp (hachures on downhill side)

= tonal lineament

= location of trench

= landslide

= fan

NV = No features indicative of recent faulting visible on aerial photographs

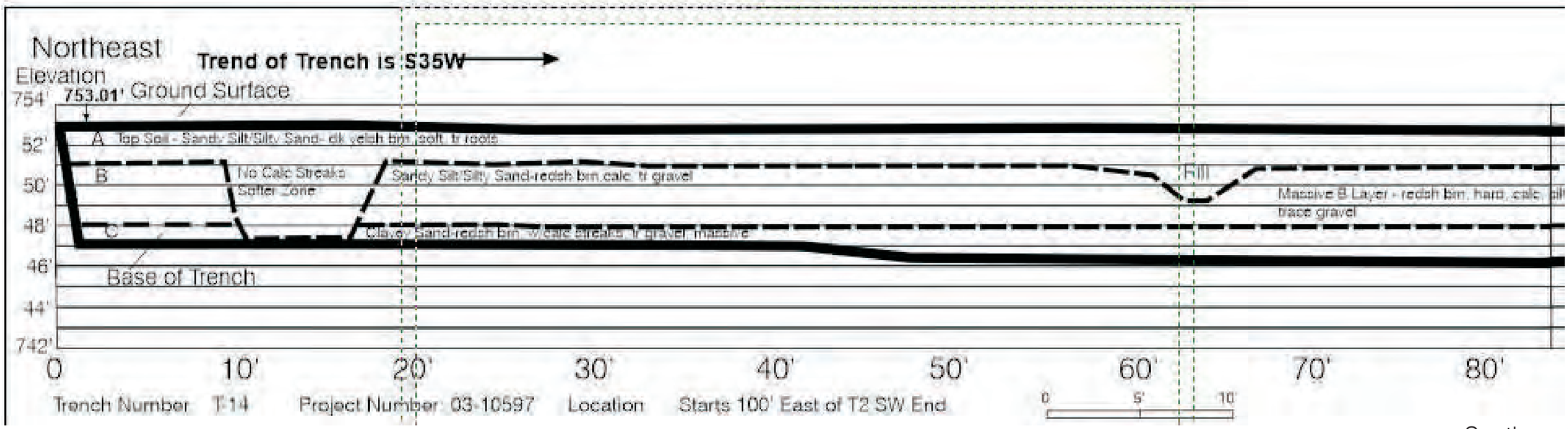
Data in black from aerial photographs.

Data in red from field observations.

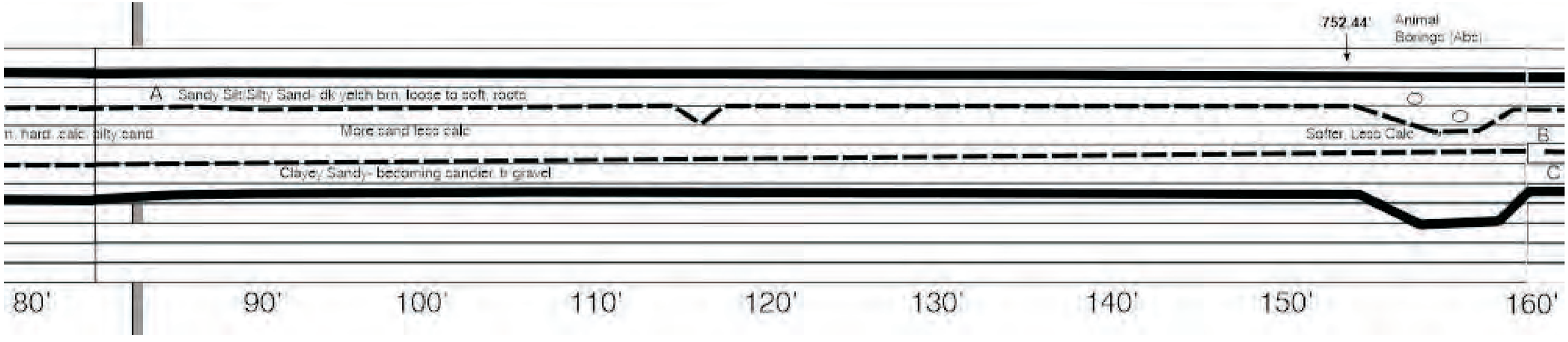
Yellow highlight indicates those features which were probably produced by recent fault movement.

From FER-145, Smith (1984)

SOILS ENGINEERING, INC. 4400 Yeager Way BAKERSFIELD, CA 93313 Date: 5/17/04 Project No.: 04-10597	City in The Hills Section 17, 18 & 19, T29S, T29E Bakersfield, CA. Historical Geologic Maps	PLATE 6A



Southwest



Trench Number: T-14 Project Number: 03-10597 Location: Starts 100’ East of T2 SW End. 0 5’ 10’

Northeast

Elevation

Trend of Trench is S35W →

Ground Surface

754’

A Sandy Silt/Silty Sand- yelsh brn, with clay

52’

More Indurated A Zone

A

50’

B More calc, harder

Softer

Hard Again

Massive B/C Zone, Silty Sand/Clayey Sand

48’

C Clayey Sand

Gradational Change

reddish brn, firm to hard, less calc, tr gravel

46’

44’

742’

160’ 170’ 180’ 190’ 200’ 210’ 220’ 230’ 240’

Trench Number: T-14 Project Number: 03-10597 Location: Starts 100’ East of T2 SW End.

0 5’ 10’

751.44’

Southwest

754’

Lots of Abs

A Sandy Silt/Silty Sand- dk yelsh brn, roots

52’

y Sand/Clayey Sand

l, less calc tr gravel

B/C

50’

Massive B/C Zone, Silty Sand/Clayey Sand

reddish brn, firm to hard, less calc tr gravel

Softer

Massive B/C Zone, Silty Sand/Clayey Sand

reddish brn, firm to hard, some calc, tr gravel

48’

46’

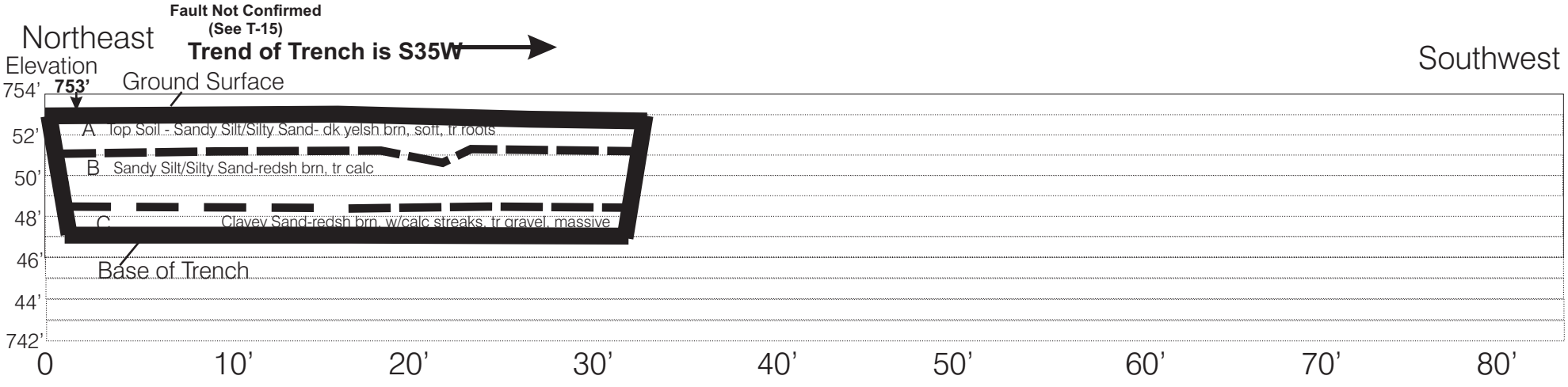
44’

742’

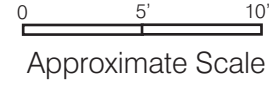
240’ 250’ 260’ 270’ 280’ 290’ 300’ 310’ 320’

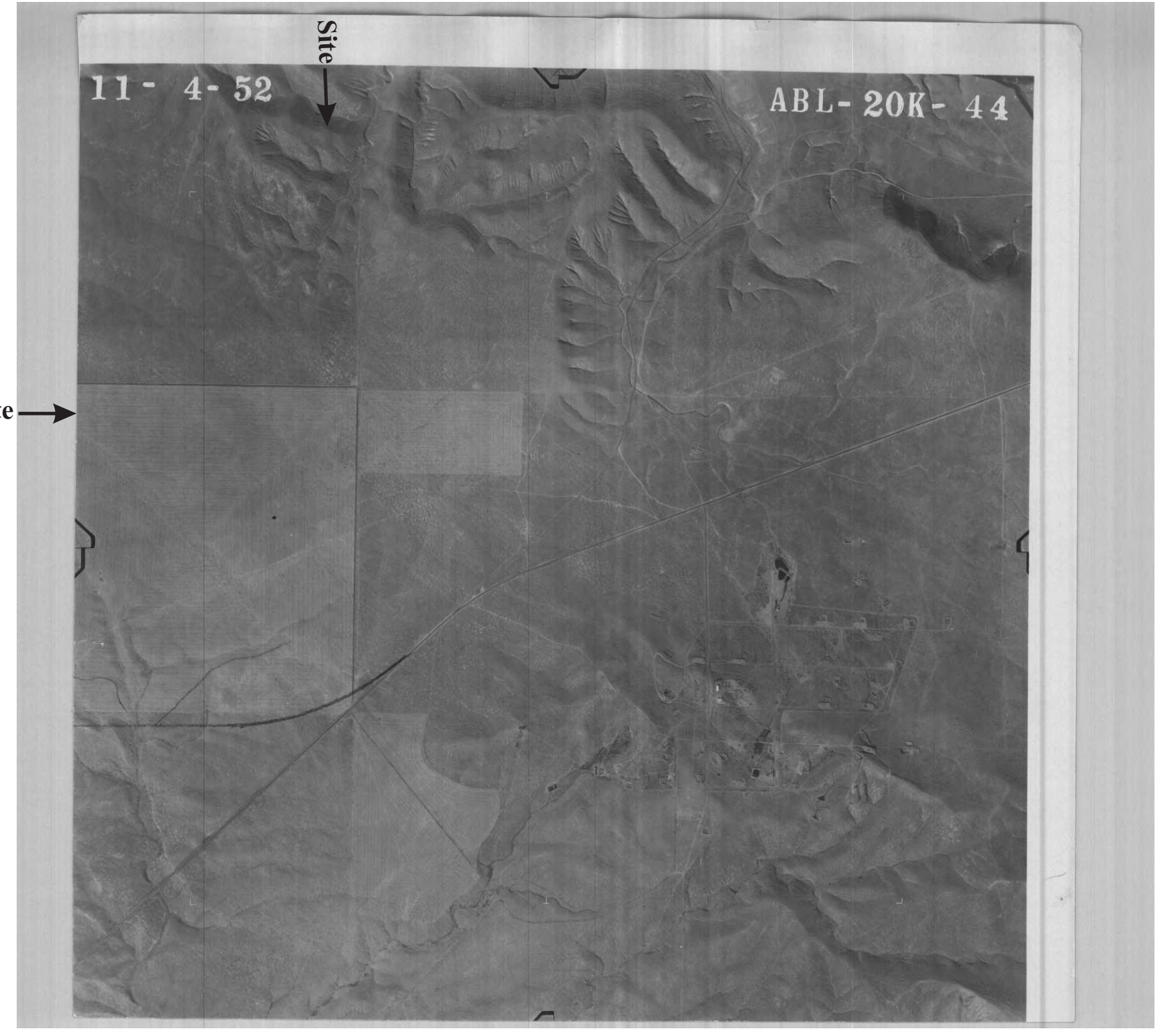
Trench Number: T-14 Project Number: 03-10597 Location: Starts 100’ East of T2 SW End.

0 5’ 10’



Trench Number: T-15 Project Number: 03-10597 Location : Starts 30’ West & 10’ North of T14 SW End.

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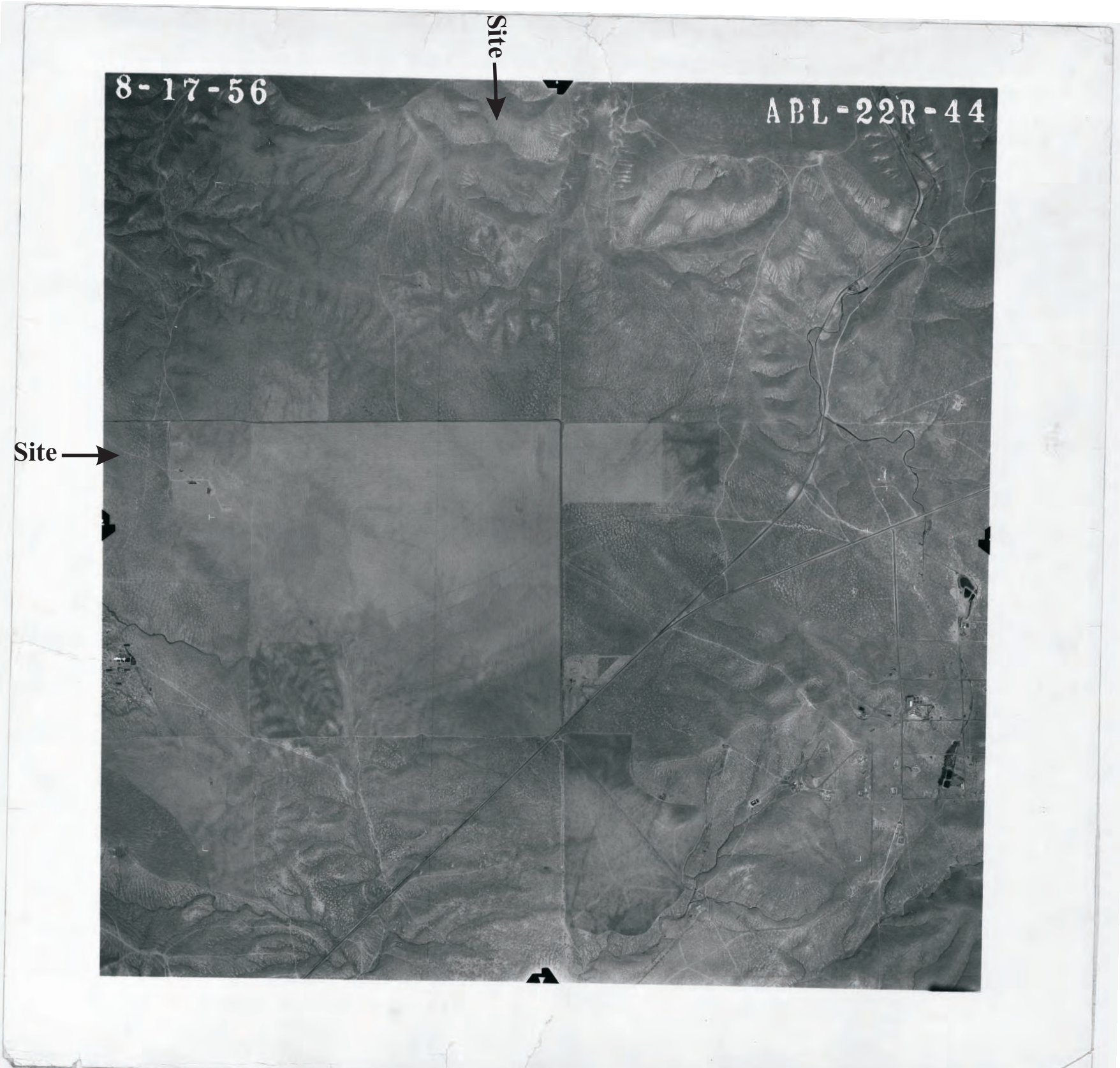
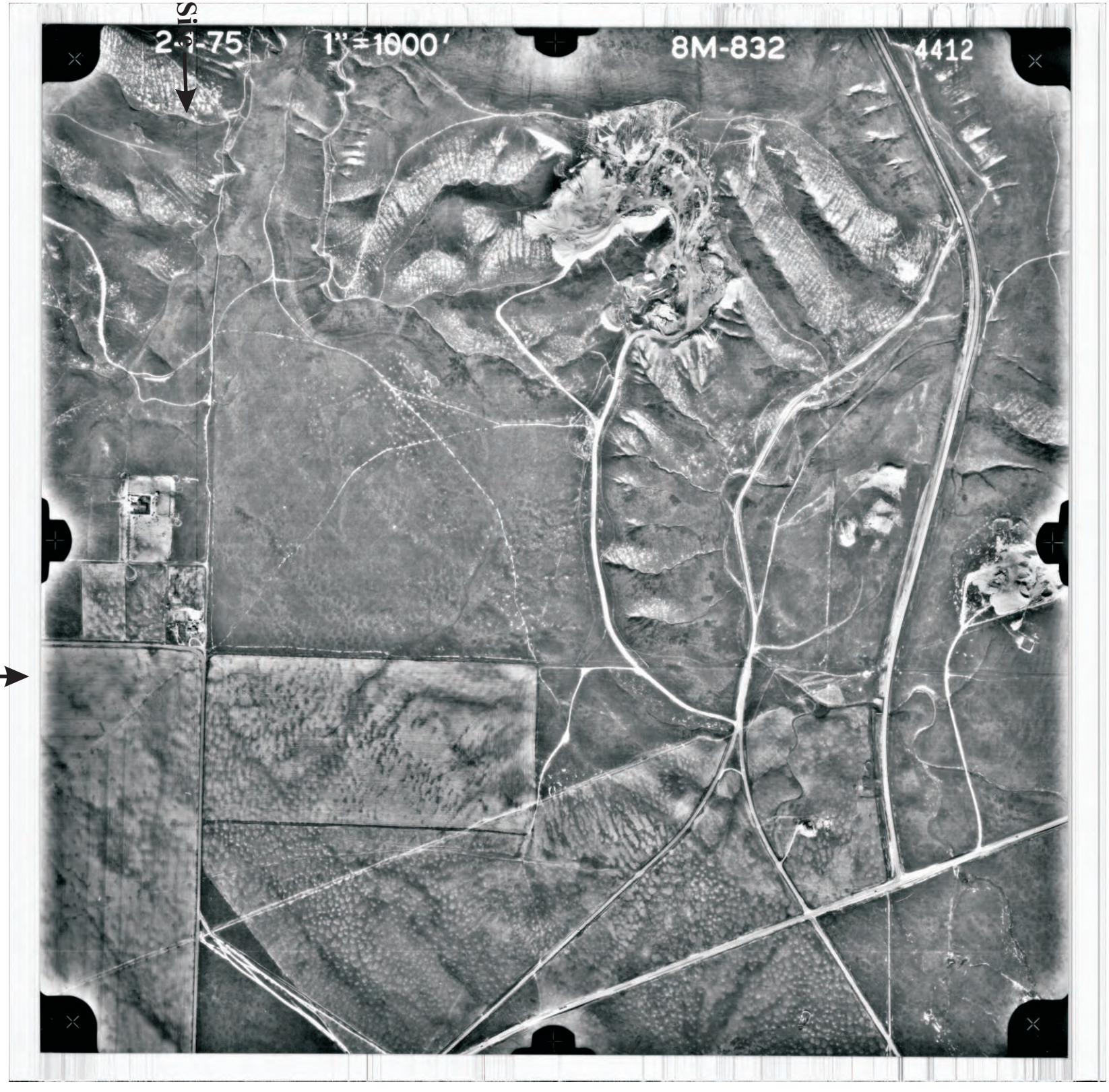
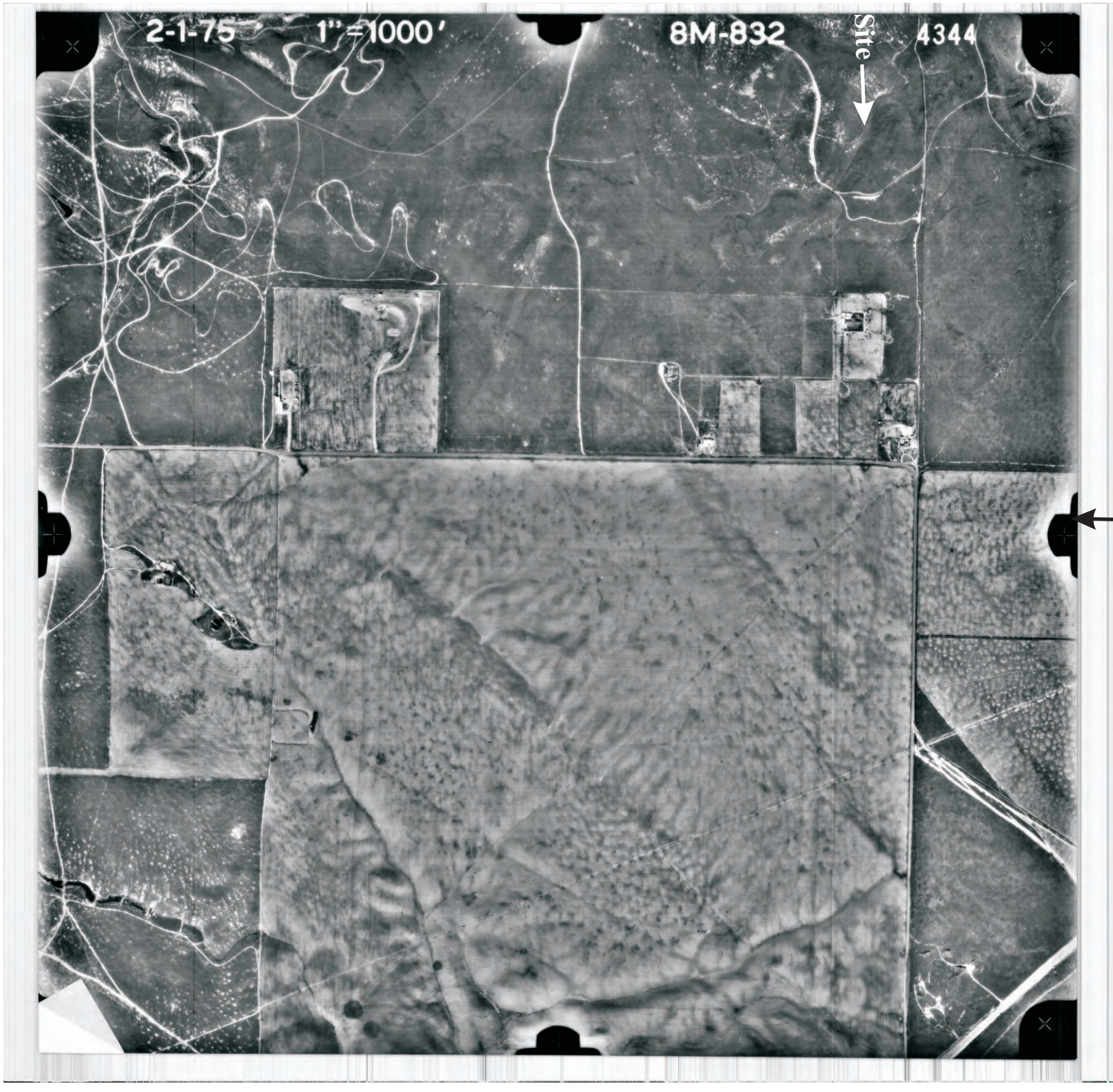
11- 4- 52
ABL- 20K- 44
Site


Site
8-17-56
ABL-22R-44
Site


2-1-75
1"=1000'
8M-832
4412
Site


2-1-75
1"=1000'
8M-832
4344
Site
Site

1981

SITE

1990

SITE

SITE

1990