GEOTECHNICAL EXPLORATION

ANDERSON 128 PROPERTY
WATER RESERVOIR

ROHNERT PARK, CALIFORNIA

SUBMITTED

TO

UD LLC

DANVILLE, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 5716.1.007.01

April 22, 2005

Project No.
5716.1.007.01

April 22, 2005

Mr. Kevin Fredrickson
UD LCC
500 LaGonda Way, Suite 100
Danville, CA 94526

Subject: Anderson 128 Property
Water Reservoir
Rohnert Park, California

GEOTECHNICAL EXLORATION

Dear Mr. Fredrickson:

ENGEO Incorporated is pleased to present this geotechnical exploration for the proposed water reservoir site on the Anderson 128 property located in Rohnert Park, California. The purpose of this geotechnical exploration is to provide the soil and geologic conditions affecting the subject site for the proposed development.

We look forward to working with you on this project. If you have any questions regarding the information included in the report, please do not hesitate to contact us.

Very truly yours,

ENGEO INCORPORATED

Keith Nowell
Staff Geologist

Josef J. Tootle, GE
Associate

REGISTERED PROFESSIONAL ENGINEER
JOSEF J. TOOTLE
2677
Exp: 6/30/26
GEOTECHNICAL
STATE OF CALIFORNIA

Reviewed by:

Theodore P. Bayham, GE
Principal

kn/tpb/cc:gex

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INTRODUCTION

Purpose and Scope

The purpose of this report is to characterize geologic conditions of the site and provide geotechnical conclusions and recommendations to assist you and your design team in the planning of the proposed project.

The scope of our work for this project included the following:

1. Review of previously published maps and reports regarding geological and geotechnical characteristics of the subject site.
2. Excavation and logging of exploratory trenches and test pits.
3. Exploratory drilling, sampling and laboratory testing of subsurface materials.
4. Analysis of the geological and geotechnical data.
5. Preparation of this report summarizing our findings and water tank site recommendations.

This report was prepared for the exclusive use of UD LLC, and its design team consultants. In the event that any changes are made in the character, design or layout of the development, the conclusions and recommendations contained in this report must be reviewed by ENGEO Incorporated to determine whether modifications to the report are necessary. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without the express written consent of ENGEO Incorporated.

Site Location and Description

The study area is the central portion of an irregular shaped parcel located east of Petaluma Hill Road, south of the Rohnert Park Expressway intersection in Rohnert Park, California (Figure 1).

The western edge of the 128-acre property is located along Petaluma Hill Road. The proposed water reservoir will be located on the south western facing slope of the hill slope in the central portion of the site. Elevations at the proposed tank site range from approximately 250 to approximately 280 feet above mean sea level (msl). The site is currently undeveloped. Vegetation at the tank site is generally composed of grasses and brush.

Proposed Development

It is our understanding that this area of the property will be developed with a potable water reservoir and underground utilities and access roadways. The proposed development will consist of cuts on the order of 20 to 30 feet to construct a relatively level building pad.

GEOLOGIC CONDITIONS

Site Geology

The site is located within the central part of the Coast Ranges Geomorphic Province of California. Active faulting within the Coast Ranges has developed in response to complex interactions along the transform boundary between the North American and Pacific tectonic plates. In general, the relative motion along the boundary between the two plates is right-lateral strike-slip, with the Pacific Plate moving northwestward with respect to the North American Plate. The San Andreas fault system, defined as the San Andreas fault, as well as the associated strands that splay from it (i.e. the Rodgers Creek, Tolay, Maacama, and Hayward faults, as well as others), is the main transform fault system along this boundary and accommodates approximately 80 percent of the relative motion along the broad boundary between the North American and Pacific plates (Argus and Gordon, 1991).

A published geologic map of the vicinity compiled by Fox (1973) indicates the site is depicted as Tertiary andesitic to basaltic lava flows (Tsa) in the eastern area of the site that this report addresses (Figure 2). The Quaternary deposits are shown as a centrally located northeast-southwest trending belt of fan deposits (Qyf) consisting of fine sand and silt, with gravel becoming more abundant toward the fan heads, with fluvial deposits (Qyfo), characterized by fine sand, silt, and clay, depicted in the west site area.

Site Seismicity

No active faults are mapped across the project site by the California Division of Mines and Geology (CDMG) or United States Geological Survey (USGS). The site is located in a region that contains numerous active earthquake faults. No known faults cross the property and the nearest

known active[1] faults are the Rogers Creek fault located about 1½ miles east; Maacama fault located about 16 miles northeast; the West Napa fault, about 16 miles to the east and the San Andreas fault approximately 17 miles to the west of the site. The site is not located within a state-mandated Earthquake Fault Zone.

Numerous small earthquakes occur every year in the San Francisco Bay Region, and larger earthquakes have been recorded and can be expected to occur in the future. Figure 3 shows the approximate locations of these faults and significant historic earthquakes recorded within the San Francisco Bay Region.

[1] An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene time (about the last 10,000 years) (Hart, 1992).

FIELD EXPLORATION

The field exploration for this study was conducted on March 10 and 11, 2005, and consisted of two exploratory borings at the approximate locations shown on Figure 4. The locations were selected based on the site accessibility and such that subsurface site conditions could be determined in the area of the reservoir. An ENGEO geologist logged the borings in the field in accordance with the Unified Soil Classification System. The boring logs are included in this report (Appendix B). The borings were performed using a CME 850 tracked rig and equipped with an NX rock coring bit.

Laboratory Testing

Following drilling, we reexamined the samples in our laboratory to confirm field classifications. Representative samples recovered from our borings were tested for the following physical characteristics:

Characteristic	Test Method	Location of Results Within this Report
Atterberg Limits	ASTM D-4318	Appendix B

Laboratory test results of the samples recovered are included on the laboratory figures in Appendix B as noted above.

Subsurface Stratigraphy

The surface soils at the site generally consist of approximately 2 feet of clayey sands and silty clays. The surface soils were underlain by Tertiary igneous bedrock which primarily consist of andesitic to basaltic lava flows. The bedrock is friable to strong, closely to moderately fractured, and deeply to moderately weathered. The Rock Quality Designation (RQD) range from 0 up to a maximum RQD

of 54 percent. Tuff beds were encountered in both borings and these had approximate thickness of 1 to 2 feet. The tuff beds are highly plastic and highly expansive when subject to fluctuations in moisture content.

Groundwater Conditions

Groundwater could not be measured due to the exploratory method used. Fluctuations in groundwater levels may occur seasonally and over a period of years because of precipitation, changes in drainage patterns, irrigation, and other factors.

GEOLOGIC HAZARDS

Seismic Hazards

Seismic hazards can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. Common secondary seismic hazards include ground shaking, lurch cracking, soil liquefaction, lateral spreading, landslides, and tsunamis and seiches. The risk of regional subsidence/uplift, landslides, tsunamis or seiches is considered unlikely at the site. The risk of earthquake-induced ground rupture, liquefaction, densification, lateral spreading, and lurching are discussed below.

Ground Rupture. Since there are no known active faults crossing the site and the site is not within a State of California Earthquake Fault Hazard Zone, the risk of ground rupture related to faulting is considered remote.

Ground Shaking. An earthquake of moderate to high magnitude generated within the San Francisco Bay Region could cause considerable ground shaking at the site. To mitigate the shaking effects, all structures should be designed using sound engineering judgment and the latest Uniform Building Code (UBC) requirements as a minimum (SEAOC, 1996). Deterministic computer studies from current California fault data yield a mean horizontal bedrock acceleration of 0.55g from the nearby Rodgers Creek fault based on the attenuation relation by Idriss (1993).

The near source factors, N_a and N_v, are based on the Rodgers Creek fault being a seismic source type A, approximately 1½ miles (2½ km) away. The UBC parameters for the reservoir design are presented in the following table:

1997 UNIFORM BUILDING CODE - Chapter 16

ITEM	DESIGN VALUE	SOURCE
Seismic Zone	4	Figure 16-2
Seismic Zone Factor	0.40	Table 16-I
Soil Profile Type	S_B	Table 16-J
Seismic Source Type	A	Table 16-U
Near Source Factor, Na	1.5	Table 16-S
Near Source Factor, Nv	2.0	Table 16-T
Seismic Coefficient, Ca	0.60 (0.40Na)	Table 16-Q
Seismic Coefficient, Cv	0.80 (0.40Nv)	Table 16-R

Seismic design provisions of current building codes generally prescribe minimum lateral forces applied statically to the structure, combined with the gravity forces of dead-and-live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the comparable forces that would be associated with a major earthquake. Therefore, structures should be able to: (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage but with some nonstructural damage; and (3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1996).

Landslides. No landslides were mapped at, immediately adjacent to, the location of the proposed reservoir tank site. Minor areas of slope instability were observed at other locations along the hill slope, but they are not anticipated to have a significant detrimental impact to the tank site location.

CONCLUSIONS AND RECOMMENDATIONS

Based on our exploration, we conclude that the proposed water reservoir project is feasible from a geotechnical standpoint. The primary geotechnical concern is the potential for on-site differential expansion below the tank site due to the presence of highly expansive tuff beds within the bedrock at the proposed reservoir location. Expansive bedrock can experience volume changes due to seasonal fluctuations in moisture content. To minimize the potential impact of the expansive site materials, the proposed reservoir tank should be underlain by relatively uniform subgrade materials.

Grading

Grading operations should meet the requirements of the "Guide Contract Specifications" included in Appendix D and should be observed and tested by ENGEO's field representative. The Geotechnical Engineer or qualified representative should be present during all phases of grading operations to observe demolition, site preparation, grading operations, and subdrain placement. The Geotechnical Engineer should be notified a minimum of 72 hours prior to the commencement of any grading or stripping operations at the site. This is to provide time to coordinate the work with the Grading Contractor.

Demolition and Stripping

All existing vegetation and soft or compressible soils in areas to be graded should be removed as necessary for project requirements. The depth of removal of these materials should be determined by the Geotechnical Engineer or qualified representative in the field at the time of grading. Evaluation of unsuitable deposits should be performed during grading by sampling and laboratory analyses.

Construction areas receiving fill and those areas that serve as borrow for fill should be stripped of existing vegetation. Actual depths will be determined by the Geotechnical Engineer or qualified representative in the field during grading. Site strippings should be reserved for placement in approved open space areas or landscape areas. Any topsoil retained for future use in landscape areas should be approved by the Landscape Architect and stockpiled in areas where it will not interfere with construction operations. Within the development areas, excavations resulting from demolition, clearing, and/or stripping which extend below final grades should be cleaned to firm undisturbed soil as determined by the Geotechnical Engineer's representative. All test pits were loosely backfilled after the completion of the field exploration. It will be necessary to remove and recompact all loose soil within the pits that will remain below final grades. All loose soil material should be removed and recompacted.

Subgrade Preparation

We anticipate that the tank pad will be excavated in bedrock. However, we expect that some variation in rock characteristics may be exposed at the subgrade level, and therefore we recommend that the tank area be subexcavated a minimum depth of 5 feet and grades restored with engineered fill. An evaluation of the need to perform the subexcavation should be made by the Geotechnical Engineer or Engineering Geologist, in conjunction with the utility district, at the time of construction.

The bedrock materials encountered were friable to moderately strong and crushed to closely fractured. Based on these characteristics we anticipate that the bedrock materials should be rippable with heavy duty grading equipment (ie, Caterpillar D-9 dozers, etc.). However, oversize fragments that may be difficult to break down could be generated during the grading operations.

Fill Materials

The site soils and bedrock are suitable to be reused as engineered fill provided these are processed to meet the grading specification requirements. Import materials, if any are needed, must meet the requirements contained in Section 2.02B, Part I of the Guide Contract Specifications. The Geotechnical Engineer should be informed if any importation of soil is contemplated. A sample of the proposed import material should be submitted to the Geotechnical Engineer for evaluation prior to delivery at the site.

Placement of Fill

With the exception of organically-contaminated near-surface material, on-site soils containing less than 3 percent organics are suitable for use as engineered fill. The following compaction control requirements are generally applied to all fills:

Test Procedures:	ASTM D-1557.
Required Moisture Content:	General engineered fill should be moisture conditioned to at least 2 percentage points above optimum moisture content.
Relative Compaction:	General engineered fill should be compacted to a minimum of 90 percent of relative compaction.

All fills should be placed in thin lifts. The lift thickness should not exceed 8 inches or the depth of penetration of the compaction equipment used, whichever is less. In general, all site preparation and grading should be performed in accordance with the Contract Guide Specifications presented in Appendix D. All site preparations for site grading should be done under the observation of the Geotechnical Engineer or his/her qualified field representative.

Graded Slopes

Cut and fill slopes can be constructed up to 30 feet at an inclination of 2:1 (horizontal:vertical) without intermediate benches. Slopes higher than 30 feet should be constructed at an inclination of 3:1 or intermediate benches should be provide in accordance with the requirements of the 1997 Uniform Building Code.

Foundation Design

Provided that the tank area has been prepared as recommended in this report, it is our opinion that the proposed water tank and associated facilities can be constructed on a continuous spread footings bearing on engineered fill. The Structural Engineer should determine all foundation reinforcement based on the anticipated structural loads. The foundation plans should be submitted to the Geotechnical Engineer for review when they become available.

The geotechnical design criteria to be used in footing sizing are as follows:

Minimum depth of footing embedment:	18 inches below lowest adjacent grade.
Minimum width of footing:	18 inches.
Maximum allowable footing pressure:	4,000 pounds per square foot (psf) for dead-plus-live loads. This value may be increased by one-third for total loads.

The foundation excavation should not be allowed to desiccate significantly prior to placement of concrete. The tank subgrade materials should be moisture conditioned by sprinkling prior to the installation of the tank to compensate for any loss of moisture which may occur between the end of the grading and the installation of the tank. Ponding of water below the water tank may result in

weakening of the subgrade materials. To mitigate possible water leakage from the water tank, a subsurface drainage system should be provided. A perimeter subdrain should be provided along the inside edge of the ring footing. This subdrain system should consist of a 4-inch-diameter perforated pipe encapsulated by a clean, free-draining crushed rock or gravel layer at least 12 inches wide surrounded by filter fabric. As an alternative to the gravel drain, a prefabricated subdrain system can be installed.

Lateral loads may be resisted by frictional resistance between the foundation concrete and the subgrade soils and by passive earth pressure acting against the side of the foundation. A coefficient of friction of 0.35 can be used between concrete and the subgrade. In addition, an allowable passive pressure based on an equivalent fluid weight of 350 pounds per cubic foot can be used in design.

Retaining Walls

Drained retaining walls should be designed for active lateral equivalent fluid pressures determined as follows:

Backfill Slope	Unrestrained (pcf)	Restrained (pcf)
Level	35	35+8H
4:1	40	40+8H
3:1	45	45+8H
2:1	55	55+8H

In addition to the active earth pressures, the retaining walls should be designed for the dynamic increment of wall pressure associated with earthquake loading. The following earthquake loadings should be used for design and are assumed to correspond to an inverted triangular distributed pressure, with zero pressure at the base of the wall increasing upwards:

Backfill Slope	Unrestrained (pcf)	Restrained (pcf)
Level	30	90
4:1	45	135
3:1	65	195
2:1	90	270

An inverted triangular distributed pressure would yield a resultant location two-thirds up from the base of the wall. However, since the triangular distribution is only an approximation, standard practice suggests that the resultant of the pressure distribution should be applied at a height of 0.6H above the base of the wall where H is the height of retained soil.

All retaining walls should be provided with drainage facilities to prevent the build-up of hydrostatic pressures behind the walls. Wall drainage should be provided using a 4-inch-diameter perforated pipe (perforations down) embedded in Caltrans Class 2 permeable material, or free-draining gravel surrounded by synthetic filter fabric. The drain rock should extend a minimum of 12 inches behind the wall and to about 12 inches below the finished grades. As an alternative, prefabricated synthetic wall drain panels can be used. The upper 12 inches of wall backfill should consist of on-site clayey soils. Drainage should be collected by perforated pipes and directed to an outlet approved by the Civil Engineer. Synthetic filter fabric should meet the minimum requirements of the Guide Contract Specifications.

All retaining wall backfill should be placed in accordance with recommendations provided above for engineered fill. Light equipment should be used during backfill compaction to minimize possible overstressing of the walls.

As an alternative to pre-cast, cast-in-place, or masonry block retaining walls, cut slopes can be supported by a soil nail wall. Soil nail walls should be designed for global, local and internal stability. The following parameters should be used for design of the soil nail stability:

Soil Material	Unit Weight (pcf)	Friction Angle (degrees)	Cohesion (psf)	Allowable Bond Stress (psi)
Andesite	130	35	0	10

Preliminary Pavement Design

Based on the field explorations and laboratory testing, we estimate that site soils will have a resistance ("R") value of 25. The following preliminary pavement sections have been determined for Traffic Indices of 5, 6 and 7 based on an assumed R-value of 25 according to the method contained in Topic 608 of Highway Design Manual by Caltrans.

Traffic Index	Pavement Section	
	AC in. (mm)	AB in. (mm)
5.0	3.0	6.5
6.0	3.5	8.5
7.0	4.0	11.0

Notes: AC is asphalt concrete
AB is aggregate base Class 2 Material with minimum R = 78

The Traffic Index should be determined by the Civil Engineer or appropriate public agency. These sections are for estimating purposes only. Actual sections to be used should be based on R-value tests performed on samples of actual subgrade materials recovered at the time of grading. Pavement construction and all materials should comply with the requirements of the Standard Specifications of the State of California Division of Highways, County requirements and the following minimum requirements.

- All pavement subgrades should be scarified to a depth of 12 inches (30 centimeters) below finished subgrade elevation, moisture conditioned to 3 percentage points above optimum, and compacted to at least 92 percent relative compaction and in accordance with County requirements.

- Subgrade soils should be in a stable, non-pumping condition at the time aggregate baserock materials are placed and compacted.

- Adequate provisions must be made such that the subgrade soils and aggregate baserock materials are not allowed to become saturated.

- Aggregate baserock materials should meet current Caltrans specifications for Class 2 aggregate baserock and should be compacted to at least 95 percent of maximum dry density at a minimum moisture content of optimum.

- Asphalt paving materials should meet current Caltrans specifications for asphalt concrete.

- All concrete curbs separating pavement and irrigated landscaped areas should extend into the subgrade and below the bottom of adjacent aggregate baserock materials.

Utilities

It is recommended that all utility trench backfill be done under the observation of a Geotechnical Engineer. Pipe zone backfill (i.e., material beneath and immediately surrounding the pipe) may consist of a well-graded import or native material less than ¾ inch (2 centimeters) in maximum dimension. Trench zone backfill (i.e., material placed between the pipe zone backfill and the ground surface) may consist of native soil compacted in accordance with recommendations for engineered fill.

Where import material is used for pipe zone backfill, we recommend that it consist of fine- to medium-grained sand or a well-graded mixture of sand and gravel and that this material not be used within 2 feet of finish grades. In general, uniformly graded gravel should not be used for pipe or trench zone backfill due to the potential for migration of (1) soil into the relatively large void spaces

present in this type of material; and (2) water along trenches backfilled with this type of material. All utility trenches entering buildings and paved areas must be provided with an impervious seal consisting of native materials or concrete where the trenches pass under structure perimeters or curb lines. The impervious plug should extend at least 3 feet (1 meter) to either side of the crossing. This is to prevent surface water percolation into the sands under foundations and pavements where such water would remain trapped in a perched condition, allowing clays to develop their full expansion potential.

Utility trenches should not be located upslope of any foundation area unless the placement, depth, and backfill material to be used are reviewed by the Geotechnical Engineer. Care should be exercised where utility trenches are located beside foundation areas. Utility trenches constructed parallel to foundations should be located entirely above a plane extending down from the lower edge of the footing at an angle of 45 degrees. Utility companies and Landscape Architects should be made aware of this information.

Utility trenches in areas to be paved should be backfilled to the specifications provided in this report for engineered fill. Compaction of trench backfill by jetting shall not be allowed at this site.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

This geotechnical report is issued with the understanding that it is the responsibility of the owner to transmit the information and recommendations of this report to developers, contractors, buyers, architects, engineers, and designers for the project so that the necessary steps can be taken by the contractors and subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this report are solely professional opinions.

The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. There are risks of earth movement and property damages inherent in land development. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our work.

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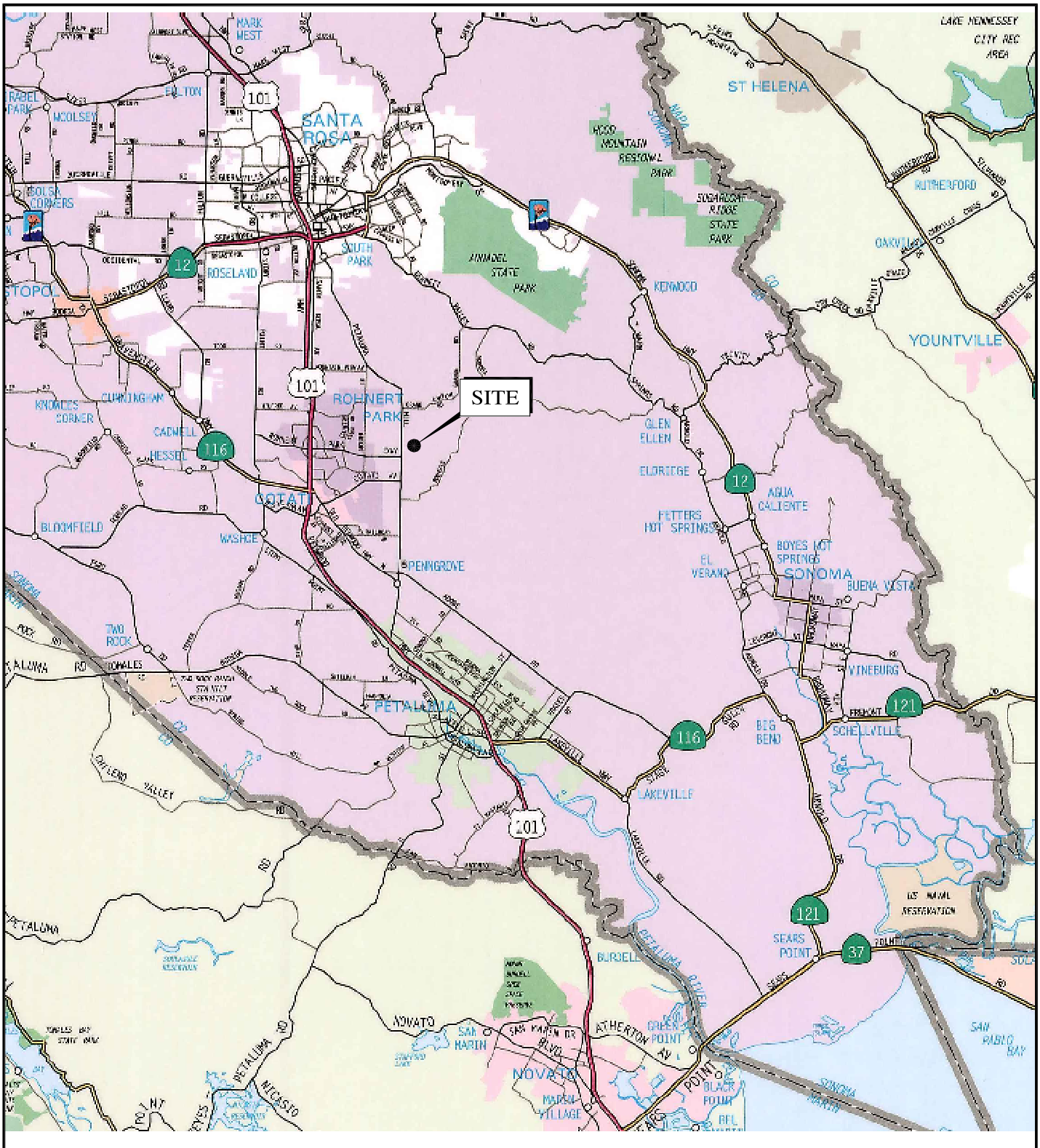
APPENDIX A

Figure 1	Site Vicinity Map
Figure 2	Preliminary Geologic Map
Figure 3	Regional Faulting and Seismicity
Figure 4	Site Map
Figure 5	Site Topographic Map



BASE MAP SOURCE: THOMAS BROTHERS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE VICINITY MAP

ANDERSON 128 PROPERTY

ROHNERT PARK, CALIFORNIA

PROJECT NO.: 5716.1.007.01		FIGURE NO. 1
DATE: APRIL 2005		
DRAWN BY: CLL	CHECKED BY: JT	

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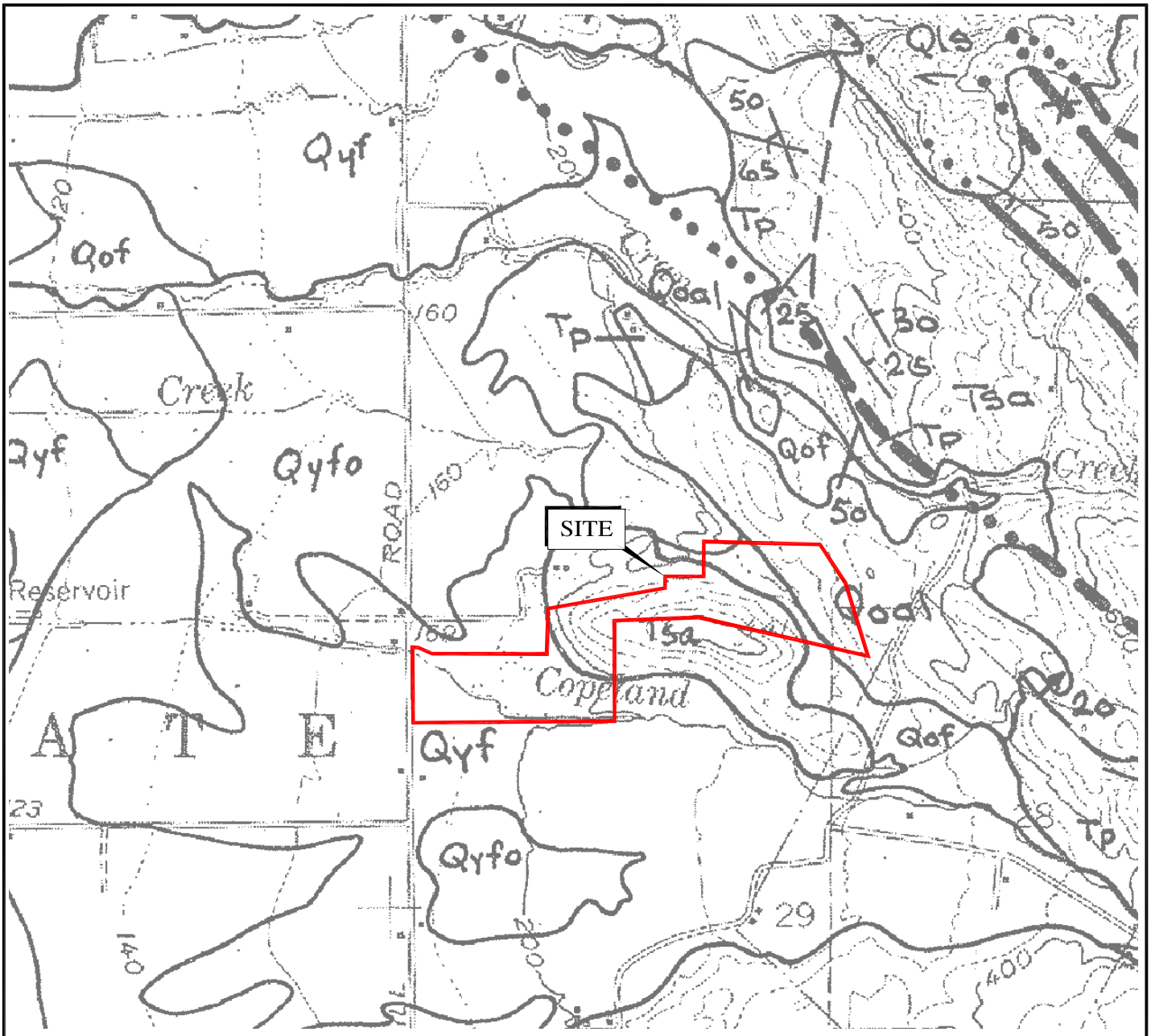

EXPLANATION

- Qoal OLDER ALLUVIUM
- Qyf ALLUVIAL FAN DEPOSITS
- Qyfo FLUVIAL DEPOSITS
- Tp PETALUMA FORMATION
- Tsa ANDESITIC TO BASALITIC LAVA FLOWS

GEOLOGIC CONTACT

FAULT - DASHED WHERE APPROXIMATELY LOCATED, SHORT DASHED WHERE INFERRED, DOTTED WHERE CONCEALED

STRIKE AND DIP OF BEDDING

N

0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: FOX, SIMS, BARTOW & HELLEY, 1973

ENGEO INCORPORATED
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PRELIMINARY GEOLOGIC MAP
ANDERSON 128 PROPERTY
ROHNERT PARK, CALIFORNIA

PROJECT NO.: 5716.1.006.01	FIGURE NO. 2
DATE: APRIL 2004	
DRAWN BY: DLB	CHECKED BY: JT

ORIGINAL FIGURE PRINTED IN COLOR

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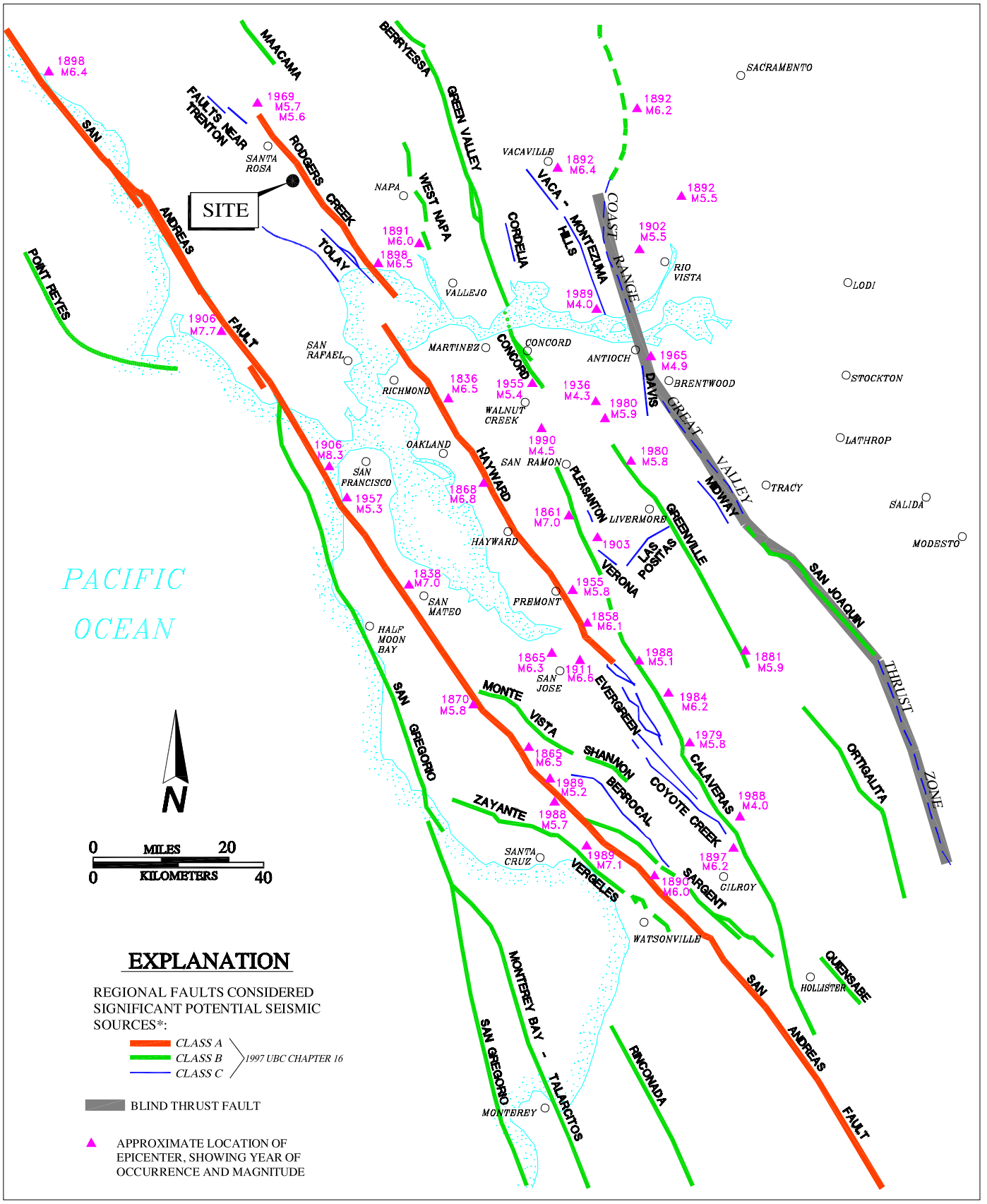

EXPLANATION

REGIONAL FAULTS CONSIDERED SIGNIFICANT POTENTIAL SEISMIC SOURCES*:

- CLASS A
- CLASS B
- CLASS C

1997 UBC CHAPTER 16

BLIND THRUST FAULT

▲ APPROXIMATE LOCATION OF EPICENTER, SHOWING YEAR OF OCCURRENCE AND MAGNITUDE

*BASED ON USGS OPEN FILE 96-706

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGIONAL FAULTING AND SEISMICITY

ANDERSON 128 PROPERTY

ROHNERT PARK, CALIFORNIA

PROJECT NO.: 5716.1.007.01		FIGURE NO. 3
DATE: APRIL 2005		
DRAWN BY: CLL	CHECKED BY: JT	

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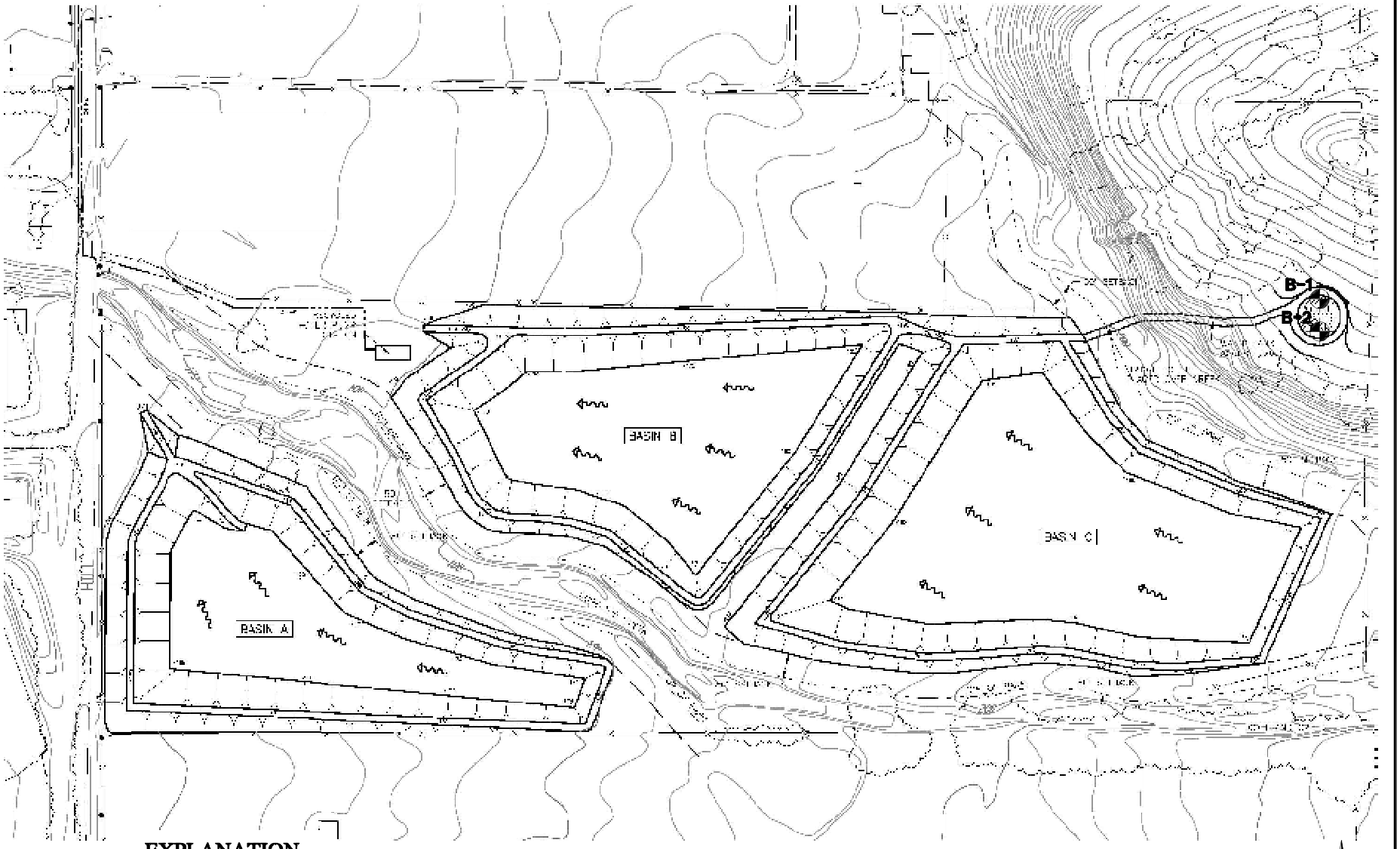

EXPLANATION

B-2 APPROXIMATE LOCATION OF BORING

0 FEET 300
0 METERS 150

N

BASE MAP SOURCE: UNKNOWN

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SITE PLAN
ANDERSON 128 PROPERTY
ROHNERT PARK, CALIFORNIA

PROJECT NO.: 5716.1.007.01		FIGURE NO. 4
DATE: APRIL 2005		
DRAWN BY: CLL	CHECKED BY: JT	

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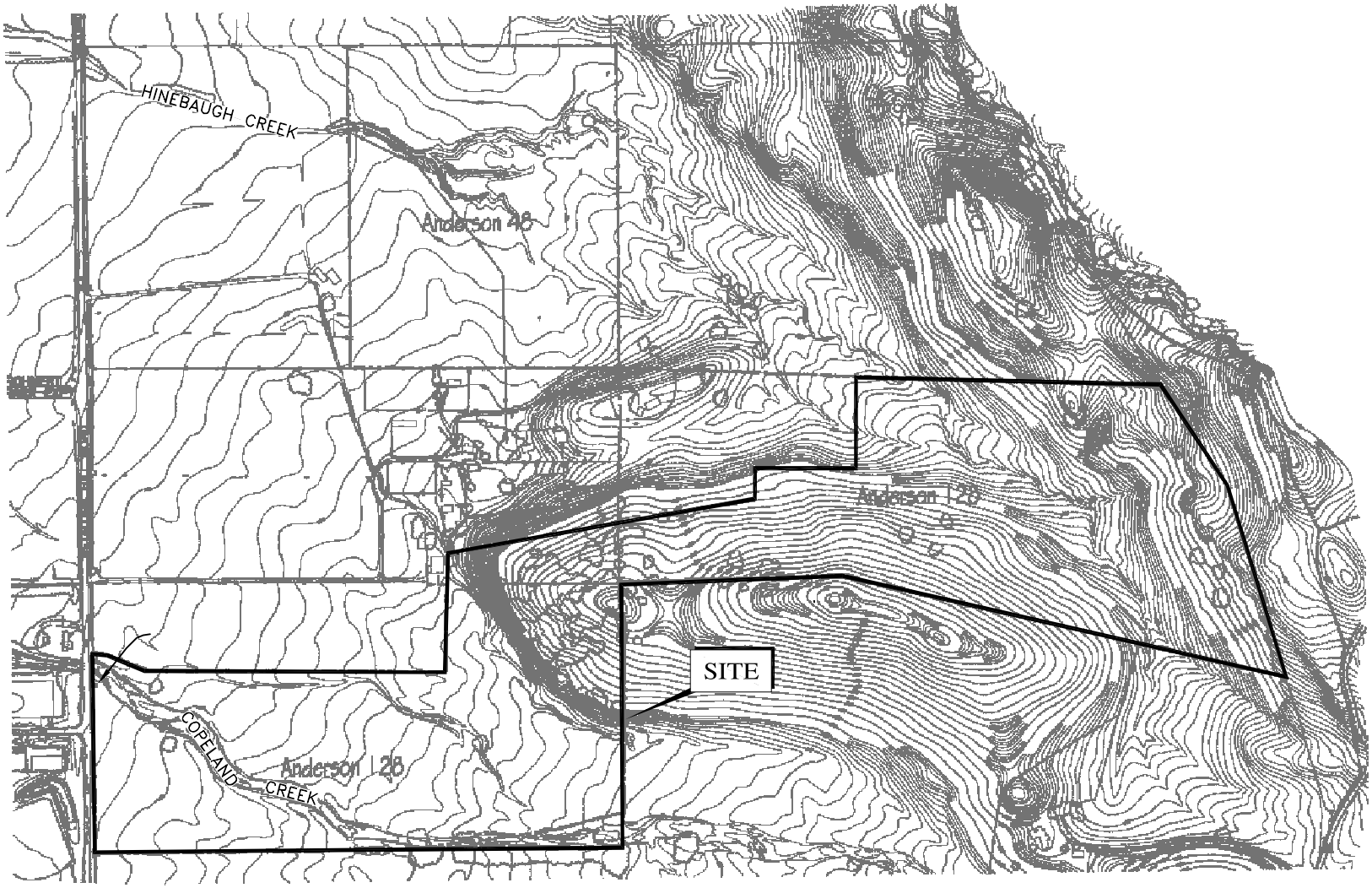

N

BASE MAP SOURCE: UNKNOWN

0 FEET 800
0 METERS 400

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SITE TOPOGRAPHIC MAP
ANDERSON 128 PROPERTY
ROHNERT PARK, CALIFORNIA

PROJECT NO.: 5716.1.007.01	FIGURE NO. 5
DATE: APRIL 2005	
DRAWN BY: CLL	CHECKED BY: JT

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APPENDIX B

Boring Logs

ENGEO INCORPORATED

LOG OF BORING B-1

GEX WATER TANK
ANDERSON 128 PROPERTY
ROHNERT PARK, CALIFORNIA
5716.1.007.01

DATE DRILLED: MARCH 10, 2005 LOGGED / REVIEWED BY: KEITH NOWELL/JTT
HOLE DEPTH (FT): 39.5 ft. DRILLING CONTRACTOR: GREGG
HOLE DIAMETER: 4.0 in. DRILLING METHOD: ROTARY WASH CORE
SURF ELEV (FT-MSL): 275 ft.

Depth in Feet	Depth in Meters	DESCRIPTION	CORELOG	Water Level	RUN NUMBER	CUT	% RECOVERY	RQD %
0	0	NO RECOVERY						
		ANDESITE - dark reddish brown to dark grey, friable to moderately strong, closely fractured, highly weathered. └fracture 45 degrees └fracture 45 degrees └fracture 30 degrees			1	4.5	56	0
5	1	WELDED TUFF - dark brown, weak to friable matrix with inclusions of basaltic and tuffaceous fragments up to 1.5" maximum dimension.						
	2	NO RECOVERY			2	5	28	0
		WELDED TUFF - dark brown, weak to friable matrix with inclusions of basaltic and tuffaceous fragments up to 1.5" maximum dimension.						
10	3	NO RECOVERY						
		SANDY WELDED TUFF - dark brown, weak to friable matrix with inclusions of basaltic and tuffaceous fragments up to 1.5" maximum dimension. └fracture 30 degrees └fracture 45 degrees fracture 45 degrees └weak to friable			3	5	64	0
15	4	NO RECOVERY						
	5	medium-WELDED TUFF - dark brown, weak to friable matrix with inclusions of basaltic and tuffaceous fragments up to 1.5" maximum dimension. └fracture 45 degrees			4	5	78	20
		ANDESITE - dark grey, moderately strong to strong, moderately weathered. └fracture 10 degrees └fracture 35 degrees						
20	6	TUFF - black, lithic fragments, weak to friable, moderately to highly weathered.						
		ANDESITE - dark grey, closely to moderately fractured, moderately strong to strong, moderately weathered. └fracture 45 degrees fracture 45 degrees			5	5	100	44
	7	fracture 45 degrees						
25		NO RECOVERY						
	8	ANDESITE - dark grey, closely to moderately fractured, moderately strong to strong, moderately weathered. └fracture 45 degrees └fractures 30 and 60 degrees └fracture 30 degrees └fracture 45 degrees └fracture 75 degrees			6	5	96	54
30	9	└fracture 45 degrees			7	5	96	36

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ENGEO INCORPORATED

LOG OF BORING B-1

Depth in Feet	Depth in Meters	DESCRIPTION	CORELOG	Water Level	RUN NUMBER	CUT	% RECOVERY	RQD %
30	9	ANDESITE - dark grey, closely to moderately fractured, moderately strong to strong, moderately weathered. - fracture 20 degrees - fracture 20 degrees - fracture 20 degrees - fracture 45 degrees - fracture 10 degrees fracture 45 degrees - closely to widely fractured			7	5	96	36
35	11	ANDESITE - reddish brown to dark grey, closely to moderately fractured, very strong, slightly weathered.			8	5	98	36
		TUFF BRECCIA - light brown to gray, friable, crushed to closely fractured, moderately weathered.						
	12	ANDESITE - reddish brown to dark grey, closely to moderately fractured, very strong, slightly weathered.						
40		Bottom of Boring at approximately 39.5 feet. No groundwater encountered.						
45	13							
	14							
	15							
50								
	16							
55								
	17							
	18							
60								
	19							

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ENGEO INCORPORATED

LOG OF BORING B-2

GEX WATER TANK
ANDERSON 128 PROPERTY
ROHNERT PARK, CALIFORNIA
5716.1.007.01

DATE DRILLED: MARCH 11, 2005
HOLE DEPTH (FT): 39.5 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 260 ft.

LOGGED / REVIEWED BY: KEITH NOWELL/JTT
DRILLING CONTRACTOR: GREGG
DRILLING METHOD: ROTARY WASH CORE

Depth in Feet	Depth in Meters	DESCRIPTION	CORELOG	Water Level	RUN NUMBER	CUT	% RECOVERY	RQD %
0	0	NO RECOVERY						
		ANDESITE - black to reddish brown, weak to moderately strong, crushed to closely fractured, moderate to highly weathered.			1	4.5	62	8
	1							
5		NO RECOVERY						
		TUFF - dark grey, friable, very closely fractured, moderate to highly weathered.						
	2	ANDESITE - reddish brown to dark grey, strong, moderately to closely fractured, moderately weathered. -fracture 45 degrees -fracture 30 degrees -fracture 60 degrees -fractures 45 degrees			2	5	82	14
10	3	NO RECOVERY						
		SILTY ANDESITE - reddish brown to dark grey, strong, moderately to closely fractured, moderately weathered. -fractures 45 degrees -fracture 70 degrees			3	5	98	12
	4	SILT ANDESITE - black with thin pale brown tuffaceous layers, friable.						
15		NO RECOVERY						
	5	TUFF - pale brown to light red, weak (plastic), highly weathered.			4	4.8	60	0
		ANDESITE - dark grey, strong, closely fractured, moderately weathered.						
		LAPILLI TUFF - friable, crushed to closely fractured, highly to moderately weathered.						
20	6	ANDESITE -grey to dark grey, strong, crushed to closely fractured, moderately weathered.			5	3	97	0
	7	TUFF - pale brown to reddish brown, crushed to closely fractured, moderately to highly weathered.			6	2.2	100	0
		ANDESITE - reddish brown, strong, closely fractured.						
25		NO RECOVERY						
	8	LAPILLI TUFF - gray, reddish gray, pale brown, friable, crushed to closely fractured, highly to moderately weathered.			7	5	94	0
	9							
30		NO RECOVERY			8	5	46	0

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ENGEO INCORPORATED

LOG OF BORING B-2

Depth in Feet	Depth in Meters	DESCRIPTION	CORELOG	Water Level	RUN NUMBER	CUT	% RECOVERY	RQD %
30								
	10	RHYOLITE - pale brown and dark grey, friable to moderately strong, crushed to closely fractured, moderately to highly weathered.			8	5	46	0
35		NO RECOVERY						
	11				9	5	38	0
		RHYOLITE - pale brown and dark grey, friable to moderately strong, crushed to closely fractured, moderately to highly weathered.						
	12	TUFF - grey to white, friable, crushed to closely fractured, lithic fragments, highly weathered.						
40		Bottom of Boring at approximately 39.5 feet. No groundwater encountered.						
	13							
45								
	14							
	15							
50								
	16							
55								
	17							
	18							
60								
	19							

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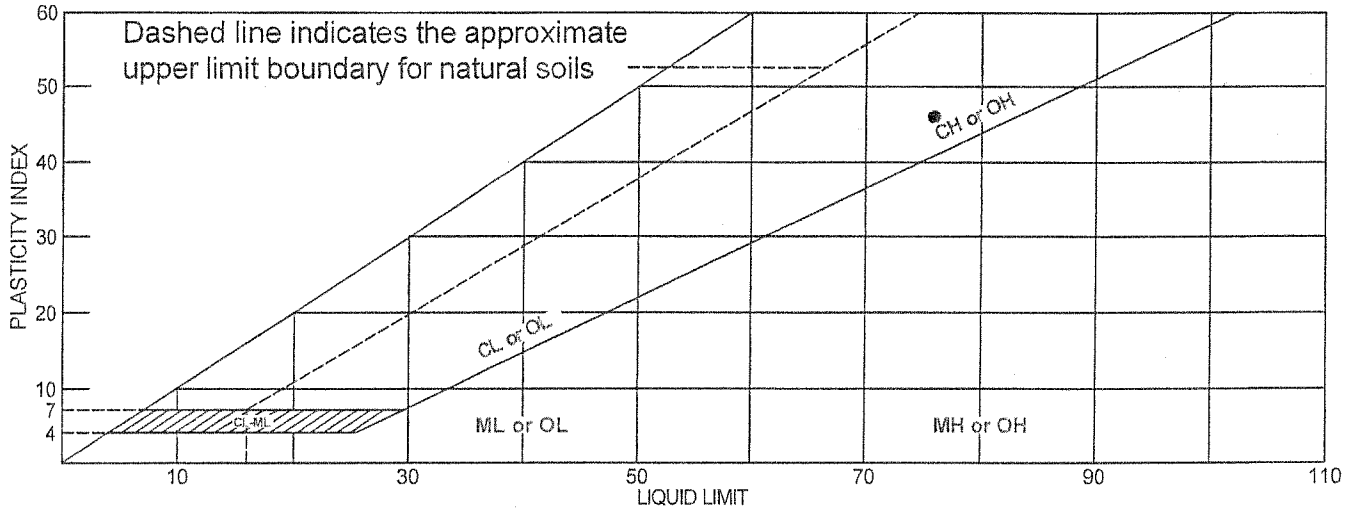
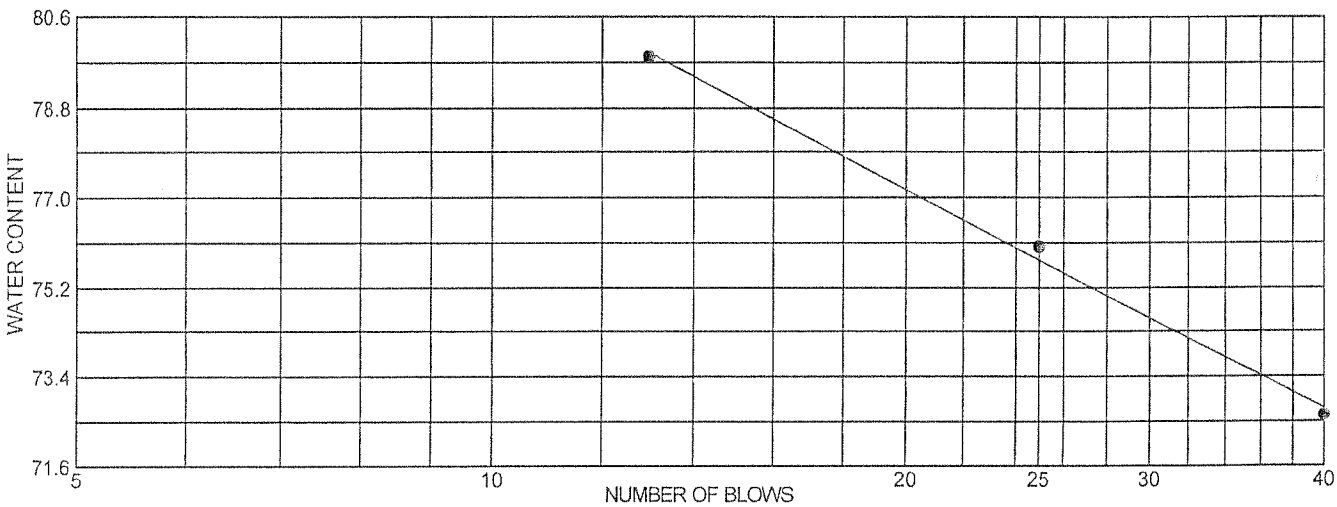
APPENDIX C

Laboratory Test Results

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Reddish brown sandy tuffaceous Clay	76	30	46			CH

Project No. 5716.1.007.01 **Client:**

Project: Rohnert Park

● **Source:** PI/GRN-SIZE **Sample No.:** B-2

Remarks:

● (B-2 @ 17.0 - 17.25 ft.)

ENGEO INCORPORATED

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Plate

APPENDIX D

Contract Guide Specifications

GUIDE CONTRACT SPECIFICATIONS

PART I - EARTHWORK

PREFACE

These specifications are intended as a guide for the earthwork performed at the subject development project. If there is a conflict between these specifications (including the recommendations of the geotechnical report) and agency or code requirements, it should be brought to the attention of ENGEO and Owner prior to contract bidding.

PART 1 - GENERAL

1.01 WORK COVERED

A. Grading, excavating, filling and backfilling, including trenching and backfilling for utilities as necessary to complete the Project as indicated on the Drawings.

B. Subsurface drainage as indicated on the Drawings.

1.02 CODES AND STANDARDS

A. Excavating, trenching, filling, backfilling, and grading work shall meet the applicable requirements of the Uniform Building Code and the standards and ordinances of state and local governing authorities.

1.03 SUBSURFACE SOIL CONDITIONS

A. The Owners' Geotechnical Exploration report is available for inspection by bidder or Contractor. The Contractor shall refer to the findings and recommendations of the Geotechnical Exploration report in planning and executing his work.

1.04 DEFINITIONS

A. Fill: All soil, rock, or soil-rock materials placed to raise the grades of the site or to backfill excavations.

B. Backfill: All soil, rock or soil-rock material used to fill excavations and trenches.

C. On-Site Material: Soil and/or rock material which is obtained from the site.

D. Imported Material: Soil and/or rock material which is brought to the site from off-site areas.

E. Select Material: On-site and/or imported material which is approved by ENGEO as a specific-purpose fill.

F. Engineered Fill: Fill upon which ENGEO has made sufficient observations and tests to confirm that the fill has been placed and compacted in accordance with specifications and requirements.

G. Degree of Compaction or Relative Compaction: The ratio, expressed as a percentage, of the in-place dry density of the fill and backfill material as compacted in the field to the maximum dry density of the same material as determined by ASTM D-1557 or California 216 compaction test method.

H. Optimum Moisture: Water content, percentage by dry weight, corresponding to the maximum dry density as determined by ASTM D-1557.

I. ENGEO: The project geotechnical engineering consulting firm, its employees or its designated representatives.

J. Drawings: All documents, approved for construction, which describe the Work.

1.05 OBSERVATION AND TESTING

A. All site preparation, cutting and shaping, excavating, filling, and backfilling shall be carried out under the observation of ENGEO, employed and paid for by the Owners. ENGEO will perform appropriate field and laboratory tests to evaluate the suitability of fill material, the proper moisture content for compaction, and the degree of compaction achieved. Any fill that does not meet the specification requirements shall be removed and/or reworked until the requirements are satisfied.

B. Cutting and shaping, excavating, conditioning, filling, and compacting procedures require approval of ENGEO as they are performed. Any work found unsatisfactory or any work disturbed by subsequent operations before approval is granted shall be corrected in an approved manner as recommended by ENGEO.

C. Tests for compaction will be made in accordance with test procedures outlined in ASTM D-1557, as applicable. Field testing of soils or compacted fill shall conform to the applicable requirements of ASTM D-2922.

D. All authorized observation and testing will be paid for by the Owners.

1.06 SITE CONDITIONS

A. Excavating, filling, backfilling, and grading work shall not be performed during unfavorable weather conditions. When the work is interrupted by rain, excavating, filling, backfilling, and grading work shall not be resumed until the site and soil conditions are suitable.

B. Contractor shall take the necessary measures to prevent erosion of freshly filled, backfilled, and graded areas until such time as permanent drainage and erosion control measures have been installed.

PART 2 - PRODUCTS

2.01 GENERAL

A. Contractor shall furnish all materials, tools, equipment, facilities, and services as required for performing the required excavating, filling, backfilling, and grading work, and trenching and backfilling for utilities.

2.02 SOIL MATERIALS

A. Fill

1. Material to be used for engineered fill and backfill shall be free from organic matter and other deleterious substances, and of such quality that it will compact thoroughly without excessive voids when watered and rolled. Excavated on-site material will be considered suitable for engineered fill and backfill if it contains no more than 3 percent organic matter, is free of debris and other deleterious substances and conforms to the requirements specified above. Rocks of maximum dimension in excess of two-thirds of the lift thickness shall be removed from any fill material to the satisfaction of ENGEO.

2. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled as required for later filling and backfilling operations. Conditioning shall consist of

spreading material in layers not to exceed 8 inches and raking free of debris and rubble. Rocks and aggregate exceeding the allowed largest dimension, and deleterious material shall be removed from the site and disposed off site in a legal manner.

3. ENGEO shall be notified at least 48 hours prior to the start of filling and backfilling operations so that it may evaluate samples of the material intended for use as fill and backfill. All materials to be used for filling and backfilling require the approval of ENGEO.

B. Import Material: Where conditions require the importation of fill material, the material shall be an inert, nonexpansive soil or soil-rock material free of organic matter and meeting the following requirements unless otherwise approved by ENGEO.

Gradation (ASTM D-421):	Sieve Size	Percent Passing
	2-inch	100
	#200	15 - 70
Plasticity (ASTM D-4318):	Liquid Limit	Plasticity Index
	< 30	< 12
Swell Potential (ASTM D-4546B): (at optimum moisture)	Percent Heave	Swell Pressure
	< 2 percent	< 300 psf
Resistance Value (ASTM D-2844):	Minimum 25	
Organic Content (ASTM D-2974):	Less than 2 percent	

A sample of the proposed import material should be submitted to ENGEO for evaluation prior to delivery at the site.

2.03 SAND

A. Sand for sand cushion under slabs and for bedding of pipe in utility trenches shall be a clean and graded, washed sand, all passing a No. 4 U. S. Standard Sieve, and generally conforming to ASTM C33 for fine aggregate.

2.04 AGGREGATE DRAINAGE FILL

A. Aggregate drainage fill under concrete slabs and paving shall consist of broken stone, crushed or uncrushed gravel, clean quarry waste, or a combination thereof. The aggregate shall be free from fines, vegetable matter, loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption of water in a saturated surface dry condition does not exceed 3 percent of the oven dry weight of the samples.

B. Aggregate drainage fill shall be of such size that the percentage composition by dry weight as determined by laboratory sieves (U. S. Series) will conform to the following grading:

Sieve Size	Percentage Passing Sieve
1½-inches	100
1-inch	90 - 100
#4	0 - 5

2.05 SUBDRAINS

A. Perforated subdrain pipe of the required diameter shall be installed as shown on the drawings. The pipe(s) shall also conform to these specifications unless otherwise specified by ENGEO in the field.

Subdrain pipe shall be manufactured in accordance with one of the following requirements:

Design depths less than 30 feet

- Perforated ABS Solid Wall SDR 35 (ASTM D-2751)
- Perforated PVC Solid Wall SDR 35 (ASTM D-3034)
- Perforated PVC A-2000 (ASTM F949)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 50 psi minimum stiffness)

Design depths less than 50 feet

- Perforated PVC SDR 23.5 Solid Wall (ASTM D-3034)
- Perforated Sch. 40 PVC Solid Wall (ASTM-1785)
- Perforated ABS SDR 23.5 Solid Wall (ASTM D-2751)
- Perforated ABS DWV/Sch. 40 (ASTM D-2661 and D-1527)

- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 70 psi minimum stiffness)

Design depths less than 70 feet

- Perforated ABS Solid Wall SDR 15.3 (ASTM D-2751)
- Perforated Sch. 80 PVC (ASTM D-1785)
- Perforated Corrugated Aluminum (ASTM B-745)

B. Permeable Material (Class 2): Class 2 permeable material for filling trenches under, around, and over subdrains, behind building and retaining walls, and for pervious blankets shall consist of clean, coarse sand and gravel or crushed stone, conforming to the following grading requirements:

Sieve Size	Percentage Passing Sieve
1-inch	100
¾-inch	90 - 100
3/8-inch	40 - 100
#4	25 - 40
#8	18 - 33
#30	5 - 15
#50	0 - 7
#200	0 - 3

C. Filter Fabric: All filter fabric shall meet the following Minimum Average Roll Values unless otherwise specified by ENGEO.

Grab Strength (ASTM D-4632).....180 lbs
Mass per Unit Area (ASTM D-4751).....6 oz/yd^2
Apparent Opening Size (ASTM D-4751).....70-100 U.S. Std. Sieve
Flow Rate (ASTM D-4491).....80 gal/min/ft^2
Puncture Strength (ASTM D-4833).....80 lbs

D. Vapor Barrier: Vapor barriers shall consist of PVC, LDPE or HDPE impermeable sheeting at least 10 mils thick.

2.06 PERMEABLE MATERIAL (Class 1; Type A)

A. Class 1 permeable material to be used in conjunction with filter fabric for backfilling of subdrain excavations shall conform to the following grading requirements:

Sieve Size	Percentage Passing Sieve
¾-inch	100
½-inch	95 - 100
3/8-inch	70 - 100
#4	0 - 55
#8	0 - 10
#200	0 - 3

PART 3 - EXECUTION

3.01 STAKING AND GRADES

A. Contractor shall lay out all his work, establish all necessary markers, bench marks, grading stakes, and other stakes as required to achieve design grades.

3.02 EXISTING UTILITIES

A. Contractor shall verify the location and depth (elevation) of all existing utilities and services before performing any excavation work.

3.03 EXCAVATION

A. Contractor shall perform excavating as indicated and required for concrete footings, drilled piers, foundations, floor slabs, concrete walks, and site leveling and grading, and provide shoring, bracing, underpinning, cribbing, pumping, and planking as required. The bottoms of excavations shall be firm undisturbed earth, clean and free from loose material, debris, and foreign matter.

B. Excavations shall be kept free from water at all times. Adequate dewatering equipment shall be maintained at the site to handle emergency situations until concrete or backfill is placed.

C. Unauthorized excavations for footings shall be filled with concrete to required elevations, unless other methods of filling are authorized by ENGEO.

D. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled for later filling and backfilling operations as specified under Section 2.02, "Soil Materials."

E. Abandoned sewers, piping, and other utilities encountered during excavating shall be removed and the resulting excavations shall be backfilled with engineered fill as required by ENGEO.

F. Any active utility lines encountered shall be reported immediately to the Owner's Representative and authorities involved. The Owner and proper authorities shall be permitted free access to take the measures deemed necessary to repair, relocate, or remove the obstruction as determined by the responsible authority or Owner's Representative.

3.04 SUBGRADE PREPARATION

A. All brush and other rubbish, as well as trees and root systems not marked for saving, shall be removed from the site and legally disposed of.

B. Any existing structures, foundations, underground storage tanks, or debris must be removed from the site prior to any building, grading, or fill operations. Septic tanks, including all drain fields and other lines, if encountered, must be totally removed. The resulting depressions shall be properly prepared and filled to the satisfaction of ENGEO.

C. Vegetation and organic topsoil shall be removed from the surface upon which the fill is to be placed and either removed and legally disposed of or stockpiled for later use in approved landscape areas. The surface shall then be scarified to a depth of at least eight inches until the surface is free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment to be used.

D. After the foundation for the fill has been cleared and scarified, it shall be made uniform and free from large clods. The proper moisture content must be obtained by adding water or aerating. The foundation for the fill shall be compacted at the proper moisture content to a relative compaction as specified herein.

3.05 ENGINEERED FILL

A. Select Material: Fill material shall be "Select" or "Imported Material" as previously specified.

B. Placing and Compacting: Engineered fill shall be constructed by approved and accepted methods. Fill material shall be spread in uniform lifts not exceeding 8 inches in uncompacted thickness. Each layer shall be spread evenly, and thoroughly blade-mixed to obtain uniformity of material. Fill material which does not contain

sufficient moisture as specified by ENGEO shall be sprinkled with water; if it contains excess moisture it shall be aerated or blended with drier material to achieve the proper water content. Select material and water shall then be thoroughly mixed before being compacted.

C. Unless otherwise specified in the Geotechnical Exploration report, each layer of spread select material shall be compacted to at least 90 percent relative compaction at a moisture content of at least three percent above the optimum moisture content. Minimum compaction in all keyways shall be a minimum of 95 percent with a minimum moisture content of at least 1 percent above optimum.

D. Unless otherwise specified in the Geotechnical Exploration report or otherwise required by the local authorities the upper 6 inches of engineered fill in areas to receive pavement shall be compacted to at least 95 percent relative compaction.

E. Testing and Observation of Fill: The work shall consist of field observation and testing to determine that each layer has been compacted to the required density and that the required moisture is being obtained. Any layer or portion of a layer that does not attain the compaction required shall be reworked until the required density is obtained.

F. Compaction: Compaction shall be by sheepsfoot rollers, multiple-wheel steel or pneumatic-tired rollers or other types of acceptable compaction equipment. Rollers shall be of such design that they will be able to compact the fill to the specified compaction. Rolling shall be accomplished while the fill material is within the specified moisture content range. Rolling of each layer must be continuous so that the required compaction may be obtained uniformly throughout each layer.

G. Fill slopes shall be constructed by overfilling the design slopes and later cutting back the slopes to the design grades. No loose soil will be permitted on the faces of the finished slopes.

H. Strippings and topsoil shall be stockpiled as approved by Owner, then placed in accordance with ENGEO's recommendations to a minimum thickness of 6 inches and a maximum thickness of 12 inches over exposed open space cut slopes which are 3:1 or flatter, and track walked to the satisfaction of ENGEO.

I. Final Prepared Subgrade: Finish blading and smoothing shall be performed as necessary to produce the required density, with a uniform surface, smooth and true to grade.

3.06 BACKFILLING

A. Backfill shall not be placed against footings, building walls, or other structures until approved by ENGEO.

B. Backfill material shall be Select Material as specified for engineered fill.

C. Backfill shall be placed in 6-inch layers, leveled, rammed, and tamped in place. Each layer shall be compacted with suitable compaction equipment to 90 percent relative compaction at a moisture content of at least 3 percent above optimum.

3.07 TRENCHING AND BACKFILLING FOR UTILITIES

A. Trenching:

1. Trenching shall include the removal of material and obstructions, the installation and removal of sheeting and bracing and the control of water as necessary to provide the required utilities and services.

2. Trenches shall be excavated to the lines, grades, and dimensions indicated on the Drawings. Maximum allowable trench width shall be the outside diameter of the pipe plus 24 inches, inclusive of any trench bracing.

3. When the trench bottom is a soft or unstable material as determined by ENGEO, it shall be made firm and solid by removing said unstable material to a sufficient depth and replacing it with on-site material compacted to 90 percent minimum relative compaction.

4. Where water is encountered in the trench, the contractor must provide materials necessary to drain the water and stabilize the bed.

B. Backfilling:

1. Trenches must be backfilled within 2 days of excavation to minimize desiccation.

2. Bedding material shall be sand and shall not extend more than 6 inches above any utility lines.

3. Backfill material shall be select material.

4. Trenches shall be backfilled as indicated or required and compacted with suitable equipment to 90 percent minimum relative compaction at the required moisture content.

3.08 SUBDRAINS

A. Trenches for subdrain pipe shall be excavated to a minimum width equal to the outside diameter of the pipe plus at least 12 inches and to a depth of approximately 2 inches below the grade established for the invert of the pipe, or as indicated on the Drawings.

B. The space below the pipe invert shall be filled with a layer of Class 2 permeable material, upon which the pipe shall be laid with perforations down. Sections shall be joined as recommended by the pipe manufacturer.

C. Rocks, bricks, broken concrete, or other hard material shall not be used to give intermediate support to pipes. Large stones or other hard objects shall not be left in contact with the pipes.

D. Excavations for subdrains shall be filled as required to fill voids and prevent settlement without damaging the subdrain pipe. Alternatively, excavations for subdrains may be filled with Class 1 permeable material (as defined in Section 2.06) wrapped in Filter Fabric (as defined in Section 2.05).

3.09 AGGREGATE DRAINAGE FILL

A. ENGEO shall approve finished subgrades before aggregate drainage fill is installed.

B. Pipes, drains, conduits, and any other mechanical or electrical installations shall be in place before any aggregate drainage fill is placed. Backfill at walls to elevation of drainage fill shall be in place and compacted.

C. Aggregate drainage fill under slabs and concrete paving shall be the minimum uniform thickness after compaction of dimensions indicated on Drawings. Where not indicated, minimum thickness after compaction shall be 4 inches.

D. Aggregate drainage fill shall be rolled to form a well-compacted bed.

E. The finished aggregate drainage fill must be observed and approved by ENGEO before proceeding with any subsequent construction over the compacted base or fill.

3.10 SAND CUSHION

A. A sand cushion shall be placed over the vapor barrier membrane under concrete slabs on grade. Sand cushion shall be placed in uniform thickness as indicated on the Drawings. Where not indicated, the thickness shall be 2 inches.

3.11 FINISH GRADING

A. All areas must be finish graded to elevations and grades indicated on the Drawings. In areas to receive topsoil and landscape planting, finish grading shall be performed to a uniform 6 inches below the grades and elevations indicated on the Drawings, and brought to final grade with topsoil.

3.12 DISPOSAL OF WASTE MATERIALS

A. Excess earth materials and debris shall be removed from the site and disposed of in a legal manner. Location of dump site and length of haul are th