TERRESTRIAL SOLUTIONS INC. GEOTECHNICAL SERVICES

DRAFT EIR-LEVEL GEOTECHNICAL ASSESSMENT

Tentative Tract Maps 17269 and 17270

"The Preserve at San Juan"

Counties of Orange and Riverside, California

For:
The Preserve at San Juan, LLC
2697 N. Vista Glen Road
Orange, CA 92867

Project No. 14-054

July 9, 2013
Revised October 30, 2014

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Irvine CA 92620
949-201-3388

TERRESTRIAL SOLUTIONS INC. GEOTECHNICAL SERVICES

To: The Preserve at San Juan, LLC
c/o J.P, Weber Group
2697 N. Vista Glen Road
Orange, CA 92867

July 9, 2013
Revised: October 30, 2014
Project No. 14-054

Attention: Mr. Jeff Weber

Subject: **DRAFT EIR-LEVEL GEOTECHNICAL ASSESSMENT**
Tentative Tract Maps 17269 and 17270
"The Preserve at San Juan"
Counties of Orange and Riverside, California

References: See Appendix A

Gentlemen and Ladies:

In accordance with your request, Terrestrial Solutions Inc. (TSI) is pleased to submit this geotechnical assessment in support of EIR submittals for "The Preserve" project located north-northwest of State Highway 74, in the County of Orange and Riverside, California. The Preserve project currently includes Tentative Tract Maps 17269 (Neilson/North Property) and 17270 (Sanchez/South Property) that were prepared by Hunsaker and Associated dated July 11, 2014. TSI has prepared this report based primarily on a previous and similar document that was prepared by Pacific Soils Engineering, Inc. (PSE) in 2008 (see references). For the referenced 2008 report PSE completed an initial geotechnical subsurface investigation that included air track drilling, excavation, logging, and sampling of backhoe trenches and having Subsurface Surveys (2005) conduct a seismic refraction survey. Additionally, PSE reviewed the technical documents listed in Appendix A as well as stereo-pair vintage aerial photographs that were archived in PSE files. TSI has also reviewed the documents referenced by PSE and included them as references as part of this assessment.

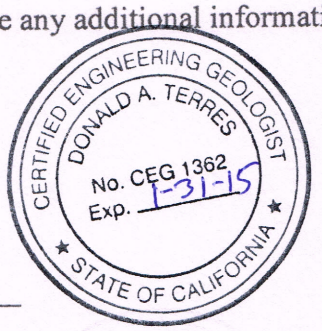
In this document TSI summarizes the investigative methodology and the geographic, geomorphic, geologic setting; and further provides engineering properties of the earth materials of The Preserve project and its environs. We then assessed geological and geotechnical

engineering issues applicable to EIR processing and offer potential mitigations, if required. Included in the text of this report are a Site Location Map (Figure 1), Regional Geomorphic and Fault Map (Figure 2), Regional Geologic Map (Figure 3), and a Simplified Fault Map of California (Figure 4). Appendices include Cited References (Appendix A), Subsurface Investigation (Appendix B), Laboratory Test Results (Appendix C), and the Seismic Refraction Survey by Subsurface Surveys and Associates, Inc. (Appendix D). 100-scale Geologic Maps are included as a pocket enclosure for both Tentative Tract Maps (Plate 1- TTM 17270 and Plates 2A and 2B - TTM 17269). This report has been updated based on revised grading plans and in response to review comments provided by the County of Orange planning and geotechnical departments.

The project is considered feasible from a geologic and geotechnical perspective. The significant geotechnical issues that could impact the development as conceived are discussed in Section 4.0 of this document and include: faulting and seismic hazards; rock excavation characteristics; sanitary septic system design; erosion/mass wasting; slope stability; and compressible/collapsible soils. All of these issues can be mitigated and alternatives for mitigation are presented in this report.

TSI appreciates the opportunity to provide you with geotechnical consulting services. If you have any questions or should you require any additional information, please contact the undersigned at 949-201-3388.

Respectfully submitted,
Terrestrial Solutions Inc.



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1.0 INTRODUCTION

1.1 Background and Purpose

This report presents the results of Terrestrial Solutions Inc. (TSI's) geotechnical assessment in support of EIR processing for The Preserve development.

1.2 Scope of Work

The scope of work conducted for preparation of this document consisted of the following tasks completed by TSI and/or Pacific Soils Engineering, Inc. (PSE):

- A review of the cited geologic literature, maps, and aerial photographs;
- Site geologic mapping by PSE and TSI;
- Advancement of thirty five (35) air-track drill holes (PSE);
- Excavation, logging, and sampling of forty-eight (48) backhoe test pits (PSE);
- Conducting 14 seismic refraction surveys (PSE);
- Perform a percolation investigation, which included the excavation of 42 test pits (TSI); 17 of these were percolation tested. 34 additional excavations for percolation testing were also conducted (TSI).
- Laboratory testing of collected soil samples (PSE);
- A limited seismic evaluation;
- Evaluation of the general remedial grading requirements;
- Evaluation of shallow groundwater conditions and the potential effects on the proposed construction;
- Consolidation of the geologic and geotechnical data and preparation of a geologic base map;
- Preparation of this report with exhibits that summarizes our findings and supports your EIR submittals.

1.3 Site Location and Existing Conditions

The site is located in the southeasterly portion of Orange County, California just west of State Highway 74 (Ortega Highway). It is bisected by Long Canyon Road and is located just west of Cariso Village and east of a United States Forest Service (USFS) fire-fighting housing complex (Figure 1). The Mystic Oak Spa area is located directly to the west of the northern portion of the site. Two general Phases of development are currently being considered as part of this project. Tentative Tract Map 17270, also referred to as the South Parcel (Sanchez

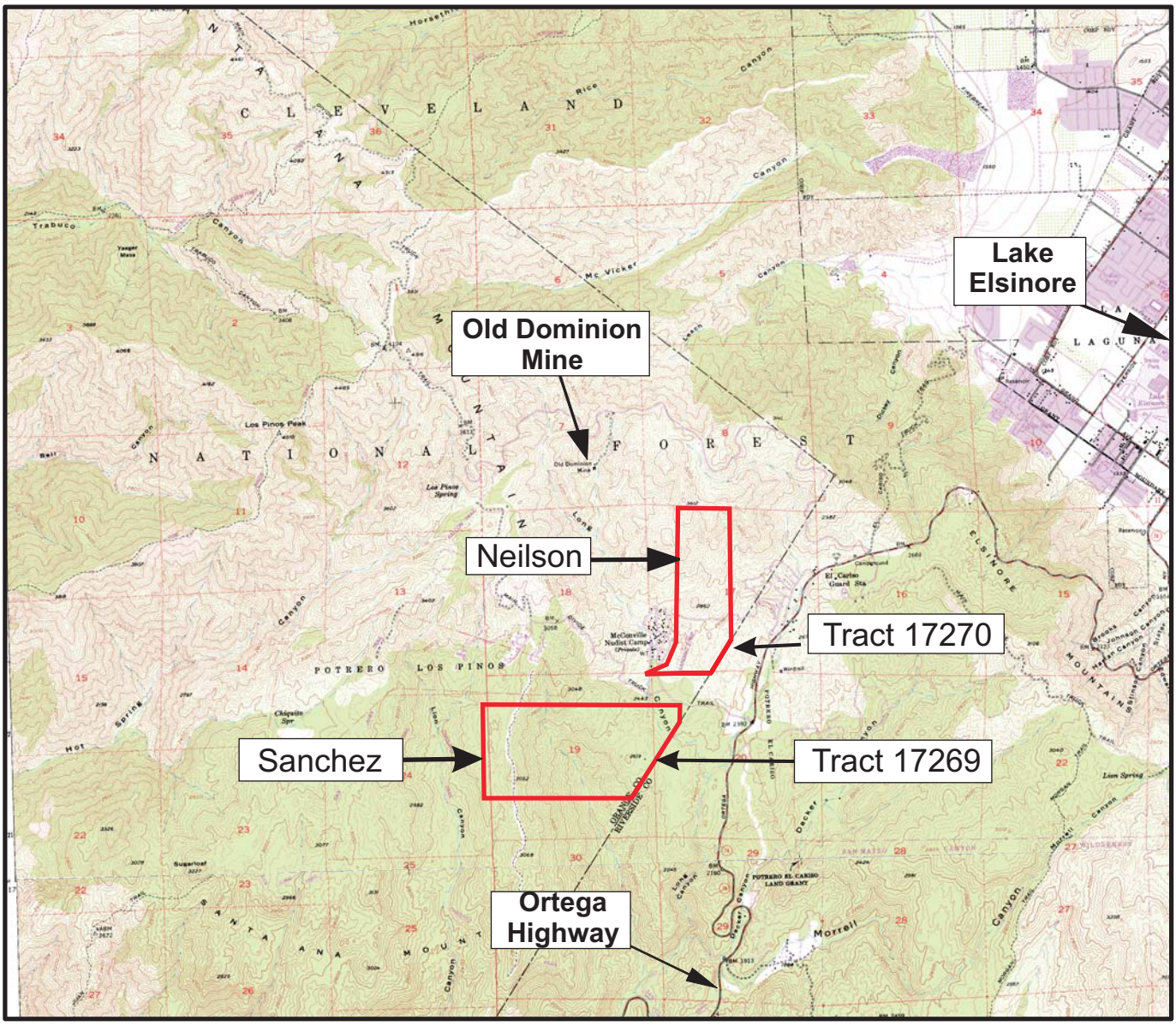
Property), is referred to as Phase 1. It is located south of Long Canyon Road, and is approximately 116.9 acres in size. Tentative Tract Map 17269, also referred to as the North Parcel (Neilson Property) is referred to as Phase 2, encompasses approximately 57.8 acres, and is located to the north of Long Canyon Road. Access to the two parcels requires crossing separate pieces of land (through easements with the USFS and others) that encompass approximately 33.3 acres.

The subject properties consist of varied terrain. The very northern area has a steep high ridgeline and the southernmost area is a deep canyon. The bulk of the proposed developable area is gently rolling hills and small irregular valleys on a large plateau. Elevations range from approximately 3,300 feet above mean sea level (MSL) in the northeast portion of the property to approximately 2,025 MSL in the southern major canyon bottom. Most of the proposed development area is between the elevations of 2,400 and 2,900 feet above MSL. Drainage is by sheet flow to the smaller draws and canyons that flow into Long Canyon.

The property is for the most part undeveloped with the exception of Long Canyon Road and the numerous dirt roads and trails which are present throughout the site. Within TTM 17269 (North Parcel/ Neilson Property) is a dirt runway that until recently was actively used for landings and take offs by private aircraft. This area also has a few scattered buildings and associated local utilities. The majority of the properties are covered with low to moderate brush, consisting of chaparral and coastal sage scrub. Stands of coast live oak trees, and other trees exist in the larger canyon areas.

1.4 Proposed Development

The proposed development as reflected on TTM 17270 (Plate 1) and 17269 (Plates 2A and 2B) is a master planned community that is separated by Long Canyon Road. In Phase 1 (Tract 17270) there are a total of 45 numbered lots. Lot 44 is for a guard shack at the entrance to the site and Lot No. 45 is for the proposed reservoir site. Lots A through Q are the interior street and open spaces. For Phase 2 (Tract 17269) there are 30 numbered lots. Lot 30 is for a proposed reservoir site. Lots A through L are for interior streets and drives and open



SITE LOCATION MAP
THE PRESERVE AT SAN JUAN

N
W
E
S

FIGURE 1

SOURCE MAP - USGS ALBERHILL AND SITTON PEAK QUADRANGLES

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Proj. No. 12-054 **Date: June 2013**

spaces. Therefore, there are a total of 75 numbered lots, 72 of which are proposed for residential units at this time.

The residential development will consist of large lots (approximately one-third acre or larger) for construction of semi-custom or custom type homes. The lots are often separated or surrounded by islands of natural undeveloped land to achieve a rural appeal and relatively low density. Vineyards are proposed to surround portions of the properties.

Development of the residential lots will include the network of access roads and attendant utilities necessary to support the development. Primary access will be from Long Canyon Road. Several of the primary utilities will also extend or require improvement off site to connect into existing main trunk lines. Sewer services will be achieved through the use of individual on-site wastewater treatment systems (OWTS). The OWTS consists of a normal septic tank that sends the effluent (liquid waste) through a series of biofilters. The biofilters clean the effluent to create water that is suitable for subsurface irrigation use. This reclaimed water is pumped to a distribution system that consists of underground emitters that water specific association slopes. When there is insufficient flow from the OWTS, then there is a backup irrigation system that supplements the OWTS. The system includes emergency overflow into a holding tank within the pump tank. Alarms will inform the homeowner if there is a failure in any of the system components.

Plates 1 and 2 attached to this report utilize the grading concept as discussed above and prepared by Hunsaker and Associates as a base map. These base maps illustrate the proposed cuts and fills proposed to achieve finish grades. Final grading plans will be developed by the design civil engineer based on the applicable codes and guidelines within the County of Orange as the planning process progresses.

2.0 INVESTIGATIVE METHODOLOGY

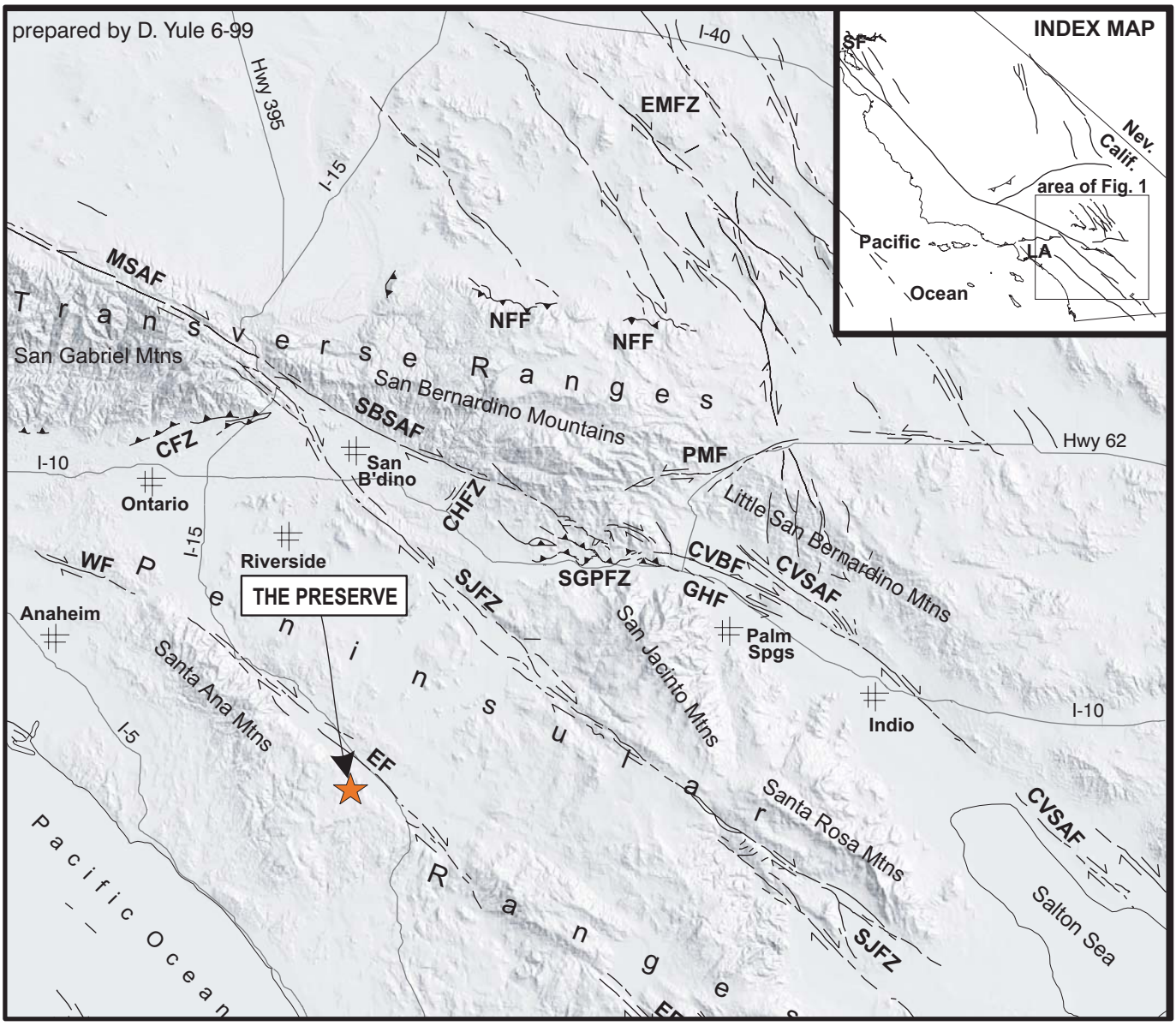
In April of 2005, PSE advanced thirty-five (35) air track holes; excavated, logged and sampled forty-eight (48) backhoe test pits. Subsurface Surveys (2005) conducted fourteen (14) seismic refraction surveys during the same time period. The test pits ranged in depth from 6 to 18 feet, and the air track holes ranged from 10 to 41 feet in depth. The approximate locations of the excavations and seismic surveys are presented on Plates 1 and 2. Soil samples were tested in the laboratory for characterization of the engineering properties of the onsite earth materials. The logs of the air track holes and trenches are presented in Appendix B. Appendix C contains the results of the laboratory testing performed on the samples collected from those excavations. Appendix D contains the findings of the seismic refraction survey lines. The purpose of PSE's investigation was to evaluate the distribution of earth materials within the property and to determine their engineering and excavation properties. No previous geotechnical studies are known to have been conducted at the site.

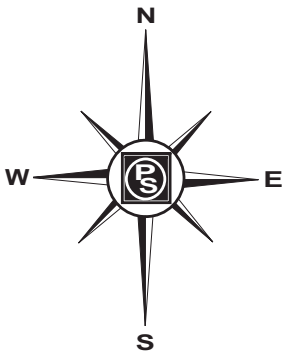
In March 2013 TSI excavated 34 test pit trenches with a rubber tired backhoe for evaluating the subsurface conditions related to the percolation characteristics of the soil and bedrock at the site. Percolation testing was conducted in seventeen of these trenches. In November 2013 TSI conducted an additional subsurface investigation consisting of 8 backhoe trenches and 34 additional test pits for percolation testing (TSI, 2014). The approximate location of the trenches and test pits are shown on Plates 1 and 2A and 2B. A summary of the results of these percolation tests is presented on Table 1, with detailed results provided in Appendix C. The logs of the trenches are included in Appendix B.

3.0 GEOLOGIC CONDITIONS

3.1 Geologic Setting

The subject property is located in the Santa Ana Mountains of the Peninsular Range geomorphic province in southern California (Figure 2). The Santa Ana Mountains are composed of basement complex crystalline and semi-crystalline rocks of Mesozoic age unconformably overlain by upper Cretaceous and Cenozoic sedimentary rocks. The geologic relationships established in the Santa Ana





GEOMORPHIC AND FAULT MAP

FIGURE 2

SOURCE MAP -
FIGURE 1 D. YULE 6-99

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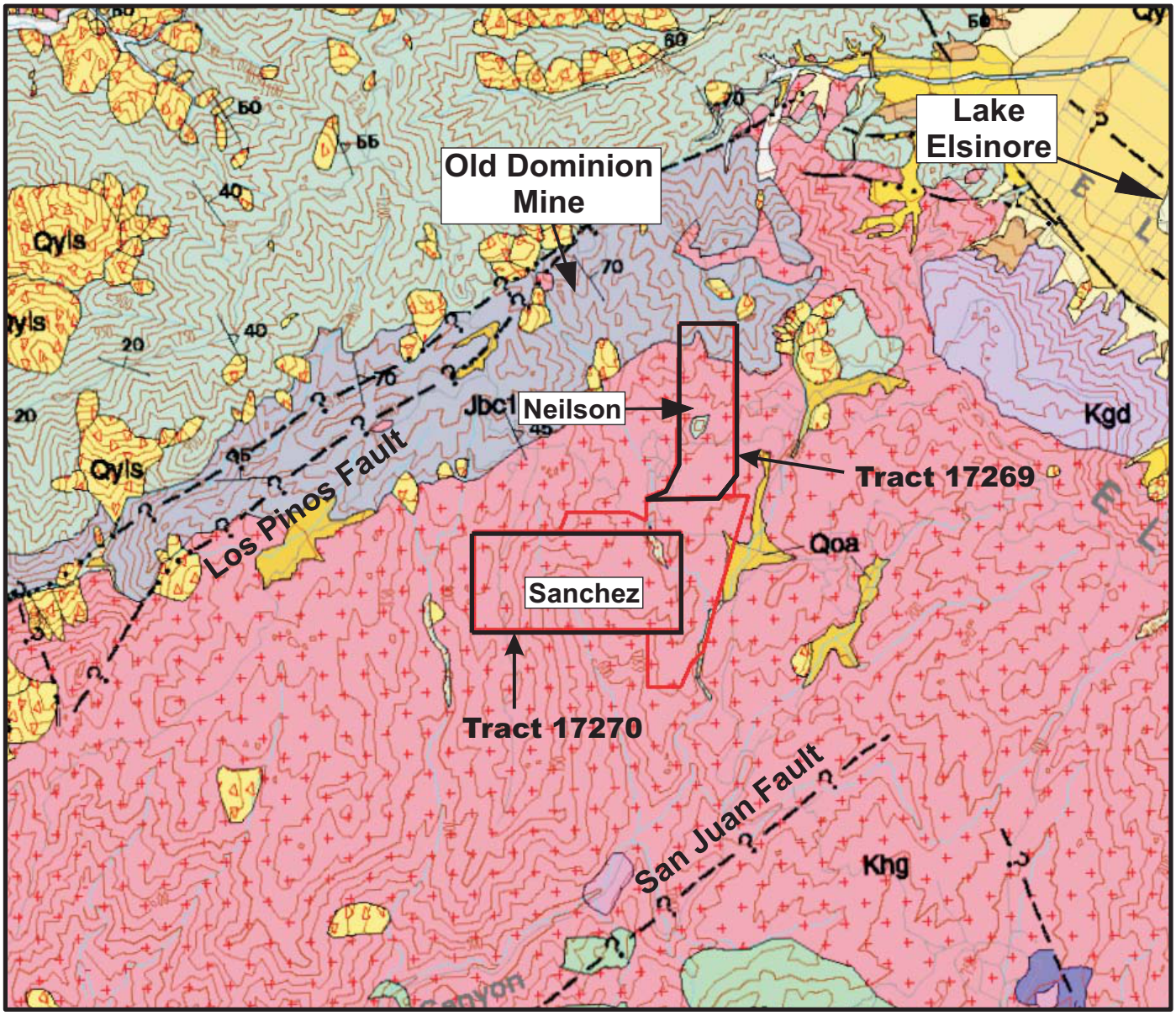
Mountains indicate that the boundary between basement and superjacent sedimentary rock is of early or middle Cenozoic age and the northeastward transgression of Paleocene strata onto successively older units infers an early Tertiary southwestward tilt of the mountain mass. The emergence of the mountain mass continued into middle Miocene time when the relative depression of the Los Angeles Basin began. Deformation has continued since that event and has produced distinct erosional unconformities in upper Miocene, Pliocene, and upper Pleistocene strata (Schoellhamer et al., 1981).

3.2 Stratigraphy

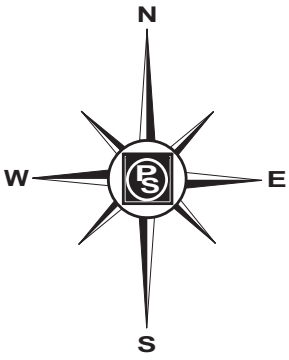
The subject property is located within the basement complex of rocks that form the core of the Santa Ana Mountains (Figure 3). The two bedrock units that have been mapped within the property limits are the Cretaceous age Woodson Mountain Granodiorite (commonly referred to as granite) and the Jurassic age Bedford Canyon Formation, which is primarily composed of moderately metamorphosed argillite, slate, greywacke and quartzite. These bedrock units are locally mantled by thin surficial deposits of colluvium (soil) and/or alluvium in the more significant drainage bottoms.

The two phases of the property are underlain entirely by the Woodson Mountain Granodiorite (Figure 3, Plates 1 and 2A and 2B). The northern most portion of TTM 17269 (Phase 2/ North Parcel/ Neilson Property) is underlain by the Bedford Canyon Formation. A hilltop within the central portion of the North Parcel has also been mapped as Bedford Canyon Formation. The mapped distribution of geologic units with the proposed development is shown on Plates 1 and 2A and 2B. Presented below is a brief description of the geologic units mapped onsite.

No landslides or significant or active faults have been mapped, nor are known to exist within the properties. No significant springs have been mapped within the property. However, minor seepage was observed from various locations during the spring of 2005 when PSE conducted their field investigation at the site. No water was observed in the spring and fall of 2013 when TSI conducted their field investigations.



GEOLOGIC MAP OF THE PRESERVE AT SAN JUAN



Qls	LANDSLIDE DEPOSITS
Qoa	ALLUVIUM DEPOSITS
Khg	HETEROGENEOUS GRANITIC ROCKS (CRETACEOUS)
Jbc	BEDFORD CANYON FORMATION (JURASSIC)
Jbc_1	BEDFORD CANYON FORMATION UNIT 1

FIGURE 3

SOURCE MAP - CALIFORNIA GEOLOGIC SURVEY, PRELIMINARY DIGITAL GEOLOGIC MAP OF THE SANTA ANA 30x60 QUADRANGLE

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3.2.1 Undocumented Artificial Fill (map symbol: Afu):

Undocumented artificial fills consist of existing dirt trails and roads, boring and trench backfill, catchment berms and other minor miscellaneous improvements. Only a few of these fills are depicted on the accompanying Plates 1and 2 due to the relatively small size of these fills in comparison to the map scale. The undocumented fills are most likely derived from onsite sources and consist of fine to coarse-grained sand with varying amounts of pebbles. The undocumented fills are in a dry, loose condition.

3.2.2 Colluvium (no map symbol):

Colluvium, where encountered, was generally less than a few feet in thickness and therefore was not mapped as a separate unit.

3.2.3 Quaternary Older/Younger Alluvium, Undifferentiated (map symbol: Qal)

The Quaternary age older/younger alluvium is located primarily within the active drainage courses. The alluvium is generally subangular, loose to medium dense. Where encountered the alluvium was a few feet in thickness. In the main canyon areas pockets of alluvium may be significantly thicker.

Within the main courses of Long Canyon and Decker Canyon the alluvium has locally formed broad alluvial pockets that are likely up to 20 feet or more in thickness. It is our experience in nearby areas that the upper few feet of this alluvium consists of a sandy soil and is underlain by silty sand that is often porous, with local zones of gravel and cobbles.

3.2.4 Woodson Mountain Granodiorite (map symbal Kgr):

The Cretaceous age Woodside Mountain Granodiorite is an intrusive rock exposed throughout most of the proposed development area. The rock is a grey, coarse grained, with white plagioclase, bluish grey quartz, black biotite and hornblende of relatively uniform composition and texture. The Woodson Mountain Granodiorite varies from hard rock outcrops and large core-stone boulders at the surface to areas of softer, decomposed granite to

a depth of approximately 10 feet. This bedrock appears to be fairly massive with few continuous fracture or fault zones.

3.2.5 Bedford Canyon Formation (map symbol Tbc):

The Jurassic age Bedford Canyon Formation were intruded by the younger Cretaceous igneous rocks. This formation is generally composed of low-grade metamorphic volcanic and sedimentary rocks typified by shale, greywacke, and quartzite. This rock is primarily found in the very northern portion of the project where no development is planned (Plate 2B).

3.3 Geologic Structure/Tectonic Setting

3.3.1 Regional

The Santa Ana Mountains lie within the Peninsular Ranges Geomorphic Province extending from the San Gabriel Mountains in the north to the southern tip of Baja California, Mexico. This Province is typified by northwest-trending alluvium-filled basins, elevated Pleistocene surfaces undergoing active erosion and northwest trending mountain ranges formed along faults oriented in the same direction (Figures 2 and 4).

The approximate 125-mile long Elsinore Fault Zone (EFZ) is the most significant fault in relation to the site. Near Lake Elsinore it forms a right-oblique, trans-tensional, pull apart tectonic basin with local reverse and normal –slip components (Weber, 1977; Shlemon and Ginter, 2001). It is one of several northwest-trending continental borderland fault zones that extend from the Mojave Desert in the east to the Channel Islands in the west (Jennings, 1994). It consists of many individual faults and as part of the boundary separating the North America and Pacific Plates; these faults typically exhibit evidence of Holocene displacement as well as historic seismic activity.

Faults within the EFZ have classic geomorphic and stratigraphic characteristics of active (Holocene) faults. Right-lateral offsets of

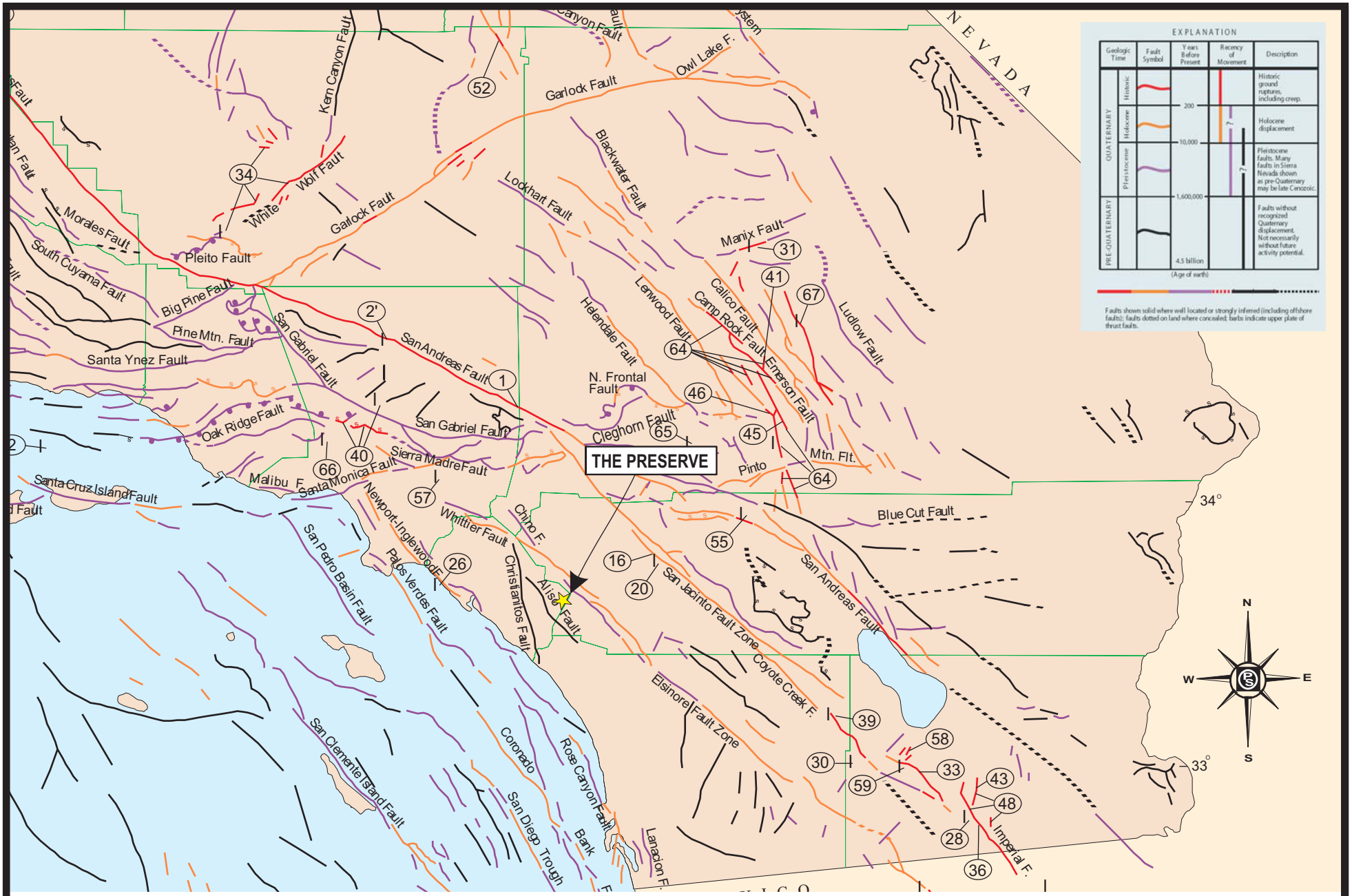

FIGURE 4

SIMPLIFIED FAULT ACTIVITY MAP OF CALIFORNIA

Compiled by Charles W. Jennings and George J. Saucedo
1999 (Revised 2002, Tousson Toppozada and David Branum)

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streams, canyons/interfluves and quaternary alluvial fans abound along its trace, as do young scarps and sag ponds (e.g. Glen Ivy Marsh).

Recent paleoseismic studies (Rockwell and others, 1986; Millman, 1988) in trenches at Glen Ivy Marsh (Table A) located about 10-miles to the northwest, identified at least five historical ground rupture events on the EFZ.

TABLE A
Summary of Late Holocene Earthquake History at Glen Ivy Marsh
(After Rockwell and Others, 1986)

Date	Size
Historical post 1660 A.D.	30-50 cm vertical separation, unknown
Between 1360 and 1660 A.D.	2-3 cm vertical separation; horizontal separation Unknown
About 1300 A.D.	Large event: 0 to 20 cm of vertical separation and at least 90 cm of horizontal separation unknown
1260-1275 A.D.	3-5 cm vertical separation, horizontal separation unknown
About 1060 A.D.	Large event: 10-30 cm vertical separation, horizontal separation unknown

In addition to the EFZ, many other significant faults occur within 100 km of the subject site (Blake, 2004). Selected faults are discussed with respect to proximity to the site. The most significant of these is the San Andreas Fault.

The San Andreas Fault is a major tectonic feature of western North America. The fault traverses 1,100 km from Cape Mendocino, north of San Francisco, to the Gulf of California in the south. It is interpreted to have formed as a transform fault which delineates the boundary between the North American and Pacific plates (Powell, 1993). The San Andreas fault is located, at its closest point, approximately 91 km northwest of The Preserve project.

3.3.2 Local Faulting

No active or significant faults have been mapped within the proposed project site. The Los Pinos Fault has been mapped to the northwest of the project and The San Juan Fault has been mapped to the southeast of the project (Figure 4). Neither of these faults are considered as active or potentially active.

3.4 Ground Water

No significant springs have been mapped within the property however, minor seepage was observed from various bedrock locations during the spring of 2005 after periods of rain when PSE conducted a field investigation at the site. In the spring and fall of 2013 when TSI conducted their field investigations, no surface or subsurface water was observed. It is anticipated that the broad alluvial valleys may have locally perched pockets of ground water near the alluvium/bedrock contact.

3.5 Mineral Deposits

No mining or significant mineral deposits are known to exist within the subject properties. However, the Old Dominion Mine is located approximately one mile northwest of the northern parcel. This mine is located within a fissure vein of the Bedford Canyon Formation. The vein is highly irregular in width and degree of mineralization present. The ore that was mined included argentiferous (silver), galena (primarily lead), sphalerite (contains zinc), minor gold within a quartz matrix, pyrrhorite, arsenopyrite, and siderite (Morton, et. al., 1976). Mining of the vein was conducted from to 1894 until 1943, with several hundred tons of ore being mined (California Division of Mines, 1959). In 1965, 13 drill holes were excavated in the area of the mine, which indicated that the vein of ore was erratic and discontinuous (Morton, el. al., 1976). The mine has not processed any ore since 1943.

3.6 Percolation Characteristics of Soils

To evaluate the percolation characteristics of the soils and other characteristics that relate to the potential for use of septic systems and/or infiltration basins at the site, 79 backhoe trenches were excavated to depths ranging from 3½ feet 10 feet

in depth (logs of trenches are included in Appendix B). Fifty-one of these trenches were then tested for their percolation characteristics in accordance with County of Orange Guidelines by drilling a 12-inch diameter boring to a total depth of between 4½ to 5 feet below the ground surface. Prior to conducting percolation testing, each borehole at the bottom and sides of the trench was cleaned of loose debris and any cake remaining from the drilling process. A couple inches of gravel was then placed in the bottom, and the hole was filled with water. The water was placed in the boring and allowed to pre-saturate the boring for a minimum of 24 hours prior to conducting the percolation testing. Percolation testing was conducted over a 6 hour period and consisted of filling the hole with approximately 6 inches of water above the gravel. From a fixed reference point at the top of the hole, the depth to the water was measured. After 30 minutes the water level was re-measured to establish the change in water level over that time period. This process was repeated for 6 hours with measurements recorded every 30 minutes. Water was poured into the hole after each reading and re-measured unless the drop between the previous readings was relatively small. The data was recorded and is tabulated in Appendix B along with the trench logs.

The test results are provided in the appended Table 1. In general, the percolation rates varied between 2.5 minutes to $\geq$120 minutes for a one inch drop in water level. These rates are based on the readings collected during the final half-hour of testing per the County of Orange guidelines. The maximum rate acceptable for a leach field is 60 minutes per inch of drop in water level.

The initial process used to choose the appropriate areas for the proposed leach fields included evaluation of the topography, the bedrock characteristics, location relative to perennial and annual streams and the required setback from these features, and the initial 17 percolation test results. Of the original 17 tests conducted, 5 had failing percolation rates (Table 1, appended). Two of the additional tests were at the maximum rate acceptable. After this initial round of testing, the site was further evaluated for those conditions that were more

favorable for percolation. These criteria included flatter topography, avoidance of rock out crop and other subtle geologic conditions where the failing tests occurred. The second round of 34 additional percolation tests were conducted in those areas estimated to have more favorable percolation characteristics. This round of percolation testing indicated 33 of the 34 percolation tests conducted had passing rates (Table 1, appended).

In summary, most of the soils and shallow bedrock beneath the site have generally favorable percolation characteristics. The favorable percolation characteristics are a result of the underlying granitic bedrock that weathers to a granular soil.

4.0 GEOTECHGHNICAL ENVIRONMENTAL IMPACTS

Appendix G of the California Environmental Quality Act (CEQA) guidelines requires an evaluation of environmental conditions and the potential impacts of those conditions. That evaluation must classify the conditions as to whether there is "No Impact" or "Impact". If the condition "impacts" the site, then it needs to be classified as 1) "potentially significant"; 2) "less than significant with mitigation"; or 3) "less than significant".

The threshold for determining geotechnical impacts as outlined in Appendix G of the CEQA guidelines are described as follows:

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

ii) Strong seismic ground shaking?

iii) Seismic-related ground failure, including liquefaction?

iv) Landslides?

b) Result in substantial soil erosion or the loss of topsoil?

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

d) Be located on expansive soil, as defined by Section 1802.3.2 of the California Building Code (2007), creating substantial risks to life or property?

e) Have soils incapable of adequately supporting the use of septic tanks or alternate waste water disposal systems where sewers are not available for the disposal of waste water?

Presented in the following sections is TSI's evaluation of the potential geotechnical impacts to the site based on the above classifications.

4.1 Fault and Seismic Hazards

4.1.1 Fault Rupture Potential

There are no State-imposed Alquist-Priolo Fault-Rupture Hazard Zones mapped onsite. In addition no significant faults have been mapped or observed within the site. Thus, the likelihood of surface fault rupture at the site is considered remote.

Level of Impact

The level of impact due to Fault Rupture Potential is considered to be "no impact" for the residential portion of the proposed development

Mitigation Measures

None.

4.1.2 Seismic Ground Shaking

Southern California, in general, is a seismically active region and the proposed improvements are likely to be subjected to significant ground motion during the design life of the project.

Level of Impact

The level of impact due to seismic shaking is considered to be less than significant with mitigation.

Mitigation Measures

Seismic shaking can be mitigated through the design of the structures in compliance with prevailing seismic codes outlined in California Building Code

(CBC, 2010). Remedial grading to further mitigate seismic hazards will also be required. Remedial grading could include:

- *The removal and replacement of loose and/or compressible soils with engineered fill; and*
- *The removal and re-compaction of the cut and shallow fill portions of building lots that exhibit unfavorable geologic conditions. These lots will be identified as a part of future geotechnical grading plan reviews and during construction of the improvements based on exposed geologic conditions in the field.*

4.1.3 Liquefaction and Dynamic Settlement

Liquefaction and dynamic settlement are the processes by which saturated sediments lose their strength during strong ground motion generated by earthquakes. The State of California (California Division of Mines, 1997) has mandated that the California Geological Survey identify areas that may be susceptible to liquefaction, and through the Seismic Hazards Mapping Act (SHMA) to provide quadrangle maps showing these zones and establish procedures for studies prior to project approval. SHMA quadrangle maps for "The Preserve" area have not yet been published. As a part of TSI's preliminary investigation of the site, an evaluation indicated no significant potential for liquefaction and/or dynamic settlement.

Level of Impact

The level of impact due to liquefaction and dynamic settlement is considered to be less than significant with mitigation.

Mitigation Measures

Mitigation measures for liquefaction/dynamic settlement potential include removal and replacement with compacted, drained fills; ground modification; and/or designing for potential settlement of liquefiable materials.

4.1.4 Earthquake Induced Landsliding

The subject site has not been evaluated under SHMA. Natural slopes steeper than 1.5:1 (horizontal to vertical) and cut slopes that expose unfavorable geologic

conditions such as day-lighted jointing, low strength, or poorly cemented soils, are potentially susceptible to the secondary seismic hazard of earthquake-induced rock falls or minor landsliding.

Rock falls generally will only occur on slopes steeper than 1.5:1 (H:V). The area of the project that is proposed for development does not have any significant slopes that are steeper than 1.5:1; therefore, there is no need for mitigation of the potential for rock fall.

Level of Impact

The level of impact due to earthquake induced landsliding is considered to be less than significant with mitigation.

Mitigation Measures

Areas susceptible to earthquake-induced landsliding can be mitigated utilizing common earthwork remedial grading techniques such as construction of drained shear keys, replacement with manufactured buttress fills, slope laybacks, or structural setbacks.

Areas subject to earthquake-induced rock fall can be mitigated by slope layback, setbacks from the toe of slope areas. In addition catchment nets, debris barriers, and other methods are available to reduce the risk of earthquake induced rock fall to an acceptable level.

4.1.5 Seiches, Tsunamis, and Dam Failures

Seiches are periodic oscillations within a large enclosed body of water. Any enclosed body of water such as an artificial lake, reservoir, or tank could be susceptible to seiche oscillations. A tsunami is a large oceanic wave generated from an earthquake or undersea landsliding.

Level of Impact

The elevation and distance from large bodies of water of the development precludes inundation resulting from tsunamis, seiches, and dam failure, and therefore, has no impact on the project.

Mitigation Measures

None.

4.2 Rock Excavation Characteristics

Generally, hard granitic rocks and Bedford Canyon formation underlie the entire site. These rocks will generally require blasting for cut areas deeper than approximately fifteen (15) to twenty (20) feet below the existing ground surface. Difficult excavation maybe encountered approximately five (5) to fifteen (15) feet below the ground surface. Oversize rock will be generated from the cut areas that will require specialized grading techniques and disposal.

Level of Impact

As the project depicted on the Tentative Tract Maps includes development within hard rock areas, the use of blasting to achieve design grades is likely to be required. Therefore, this condition is considered to have significant economic impact on the project development; however, this is a less than significant impact with mitigation and is considered geotechnically feasible.

Mitigation Measures

The impacts of the use of explosives include noise, vibration, and flying debris. Those impacts can be mitigated through the use of experienced blasting contractors who would submit a blasting plan to the appropriate agencies for approval. Additionally, numerous small charges are typically used in the blasting process and overburden is typically left-in-place to improve the effects of the detonation. This process, combined with the remote location of the site in relation to existing homes or other structures, can significantly reduce the impacts of noise, vibration, and flying debris. Other geotechnical concerns related to hard rock conditions that can be mitigated include excavation of deep utilities, swimming pools and other underground improvements. Mitigation for these positional improvements would include overexcavation or blasting to the anticipated depth. Blasting will require the appropriate permitting process through the Orange County Fire Authority.

4.3 Soil Erosion/Mass Wasting

Soil erosion or mass wasting is the process in which earthen materials are transported down slope by gravity. Large scale mass wasting is not present onsite and is not anticipated to be a hazard to the project. Deposits of topsoil of relatively minor thickness (a few feet) are present over a majority of the site. The relative lack of topsoil is due to

the arid environment and the hardness of the bedrock. Seasonal runoff is the principal agent of erosion in addition to local, shallow, soil slumping.

Level of Impact

Due to the lack of significant top soils at the site, and the proposed site improvements, soil erosion or mass wasting is deemed be less than significant with mitigation on the site.

Mitigation Measures

Control of surface drainage and diversion of flows to non-erodible devices are the principle mitigation measures typically employed and can be accomplished with compliance with design standards outlined in the CBC. Mitigation of slope surface erosion of highly granular soils can be accomplished by establishing appropriate surface drainage patterns, judicious landscaping, and, when necessary, use of surface erosion control products such as spray-on protectants or "jute mesh" type products, or "straw waddles" in compliance with erosion control standards.

4.4 Slope Stability

Cut, fill, and natural slope stability can be affected by several factors including geologic structure, strength of materials, height, inclination, and orientation of design slopes. Bedding within the granitic bedrock is absent, and jointing is anticipated to be primarily related to weathering and not well defined or continuous at depth. Therefore, only the upper weathered zone is anticipated to have a significant potential for weak planar features that could be prone to mass movement with the slope angles proposed.

The project plans indicate that all proposed cut slopes will have design cut slopes that are no steeper than a 2:1 (horizontal to vertical) inclination. Natural slopes are generally flatter than 2:1 in inclination, however, locally same sections that are steeper than 1.5:1.

Evaluation of the interrelationships of the various combinations of slope configuration, geologic structure, and material strength characteristics will be required to assess each specific slope condition when more detailed project designs are evaluated.

4.4.1 Cut Slopes

The underlying bedrock is generally capable of supporting Code-compliant, 2:1 or flatter cut slopes. Slopes as steep as 1.5:1 are likely stable pending results of

additional future geotechnical but will require a waiver from the County of Orange because they are not compliant with either County's grading standards.

Level of Impact

The level of impact due to cut slope instability is considered to be less than significant with mitigation.

Mitigation Measures

Stability of proposed cut slopes may be of significant economic importance to the proposed development. All cut slopes will require evaluation during the design process as well as during construction. Mitigation of some slopes may be required and will likely include overexcavation and replacement with either drained stabilization fill or buttress fills. Stabilization fills should be utilized when cut slopes expose loose or highly erosive soils or highly fractured bedrock. At the developers discretions selected cut slopes may be converted with a replacement fill so that more desirable landscaping can be established.

4.4.2 Fill Slopes

Based on the engineering characteristics defined by our laboratory testing, the onsite earth materials are generally considered suitable for use as engineered fill and, when properly constructed and maintained, can be expected to perform satisfactorily in Code compliant embankments and fill slopes (typically 2:1 or flatter).

Level of Impact

The level of impact due to the design and construction of fill slopes is considered to be less than significant with mitigation.

Mitigation Measures

Subsurface drainage devices should be installed below fills to intercept and direct water that may seep from the bedrock or be introduced from the surface. After fill slopes are constructed they should be protected from surficial erosion by use of surface erosion control products such as spray on protectants, "jute mesh" type products, or "straw waddles" in compliance with erosion control standards.

4.4.3 Natural Slope Stability

The proposed plans indicate that natural slopes will surround the perimeter of the project. In general, these natural slopes have an inclination of 2:1 or less with localized areas of steeper up to approximately 1:1 slopes. According to the development plan they are set back a significant distance from the majority of the development. In addition, because of the nature of the bedrock these slopes are considered grossly stable. However, the slopes steeper than 1.5:1 may have a potential for rock fall hazard.

Level of Impact

The level of impact due to natural slope stability is considered less than significant with mitigation.

Mitigation Measures

Steep natural slopes above the proposed project should be evaluated for rock fall potential. Mitigation techniques may include structural setbacks, rock catchment walls or fences, layback of natural slope areas, setback, or a combination of these measures. Mitigation alternatives discussed above can be implemented to correct local instabilities, if they exist.

4.5 Compressible/Collapsible Soils

Based upon the data obtained from this firm's subsurface investigation and laboratory testing, highly weathered granite and alluvial deposits are likely to be compressible.

Hydro-collapse is the process in which loose dry soils undergo rapid consolidation (collapse) when wetted. Unmitigated, the presence of compressible and collapsible soils below fills and where exposed in cuts can produce significant settlements that can be manifested differentially on engineered structures.

Level of Impact

The level of impact due to collapsible soils is considered to be less than significant with mitigation.

Mitigation Measures

Typically, compressible and collapsible soils can be mitigated using a combination of removal and overexcavation of the susceptible soils and re-compaction as engineered

fills. TSI estimates that remedial grading removals will be on the order of one (1) to ten (10) feet. All undocumented fills will also require removal and re-compaction.

4.6 Expansive Soils

The expansion potential of the vast majority of soils that will be encountered onsite during grading will likely range from "very low" to "low". Expansive soils can increase in volume upon the introduction of water, and decrease in volume (shrink) upon drying. These volume changes can produce stresses on engineered structures than can result in cosmetic distress and even structural damage.

Level of Impact

The level of impact due to expansive soils is considered to be less than significant with mitigation.

Mitigation Measures

The presence of expansive soils and bedrock is commonly and effectively mitigated by various techniques including: 1) proper design of foundations, slabs, streets, and other improvements subject to the influence of the soils; 2) overexcavation of the expansive soils/bedrock and replacement with less expansive fill soils; 3) utilizing selective grading techniques to place more highly expansive soils well below foundation elements; 4) employment of pre-saturation techniques to lessen expansion potential; 5) control of surface and subsurface drainages to reduce moisture variations; and 6) combinations of these various techniques.

4.7 On-Site Septic Systems

The proposed project relies on an advanced engineered onsite waste water system (OWTS). This septic system consists of a typical septic tank followed by treatment of the effluent through bio-filters to create water that can be reclaimed for subsurface use. This reclaimed water is then pumped to specific association maintained fill slopes where the reclaimed water is used to irrigate the landscaping. The delivery system is through a below ground system that is engineered to have non-clogging hoses and emitters. This below ground system is supplemented, when necessary, by an above ground irrigation system that is linked to weather monitoring controllers. The proposed OWTS system

includes emergency alarms and extra tank capacity in case there is a failure of the septic tank and/or biofilters or through homeowner neglect.

Level of Impact

Advanced engineered septic systems (OWTS) are planned for this site; therefore, there is no significant impact anticipated for the site due to wastewater generated at the site. Because the wastewater is passed through bio-filters, it is transformed into reclaimed water that has the beneficial effect of being used for subsurface irrigation purposes. These advanced septic systems have been used throughout the country in remote areas where typical sewer piping and community wastewater treatment facilities are not feasible.

Mitigation Measures

The OWTS system requires approval from the building official. The system components must be installed per manufacturer's recommendations and the guidelines provided in the County of Orange On-site Sewage guidelines (2010). More specific recommendations should be provided once specific details are provided at either the tentative tract or building permit phases.

4.8 Corrosion

The presence of soluble sulfates in soils can be detrimental to concrete. Low resistivity soils can have a detrimental effect on metals. Based upon the laboratory results, the onsite soils exhibit "negligible" sulfate exposure and are classified as "mildly corrosive" in accordance with NACE standards.

Level of Impact

The level of impact due to corrosive soils is considered to be less than significant with mitigation.

Mitigations Measures

Consultation with a Corrosion Engineer is recommended in order to mitigate the potential corrosive effects on metal portions of structures and should be accomplished in compliance with CBC. Final mitigations should be based on testing of as-graded soil conditions.

5.0 FUTURE GEOTECHNICAL ANALYSIS

Prior to approval of a Tentative Tract Map, a geotechnical report shall be prepared by a licensed Engineering Geologist and Geotechnical Engineer and submitted to the governing agency for review and approval. This report shall be prepared in accordance with the governing agency standards and shall evaluate the proposed development in relation to site soils and geologic conditions. Recommendations shall be provided to specifically identify and mitigate any hazards related to seismicity, collapsible soils, expansive soils, corrosion, septic systems, and slope stability.

The Preserve **Table 1**

Percolation Summary Sheet

Test No.	Test Date	Final Rate in/Hr.	Final Rate Minutes per inch	Pass or Fail
Tract 17270				
1A-1	11/13/2013	1.5	**40**	Pass
1A-2	11/13/2013	1.0	**60**	Pass
1A-3	11/13/2013	1.5	**40**	Pass
1A-4	11/13/2013	1.0	**60**	Pass
1A-5	11/13/2013	1.5	**40**	Pass
PT-21	3/28/2013	5.0	**12**	Pass
PT-23	3/28/2013	6.5	**9.2**	Pass
1B-1	11/13/2013	2.0	**30**	Pass
1B-2	11/13/2013	4.5	**13.3**	Pass
1B-3	11/13/2013	1.5	**40**	Pass
1C-1	11/14/203	5.0	**12**	Pass
1C-2	11/14/203	5.0	**12**	Pass
1C-3	11/14/203	0.5	**120**	Fail
1C-4	11/14/203	4.0	**15**	Pass
PT-26	3/28/2013	4.0	**15**	Pass
1D-1	11/14/2013	1.0	**60**	Pass
1D-2	11/14/2013	1.5	**40**	Pass
1 E-1	11/15/2013	2.0	**30**	Pass
1 E-2	11/15/2013	2.5	**24**	Pass
1 E-3	11/15/2013	2.0	**30**	Pass
1 E-4	11/15/2013	3.5	**17.1**	Pass
PT-16	3/27/2013	0.5	**120**	Fail
PT-18	3/28/2013	2.0	**30**	Pass
PT-20	3/27/2013	2.0	**30**	Pass
PT-22	3/27/2013	0.5	**120**	Fail
PT-24	3/27/2013	1.0	**60**	Pass
PT-33	3/27/2013	0.5	**120**	Fail

Tract 17269	Test Date	Final Rate in/Hr.	Final Rate Minutes per inch	Pass or Fail
PT-2	3/27/2013	4.0	**15**	Pass
2A-1	11/6/2013	1.5	**40**	Pass
2A-2	11/6/2013	2.5	**24**	Pass
2A-3	11/6/2013	2.5	**24**	Pass
2A-4	11/20/2013	2.0	**30**	Pass
2A-5	11/20/2013	3.0	**20**	Pass
PT-8b	3/27/2013	2.0	**30**	Pass
2B-1	11/7/2013	10+	**2.9**	Pass
2B-2	11/7/2013	3.0	**20**	Pass
2B-3	11/7/2013	2.0	**30**	Pass
PT-9	3/27/2013	1.0	**60**	Pass
2C-1	11/6/2013	2.0	**30**	Pass
2C-2	11/7/2013	4.0	**15**	Pass
2C-3	11/7/2013	4.0	**15**	Pass
2C-4	11/7/2013	2.0	**30**	Pass
PT-14	3/28/2013	2.0	**30**	Pass
2D-1	11/6/2013	3.0	**20**	Pass
2D-2	11/6/2013	2.5	**24**	Pass
2D-3	11/20/2013	2.5	**24**	Pass
2D-4	11/20/2013	5.0	**12**	Pass
PT-3	3/27/2013	0.5	**120**	Fail
PT-5	3/27/2013	0.5	**120**	Fail
PT-11	3/28/2013	2.5	**30**	Pass
PT-13	3/28/2013	3.5	**17.1**	Pass

APPENDIX A

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949-201-3388

APPENDIX A

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APPENDIX B

Subsurface Investigation

Terrestrial Solutions Inc.

Test Pit No.	Depth (ft.)	USCS	Description__ _Date of Excavations: March and April 2013
PT-1	0 - 4’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate to 4’. Total Depth 4.0 Feet. No Groundwater, No Caving
PT-2	0 - 1.0’ 1.0’- 3.5’	SM	Artificial Fill: Silty SAND, fine to med. grained, dry to damp, Sl. Dense. Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate to 3.5’. Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-3	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate to 3.5’. Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-4	0 - 5.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate to 5.5’. Total Depth 5.5 (9.5) Feet. No Groundwater, No Caving 12” dia. boring excavated to 4’ below TD.
PT-5	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate to 3.5’. Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.

PT-5B	0 - 10’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate to 5’. Still able to excavate below 10.0’ Total Depth 10.0 Feet. No Groundwater, No Caving
PT-6	0 - 8’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. V. moist below 2’, Easy to excavate to 7’. Gravelly sand below 7’, Still able to excavate below 8’. Total Depth 8.0 Feet. No Groundwater, No Caving
PT-7	0 – 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. hard to excavate below 3.5’. Total Depth 3.5 Feet. No Groundwater, No Caving
PT-8	0 - 10’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Still able to excavate below 10.0’ Total Depth 10.0 Feet. No Groundwater, No Caving
PT-8B	0 - 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate to 4.0’. Total Depth 4.0 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-9	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Harder to excavate below 3.5’. Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-10	0 - 3’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Hard to excavate below 3.0’ Total Depth 3.0 Feet. No Groundwater, No Caving

PT-11	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Harder to excavate below 3.5’. Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-12	0 – 9.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, Silty to clayey SAND, medium to coarse grained to 3’. Silty SAND to 7’. Harder to excavate below 8’. Total Depth 9.5 Feet. No Groundwater, No Caving
PT-13	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Harder to excavate below 3.5’. Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-14	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-14b	0 – 8.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Still able to excavate below 8.0’ Total Depth 8.0 Feet. No Groundwater, No Caving
PT-15	0 - 10’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Still able to excavate below 10.0’ Total Depth 10.0 Feet. No Groundwater, No Caving
PT-16	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.

PT-17	0 - 7’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Difficult to excavate below 5.0’ Total Depth 7.0 Feet. No Groundwater, No Caving
PT-18	0 - 3’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Difficult to excavate below 3.0’ Total Depth 3.0 Feet. No Groundwater, No Caving
PT-19	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate below 3.5’ Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-20	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate below 3.5’ Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-21	0 – 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 4.0 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-22	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Moderately Difficult to excavate below 3.5’. Many rock outcrops in nearby area. Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-23	0 – 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Moderately difficult to excavate below TD. Total Depth 4.0 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.

PT-24	0 – 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate below TD. Total Depth 4.0 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-25	0 - 7’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate below 7’. 6’ bluff next to trench excavation. Total Depth 7.0 Feet. No Groundwater, No Caving
PT-26	0 – 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate below TD. Total Depth 4.0 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-27	0 - 4’	SM	Colluvium: Silty SAND, fine to med. grained, dry to damp, Sl. Dense.
	4’-8’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. More difficult to excavate below 7’. Total Depth 8.0 Feet (not refusal). No Groundwater, No Caving
PT-28	0 – 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Hard to excavate. Total Depth 4.0 Feet. No Groundwater, No Caving
PT-29	0 – 5.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Hard to excavate @ TD. Total Depth 5.0 Feet. No Groundwater, No Caving
PT-30	0 – 5.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Hard to excavate @ TD. Total Depth 5.0 Feet. No Groundwater, No Caving

PT-31	0 – 4.5’	SM	Colluvium: Silty SAND, fine to med. grained, dry to damp, Sl. Dense.
	4.5’-7’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 7.0 Feet (not refusal). No Groundwater, No Caving
PT-32	0 – 6.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Easy to excavate to 4’. Harder below 4’ to TD.
			Total Depth 6.0 Feet. No Groundwater, No Caving
PT-33	0 - 3.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Moderately Difficult to excavate below 3.5’. Many rock outcrops in nearby area.
			Total Depth 3.5 Feet. No Groundwater, No Caving 12” dia. boring excavated to 12” below TD for percolation testing.
PT-34	0 – 10.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Still easy to excavate @ TD.
			Total Depth 10.0 Feet. No Groundwater, No Caving
PT-35	0-7.0’		Artificial Fill (Afu): Clayey to Silty Sand, medium to fine grained, Red brown. Occasional large clast of Granitics.
			Total Depth 7.0 Feet. No Groundwater, No Caving
PT-36	0 – 5.0’	SM	Artificial Fill (Afu): Clayey to Silty Sand, medium to fine grained, Red brown. Occasional large clast of Granitics.
			Total Depth 5.0 Feet. No Groundwater, No Caving
PT-37	0 – 4.0’	SM	Artificial Fill (Afu): Clayey to Silty Sand, medium to fine grained, Red brown. Occasional large clast of Granitics.
			Total Depth 4.0 Feet. No Groundwater, No Caving
PT-38	0 – 5.0’	SM	Artificial Fill (Afu): Clayey to Silty Sand, medium to fine grained, Red brown. Occasional large clast of Granitics.

			Total Depth 5.0 Feet. No Groundwater, No Caving
PT-39	0 – 5.0’	SM	Artificial Fill (Afu): Clayey to Silty Sand, medium to fine grained, Red brown. Occasional large clast of Granitics.
			Total Depth 5.0 Feet. No Groundwater, No Caving
PT-40	0 – 5.0’	SM	Artificial Fill (Afu): Clayey to Silty Sand, medium to coarse grained, red brown. Occasional large clast of Granitics.
			Total Depth 5.0 Feet. No Groundwater, No Caving
PT-41	0 – 5.0’	SM	Artificial Fill (AFu): Clayey to Silty Sand, medium to fine grained, Red brown. Occasional large clast of Granitics.
	3.5’-5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 5.0 Feet. No Groundwater, No Caving
PT-42	0 - 5’	SM	Colluvium: Silty SAND, fine to med. grained, dry to damp, Sl. Dense.
	5’-9’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 9.0 Feet (not refusal). No Groundwater, No Caving

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Test Pit No.	Depth (ft.)	USCS	Description__ _Date of Excavations: November, 2013
1A-1	0 – 4.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 4.5 Feet. No Groundwater, No Caving
1A-2	0- 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 4.0 Feet. No Groundwater, No Caving
1A-3	0 - 2.0’	SM	Soil: Silty SAND, fine to med. grained, dry to damp, Sl. Dense.
	2.0’ - 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 4.0 Feet. No Groundwater, No Caving
1A-4	0 - 3.0’	SM	Soil: Silty SAND, fine to med. grained, dry to damp, Sl. Dense.
	3.0’ - 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 4.0 Feet. No Groundwater, No Caving
1A-5	0 - 4.75’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 4.75 Feet. No Groundwater, No Caving
1B-1	0 – 4.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 4.5 Feet. No Groundwater, No Caving

1B-2	0 - 3.0’	SM	Soil: Silty SAND, fine to med. grained, dry to damp, Sl. Dense.
	3.0’ - 5.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 5.0 Feet. No Groundwater, No Caving
1B-3	0- 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.0 Feet. No Groundwater, No Caving
1C-1	0 – 4.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.5 Feet. No Groundwater, No Caving
1C-2	0- 4.75’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.75 Feet. No Groundwater, No Caving
1C-3	0 - 3.0’	SM	Soil: Silty to clayey SAND, fine to med. grained, dry to damp, Sl. Dense. White clay rich zones.
	3.0’ - 4.5’	SM	Very Highly Decomposed Bedrock (Kgr): Weathered igneous bedrock, white, sandy clay zones in bedrock to 3.5 feet. Clay weathering along fractures to TD.
			Total Depth 4.5 Feet. No Groundwater, No Caving
1C-4	0 - 4.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.5 Feet. No Groundwater, No Caving
1D-1	0 - 4.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.5 Feet. No Groundwater, No Caving

1D-2	0 - 3.5’	SM	Soil: Silty to clayey SAND, fine to med. grained, dry to damp, Sl. Dense. White clay rich zones.
	3.5’ - 5.5’	SM	Very Highly Decomposed Bedrock (Kgr): Weathered igneous bedrock, white, sandy clay zones in bedrock to TD. Clay weathering along fractures. Less weathered @ 4.5 feet.
			Total Depth 5.5 Feet. No Groundwater, No Caving
1E-1	0 – 4.25’		SM Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.25 Feet. No Groundwater, No Caving
1E-2	0- 4.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.5 Feet. No Groundwater, No Caving
1E-3	0 - 2.0’	SM	Soil: Silty to SAND, fine to med. grained, dry to damp, Sl. Dense.
	2.0’ - 4.5’	SM	Very Highly Decomposed Bedrock (Kgr): Weathered igneous bedrock,
			Total Depth 4.5 Feet. No Groundwater, No Caving
1E-4	0 - 4.25’		SM Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.25 Feet. No Groundwater, No Caving
2A-1	0 – 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.0 Feet. No Groundwater, No Caving
2A-2	0- 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.0 Feet. No Groundwater, No Caving

2A-3	0 - 3.5’	SM	Artificial Fill: Silty SAND, fine to med. grained, dry to damp, Sl. Dense. Clast of granitic material.
	3.5’ - 6.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 6.0 Feet. No Groundwater, No Caving
2A-4	0 - 1.0’	SM	Artificial Fill: Silty SAND, fine to med. grained, dry to damp, Sl. Dense.
	1.0’ - 4.25’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 4.25 Feet. No Groundwater, No Caving
2A-5	0 - 4.0’	SM	Artificial Fill: Silty SAND, fine to med. grained, dry to damp, Sl. Dense.
	4.0’- 6.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained.
			Total Depth 6.5 Feet. No Groundwater, No Caving
2B-1	0 - 4.75’		SM Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Loose in upper 4.0 feet
			Total Depth 4.75 Feet. No Groundwater, No Caving
2B-2	0 - 4.25’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Very dense @ 3’.
			Total Depth 4.25 Feet. No Groundwater, No Caving
2B-3	0- 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Very dense @ 2’.
			Total Depth 4.0 Feet. No Groundwater, No Caving
2C-1	0 – 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Very dense @ 2’
			Total Depth 4.0 Feet. No Groundwater, No Caving

2C-2	0- 5.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 5.0 Feet. No Groundwater, No Caving
2C-3	0 - 4.25’	SM	Very Highly Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Very dense @3.5’. Total Depth 4.25 Feet. No Groundwater, No Caving
2C-4	0- 4.25’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Very dense below 2 feet. Total Depth 4.25 Feet. No Groundwater, No Caving
2D-1	0 - 4.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 4.0 Feet. No Groundwater, No Caving
2D-2	0 - 4.5’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Hard @ 3’. Total Depth 4.5 Feet. No Groundwater, No Caving
2D-3	0 – 2.0’	SM	Artificial Fill: Silty to clayey SAND, fine to med. grained, dry to damp, Sl. Dense.
	2.0’ - 5.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous rock, medium to coarse grained. Total Depth 5.0 Feet. No Groundwater, No Caving
2D-4	0 - 3.0’	SM	Artificial Fill: Silty to clayey SAND, fine to med. grained, dry to damp, Sl. Dense.
	3.0’ - 6.0’	SM	Decomposed Bedrock (Kgr): Weathered igneous bedrock, medium to coarse grained. Total Depth 6.0 Feet. No Groundwater, No Caving

Work Order	**500654**
Date Excavated	April 11-13, 2005
Excavated by	TJM
Equipment	CAT 320 Excavator~47,000 lbs

TABLE I

LOG OF TEST PITS

Test Pit No.	Depth (ft.)	USCS	Description
T-1	0.0 – 17.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, hard, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. Upper 5 feet, extremely weathered REFUSAL AT 17 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED BULK SAMPLE AT 13 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-2	0.0 – 14.5	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. Upper 4 feet, extremely weathered REFUSAL AT 14.5 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-6	0.0 – 8.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. Upper 3 feet, extremely weathered REFUSAL AT 8 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED BULK SAMPLE AT 5 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-7	0.0 – 8.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. Upper 3 feet, extremely weathered REFUSAL AT 8 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-8	0.0 – 11.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 11 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-12	0.0 – 9.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 9 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-13	0.0 – 13.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 13 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED BULK SAMPLE AT 3 - 4 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-14	0.0 – 10.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 10 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-15	0.0 – 10.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 10 FEET SEEPAGE AT 5 FEET NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-16	0.0 – 11.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 11 FEET SEEPAGE AT 5 FEET NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-17	0.0 – 8.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 8 FEET SEEPAGE AT 3 FEET NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-9	0.0 – 2.5	ML	**TOP SOIL (No Map Symbol):** CLAYEY SILT, dark brown to black, moist to wet, soft, roots, organics
	2.5 – 6.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 6 FEET NO GROUNDWATER ENCOUNTERED MINOR CAVING OBSERVED AT 2 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-10	0.0 – 6.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic . REFUSAL AT 6 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-11	0.0 – 6.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 6 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-18	0.0 – 10.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 10 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-19	0.0 –8.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 8 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-20	0.0 –7.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 7 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-21	0.0 – 2.0	SM	**COLLUVIUM (Col):** SILTY SAND, fine to medium sand, medium dense, moist, brown, minor clays, increase in grain size and density with depth.
	2.5 – 6.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 6 FEET NO GROUNDWATER ENCOUNTERED MINOR CAVING OBSERVED AT 2 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-22	0.0 – 2.0	SM	**ALLUVIUM (Qal):** SILTY SAND, fine grained, soft, brown, moist to wet, minor pebbles
	2.0 – 6.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 6 FEET GROUNDWATER AT 2 FEET MINOR CAVING OBSERVED AT 2 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-23	0.0 –18.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 18 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED BULK SAMPLE AT 3 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-24	0.0 –7.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 7 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-25	0.0 –10.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 10 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-26	0.0 –13.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 13 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-27	0.0 –14.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 14 FEET BOULDER (FLOAT) 10 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-28	0.0 –11.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 11 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED BULK SAMPLE AT 4 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-29	0.0 –7.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 7 FEET BOULDER (FLOAT) 5 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-30	0.0 –14.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 14 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-31	0.0 – 3.0	SM	**ALLUVIUM (Qal):** SILTY SAND, fine grained, soft, brown, moist to wet, minor pebbles
	3.0 – 16.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 16 FEET GROUNDWATER AT 8 FEET MINOR CAVING AT 4 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-32	0.0 –13.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 13 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-33	0.0 –7.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 7 FEET GROUNDWATER AT 5 FEET MINOR CAVING AT 5 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-34	0.0 –9.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 9 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-35	0.0 –13.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 13 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-36	0.0 –15.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 15 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-37	0.0 –5.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 5 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-37A	0.0 –9.0	Bedrock	**GRANODIORITE BEDROCK (Kgr** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 9 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-38	0.0 –3.0	Bedrock	**GRANODIORITE BEDROCK (Kgr** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 3 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-38A	0.0 –6.0	Bedrock	**GRANODIORITE BEDROCK (Kgr** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 6 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-39	0.0 –13.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 13 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-40	0.0 –10.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 10 FEET SEEPAGE AT 6 FEET MINOR CAVING AT 6 FEET BULK SAMPLE AT 5 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-41	0.0 –6.0	Bedrock	**GRANODIORITE BEDROCK (Kgr** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 6 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-42	0.0 –7.0	Bedrock	**GRANODIORITE BEDROCK (Kgr** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 6 FEET GROUNDWATER AT 4 FEET CAVING IN UPPER 4 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-43	0.0 –13.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 13 FEET GROUNDWATER AT 4 FEET CAVING IN UPPER 4 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-44	0.0 –11.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 11 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-45	0.0 –11.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 11 FEET NO GROUNDWATER ENCOUNTERED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-46	0.0 – 3.0	SM	**ALLUVIUM (Qal):** SILTY SAND, fine grained, soft, brown, moist to wet, minor pebbles
	3.0 – 16.0	Bedrock	**GRANODIORITE BEDROCK (Kgr)** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 15 FEET GROUNDWATER AT 7 FEET MINOR CAVING AT 7 FEET

Test Pit No.	Depth (ft.)	USCS	Description
T-47	0.0 – 11.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 11 FEET NO GROUNDWATER OBSERVED NO CAVING OBSERVED

Test Pit No.	Depth (ft.)	USCS	Description
T-48	0.0 – 8.0	Bedrock	**GRANODIORITE BEDROCK (Kgr):** Igneous bedrock, medium to coarse grained, granular texture, mostly grey with a salt and pepper appearance, ~75% quartz / feldspar, ~25% mafic. REFUSAL AT 8 FEET NO GROUNDWATER OBSERVED NO CAVING OBSERVED

AIR TRACK-1

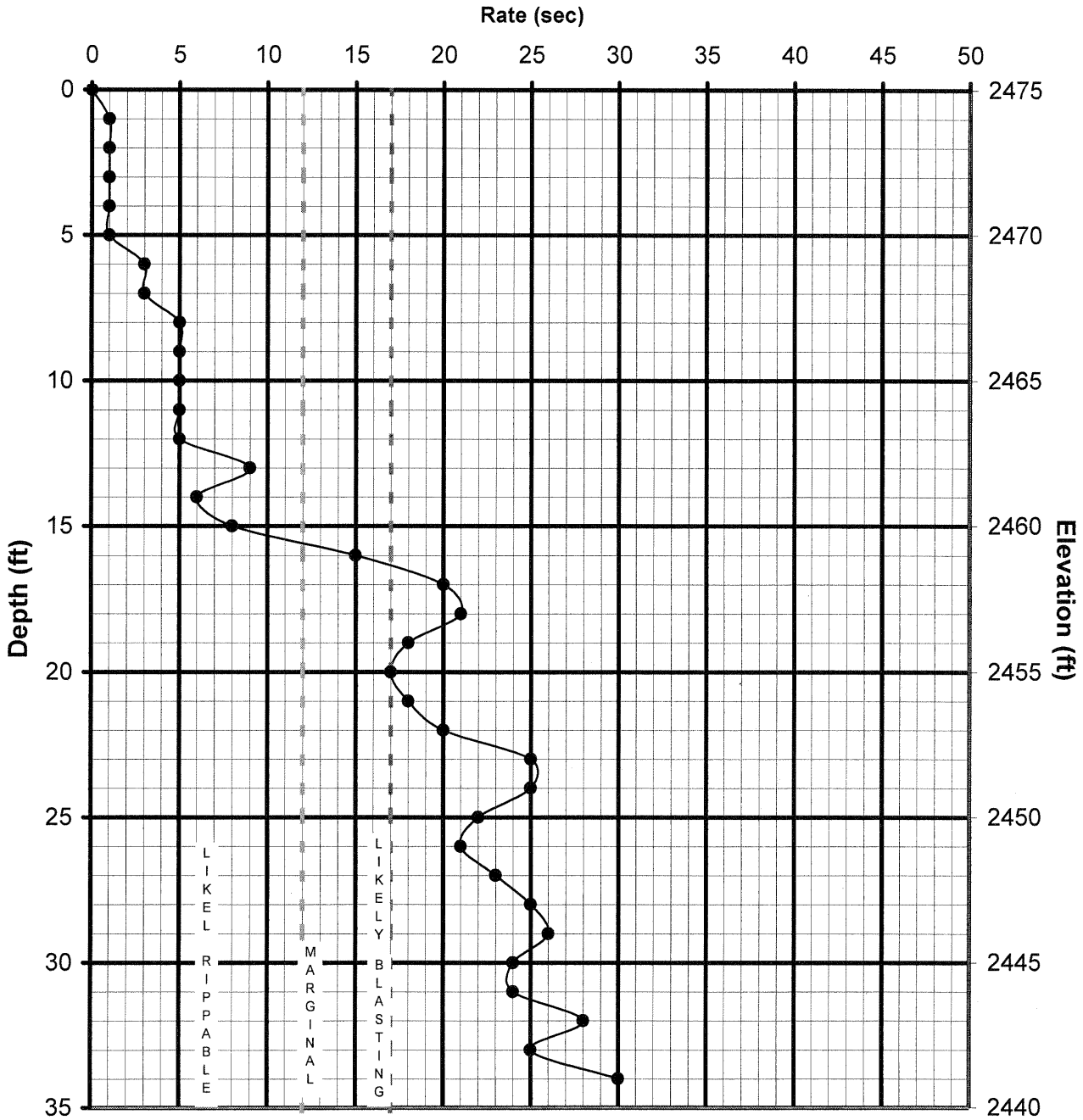

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PLATE B-1

AIR TRACK-2

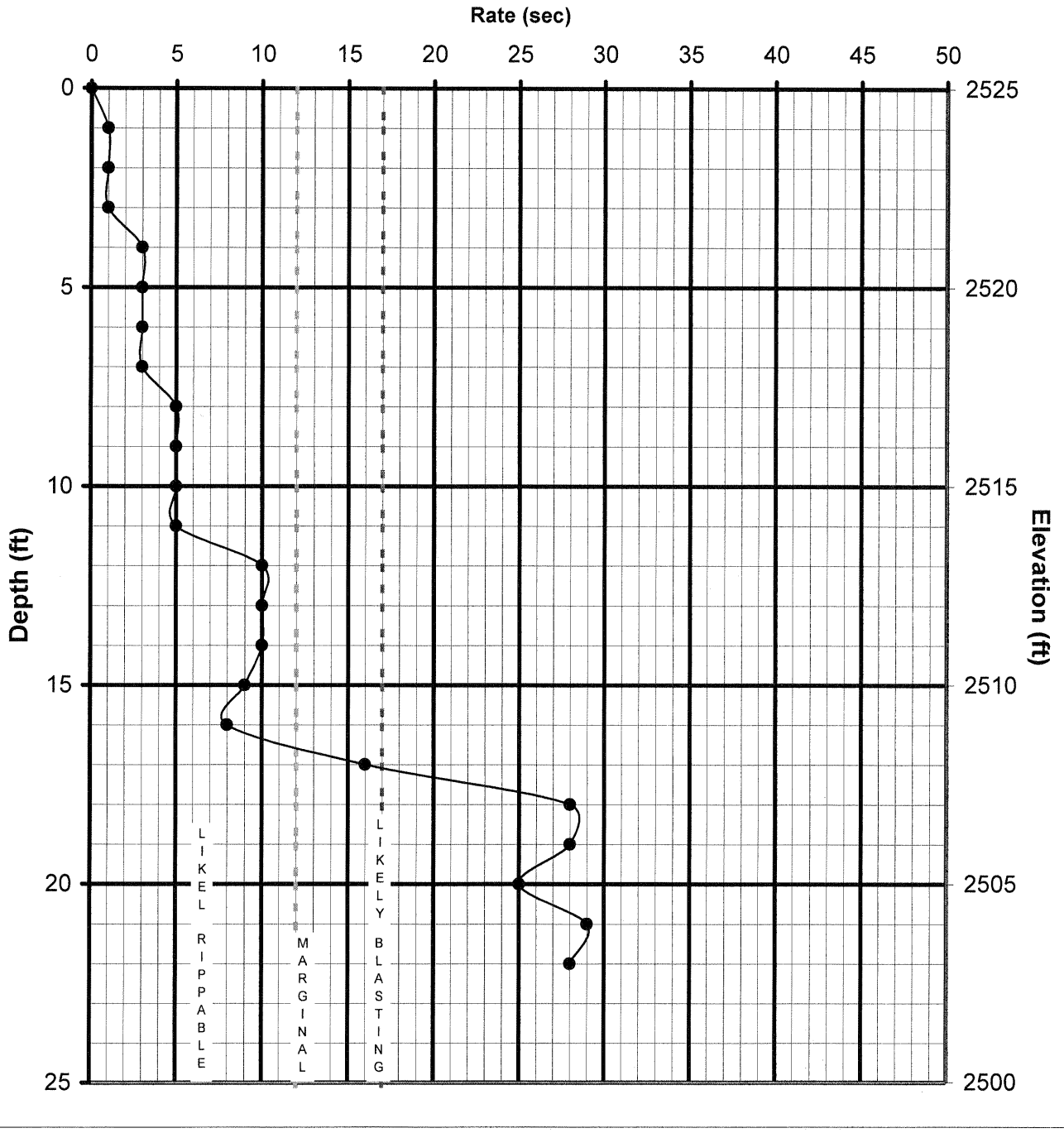

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PLATE B-2

AIR TRACK-3

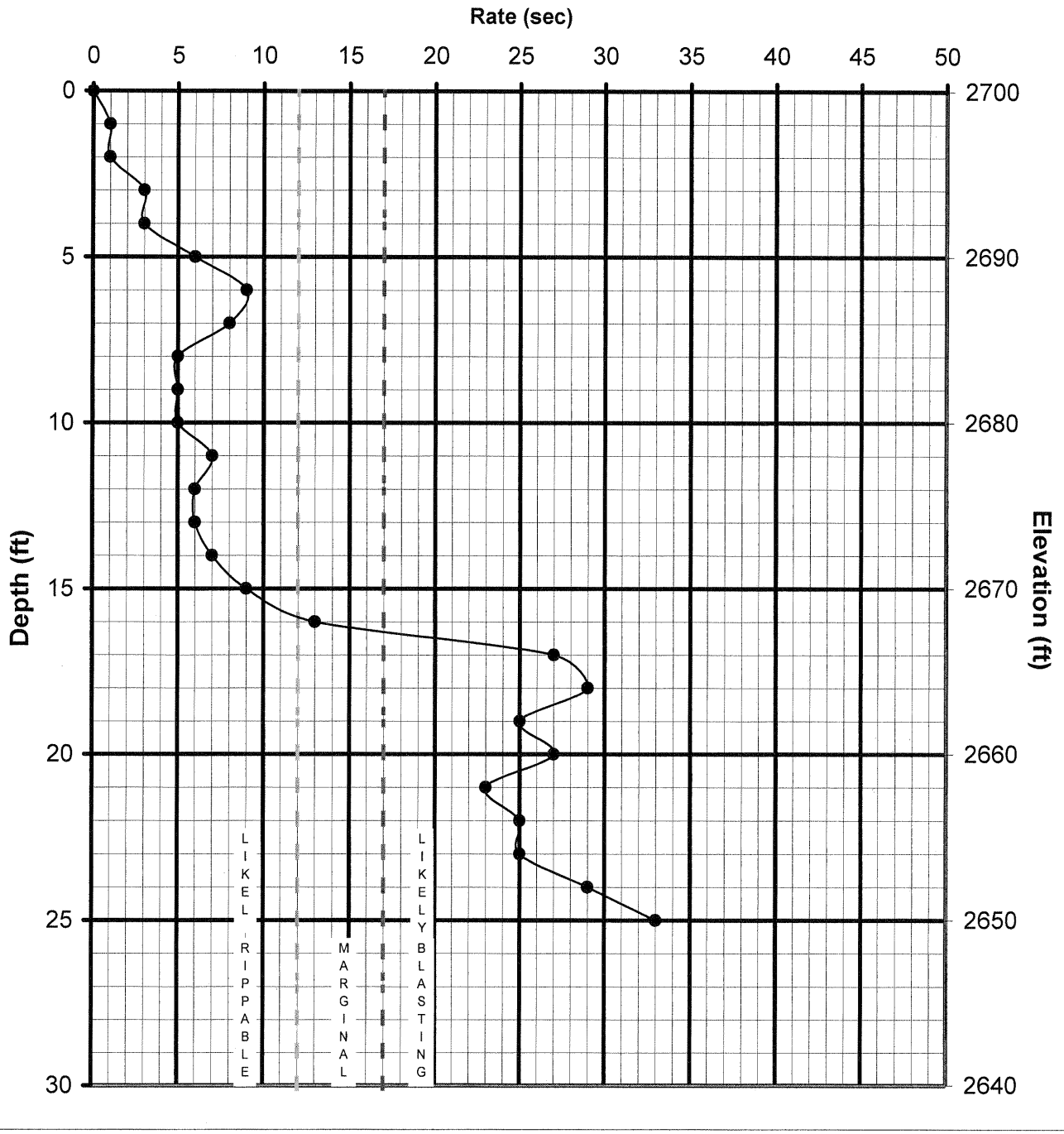

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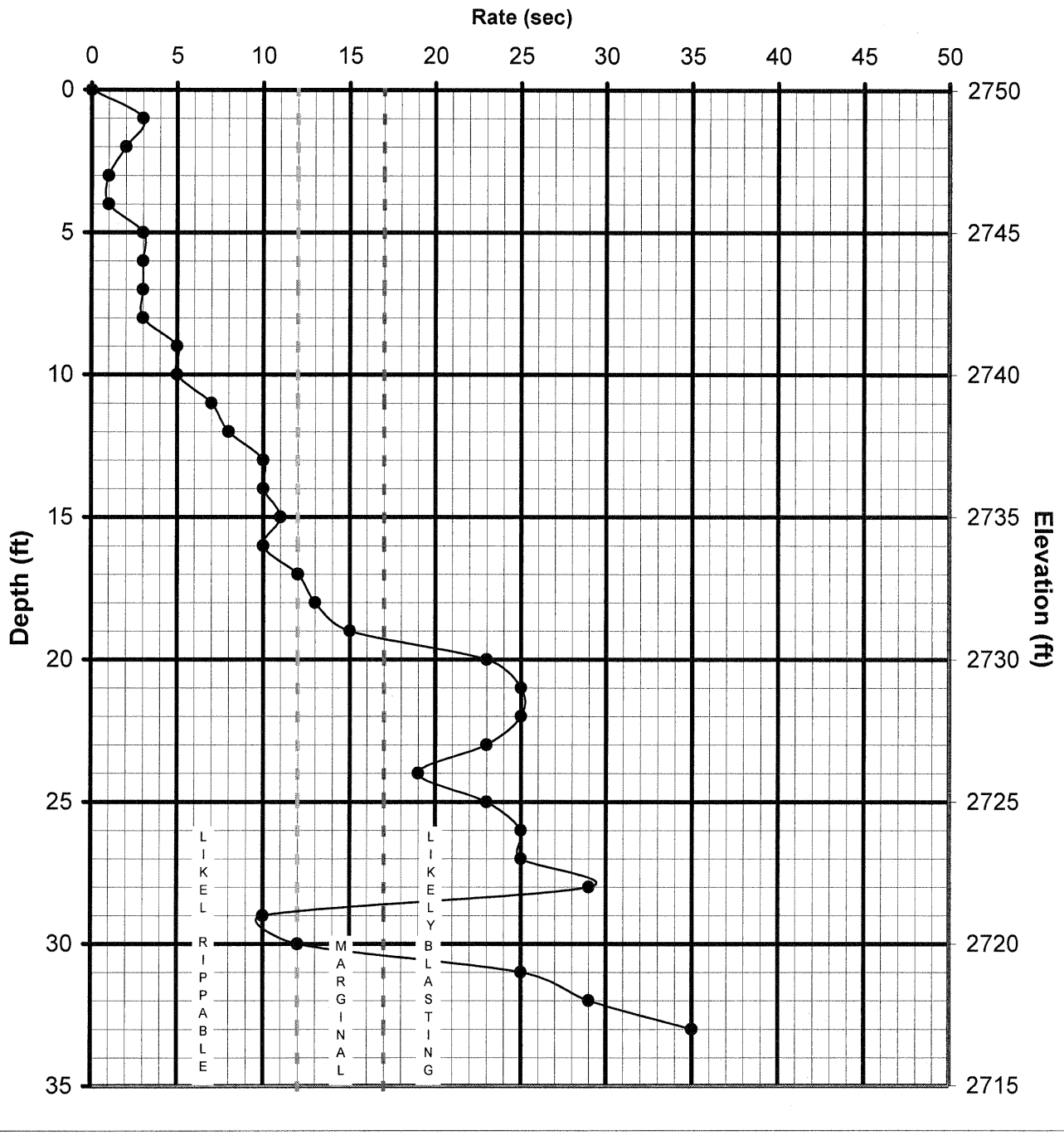
PLATE B-3

AIR TRACK-4



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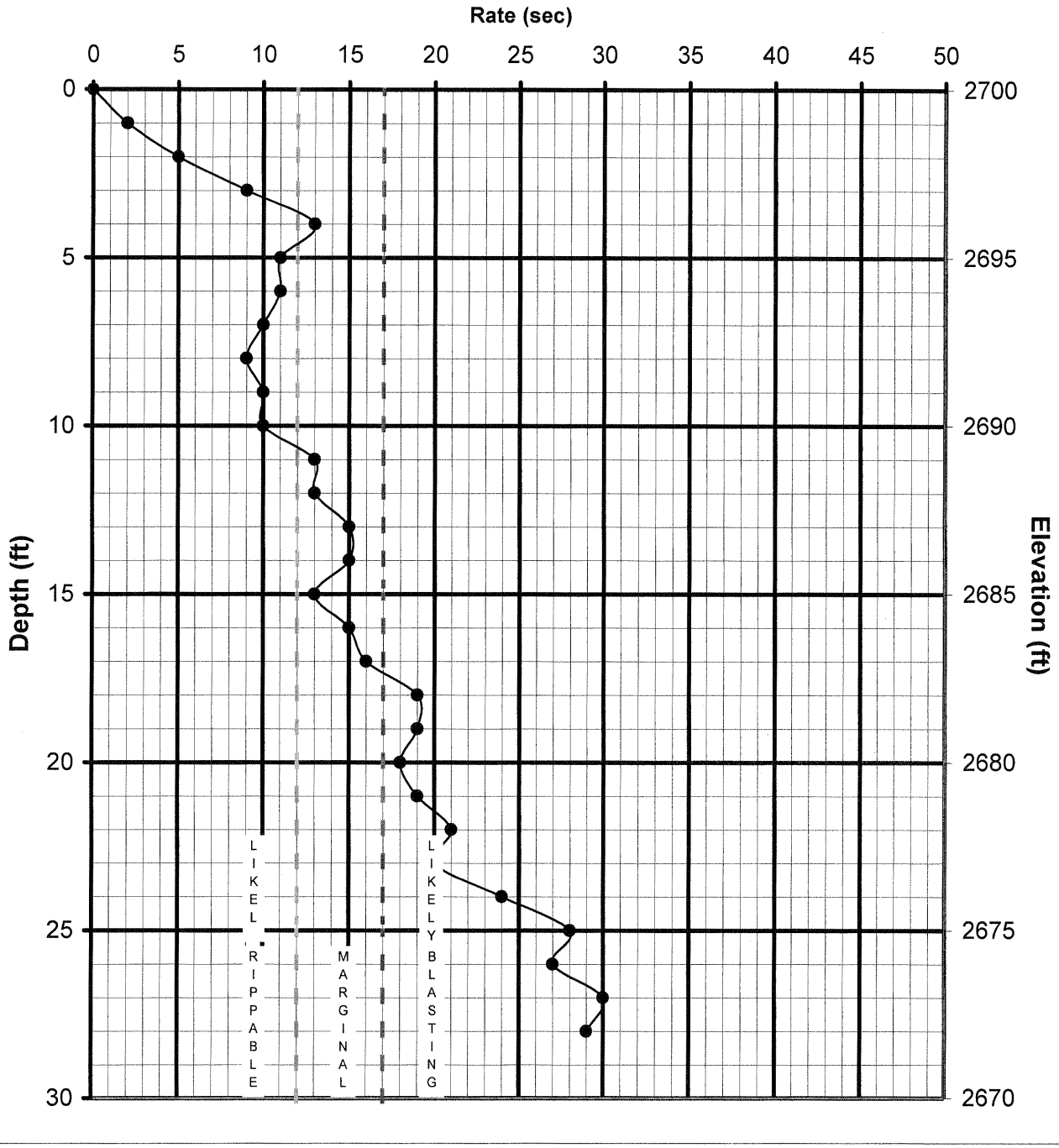
AIR TRACK-5



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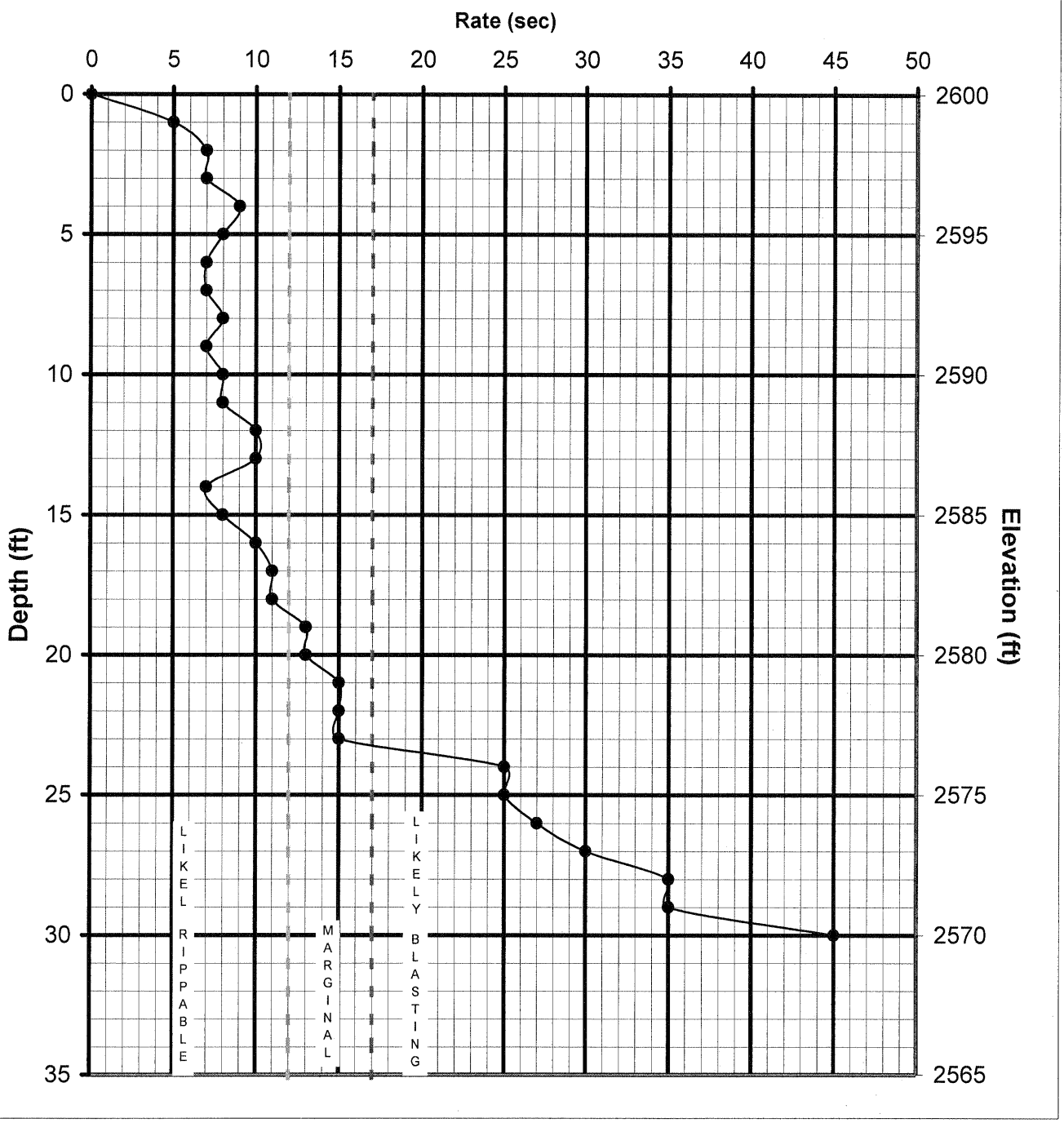
AIR TRACK-6



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AIR TRACK-7

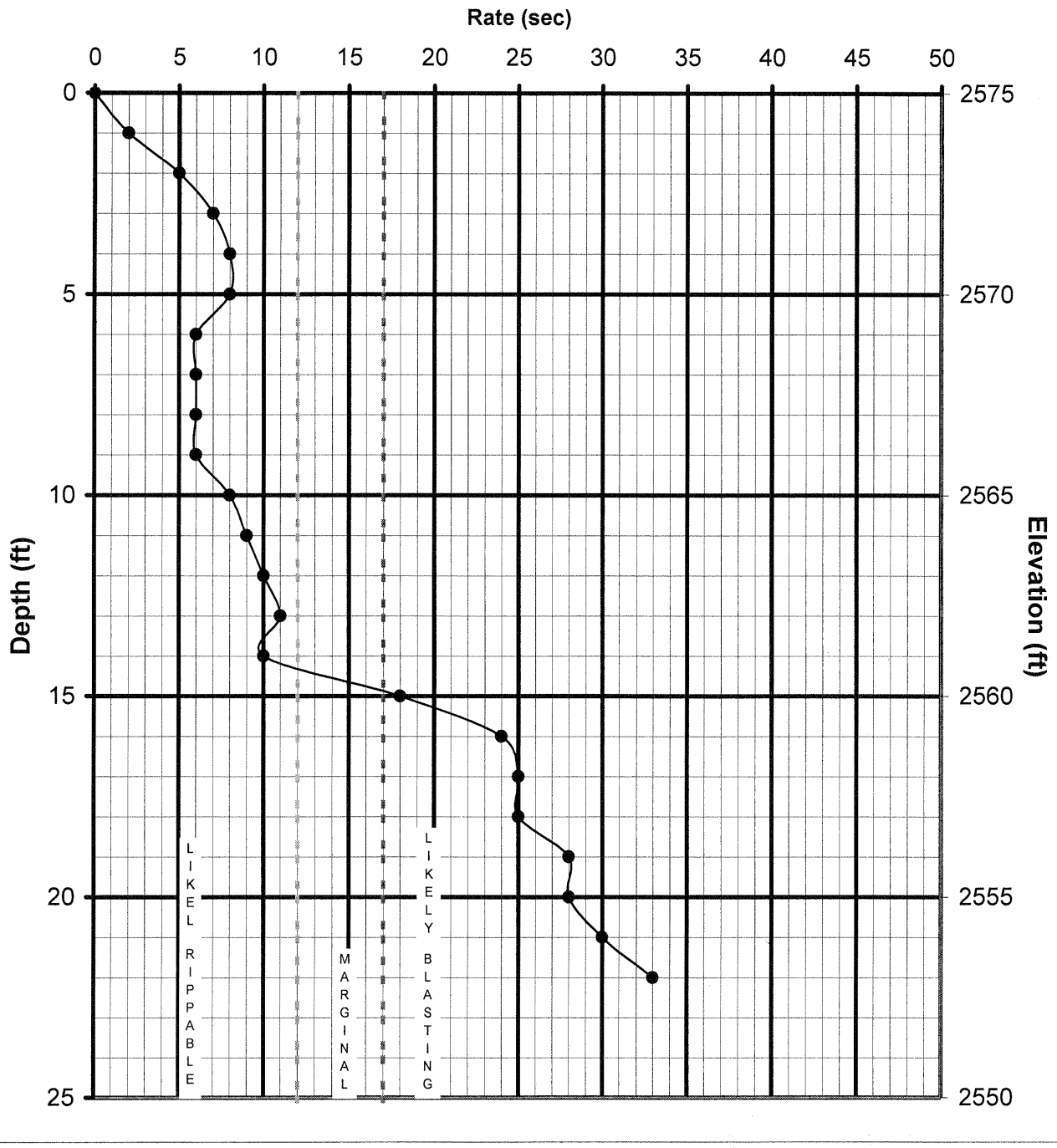

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PLATE B-7

AIR TRACK-8

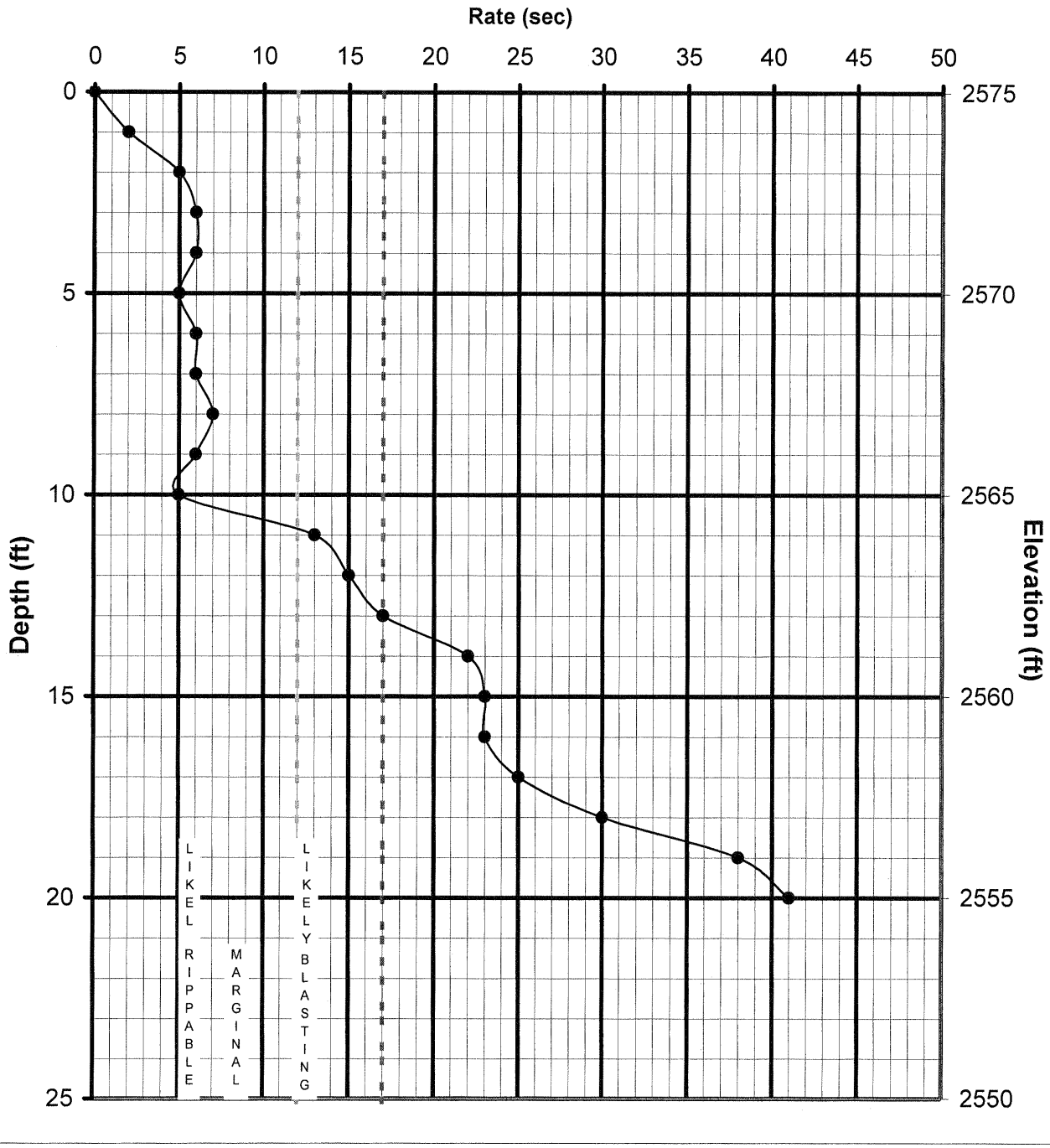

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PLATE B-8

AIR TRACK-9

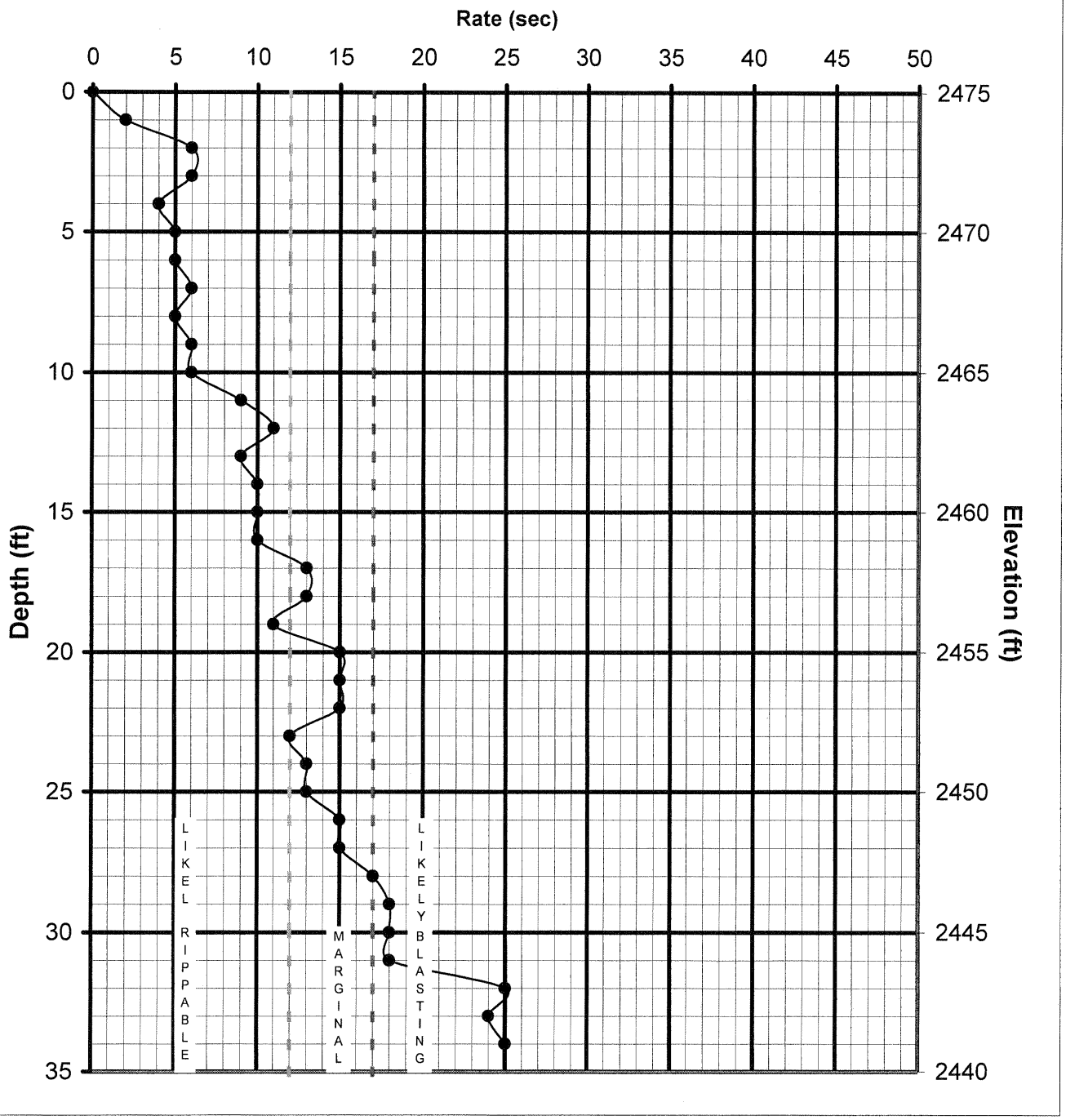

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PLATE B-9

AIR TRACK-10

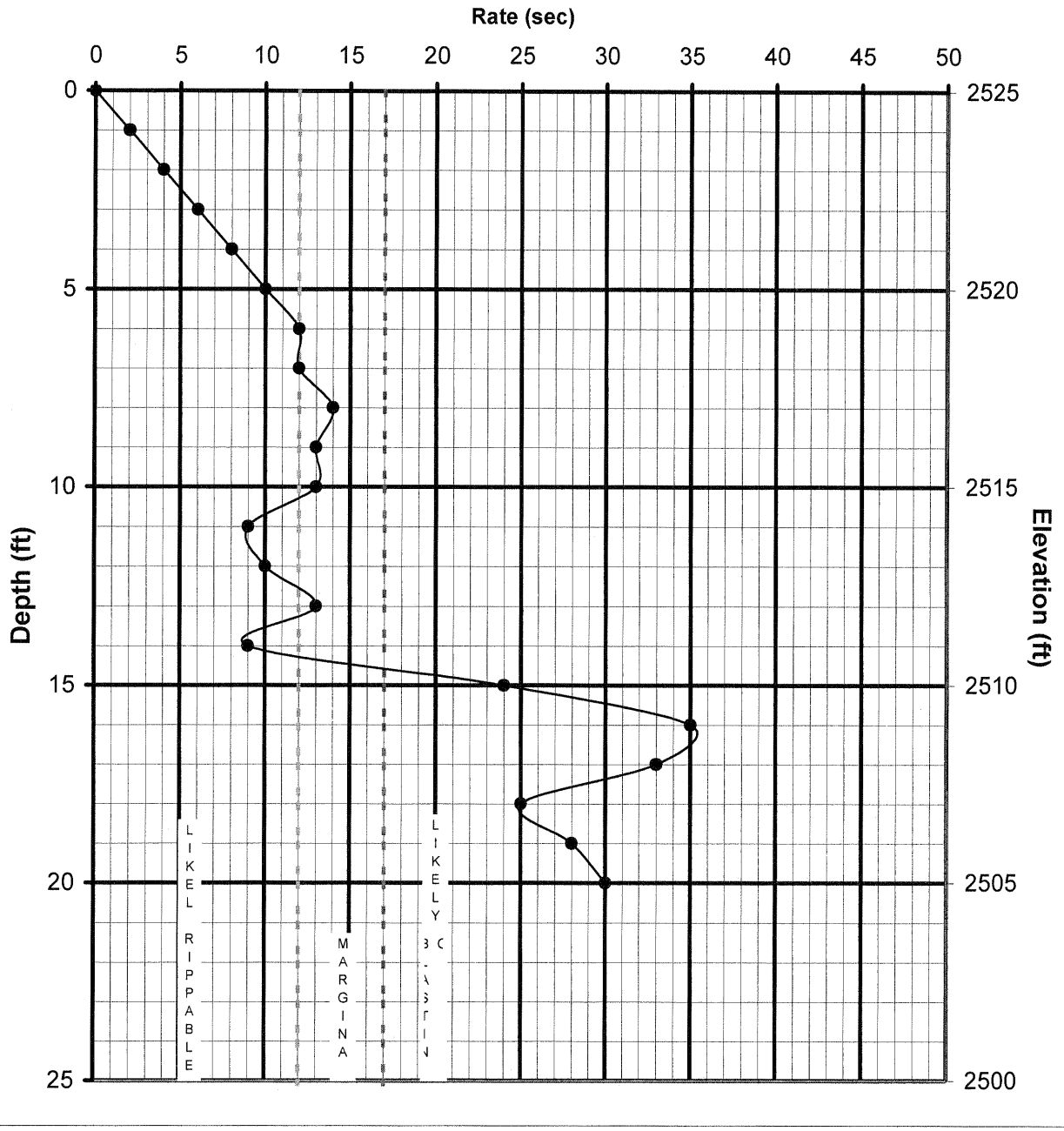

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PLATE B-10

AIR TRACK-11

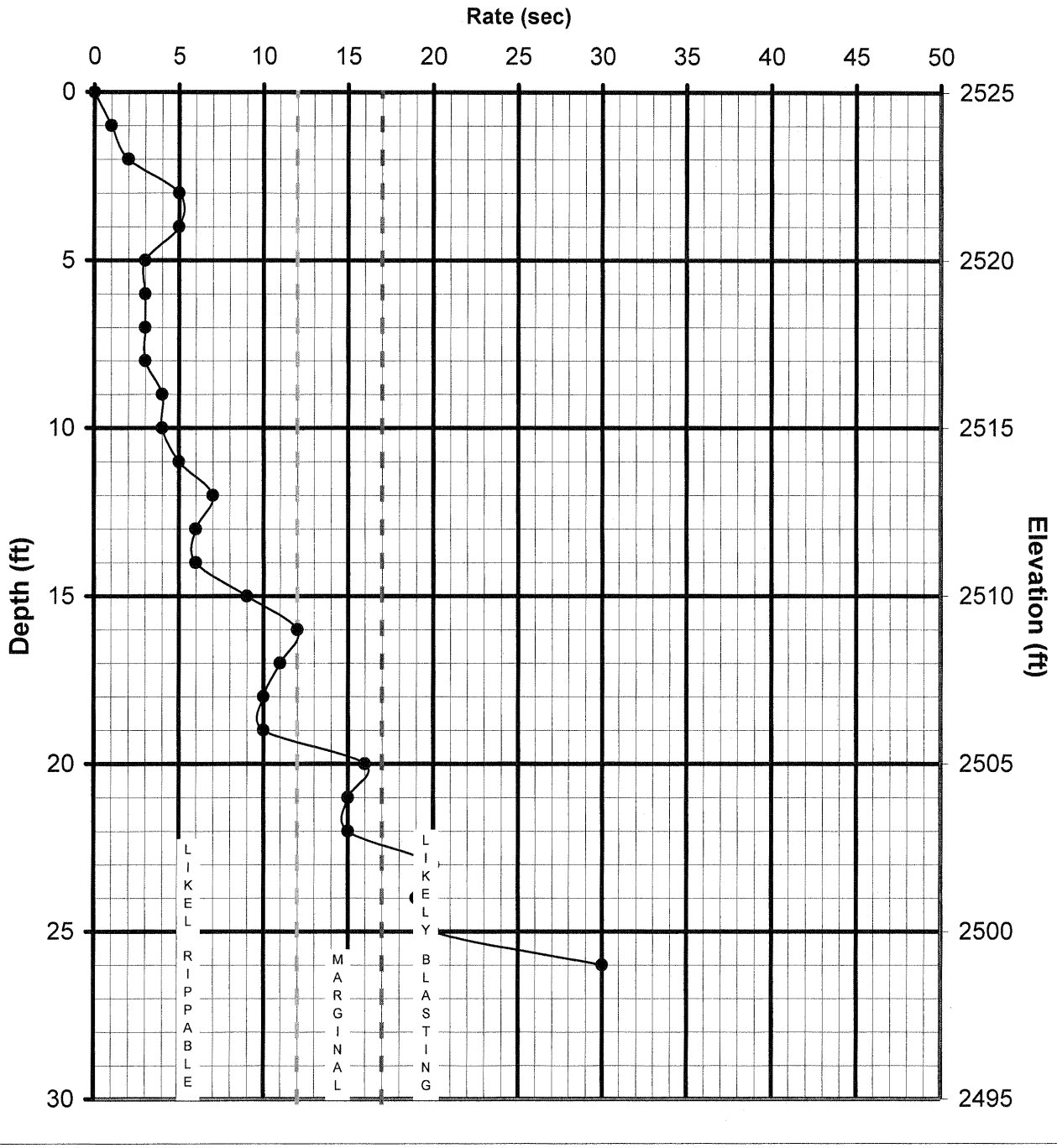

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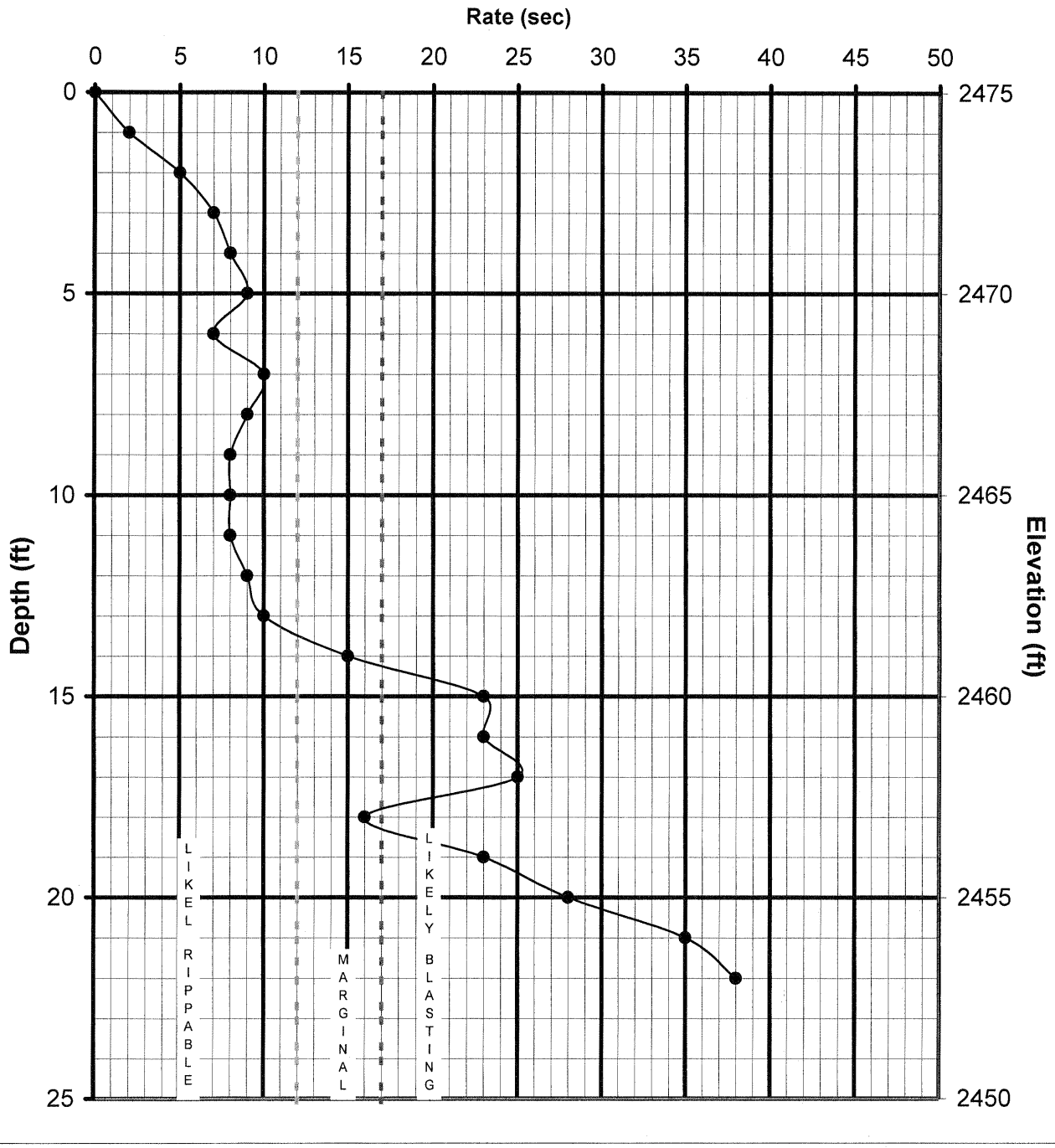
PLATE B-11

AIR TRACK-12



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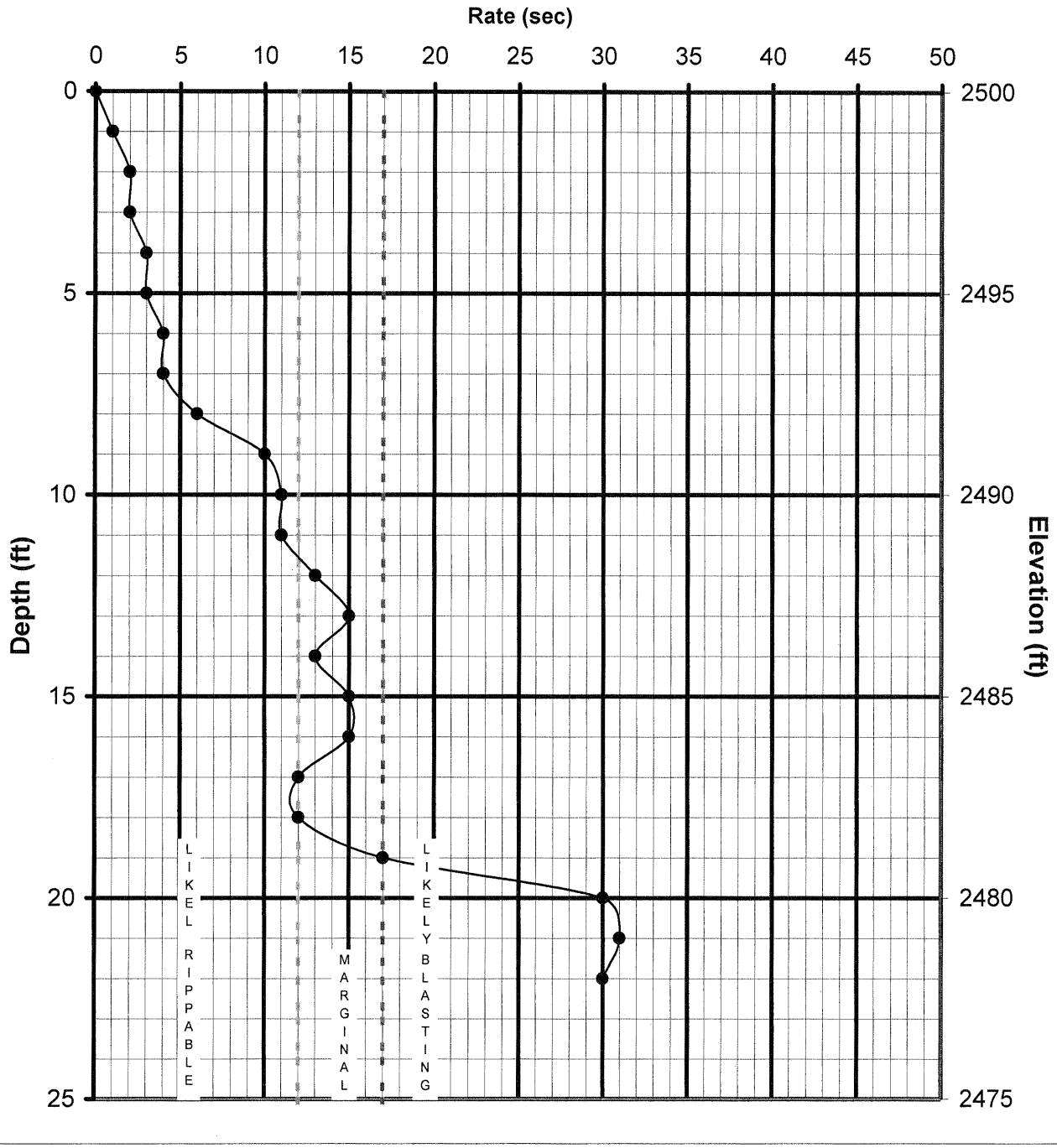
Work Order: 500654 Date: 04/29/04
PLATE B-12

AIR TRACK-13



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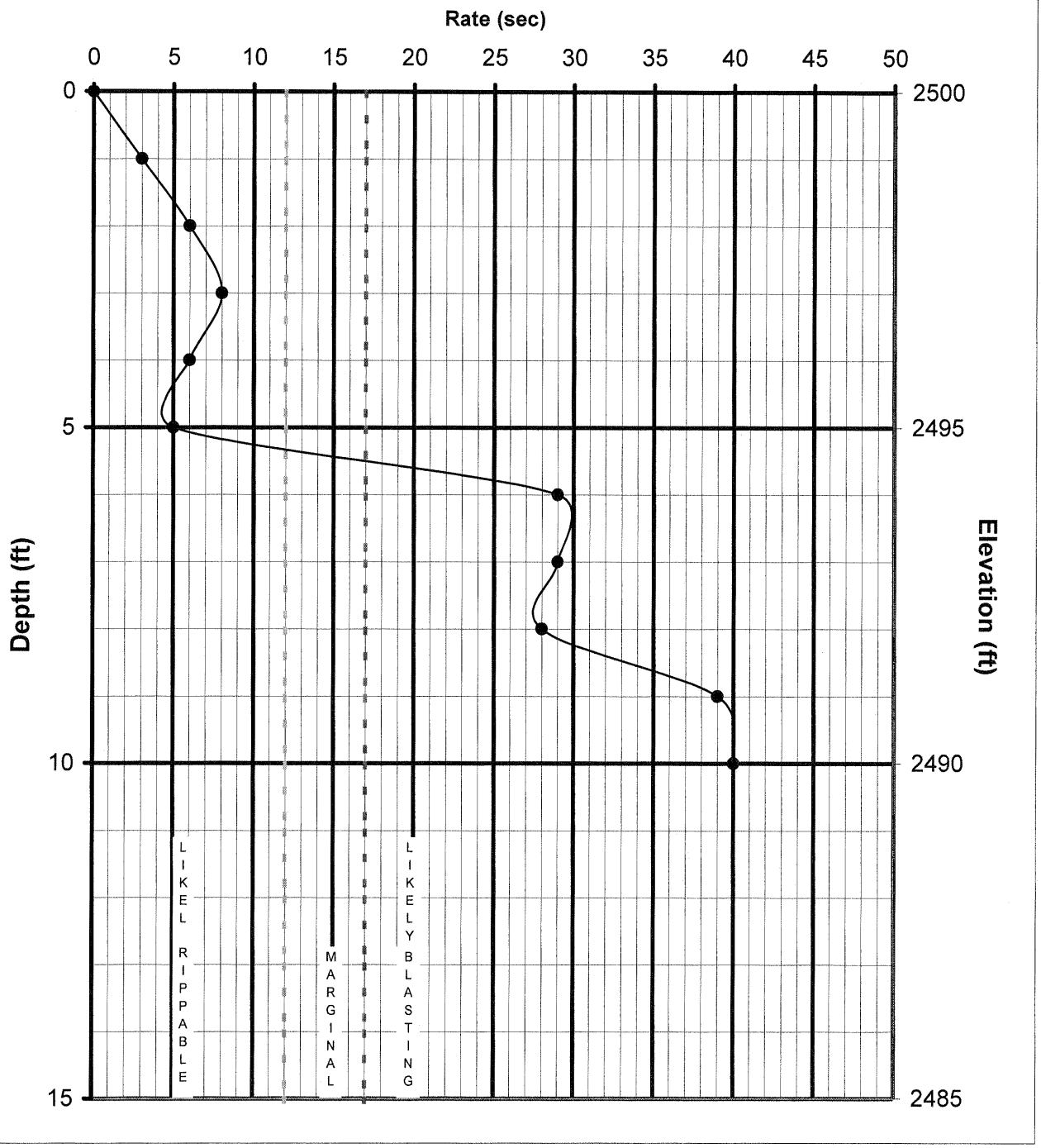
AIR TRACK-14



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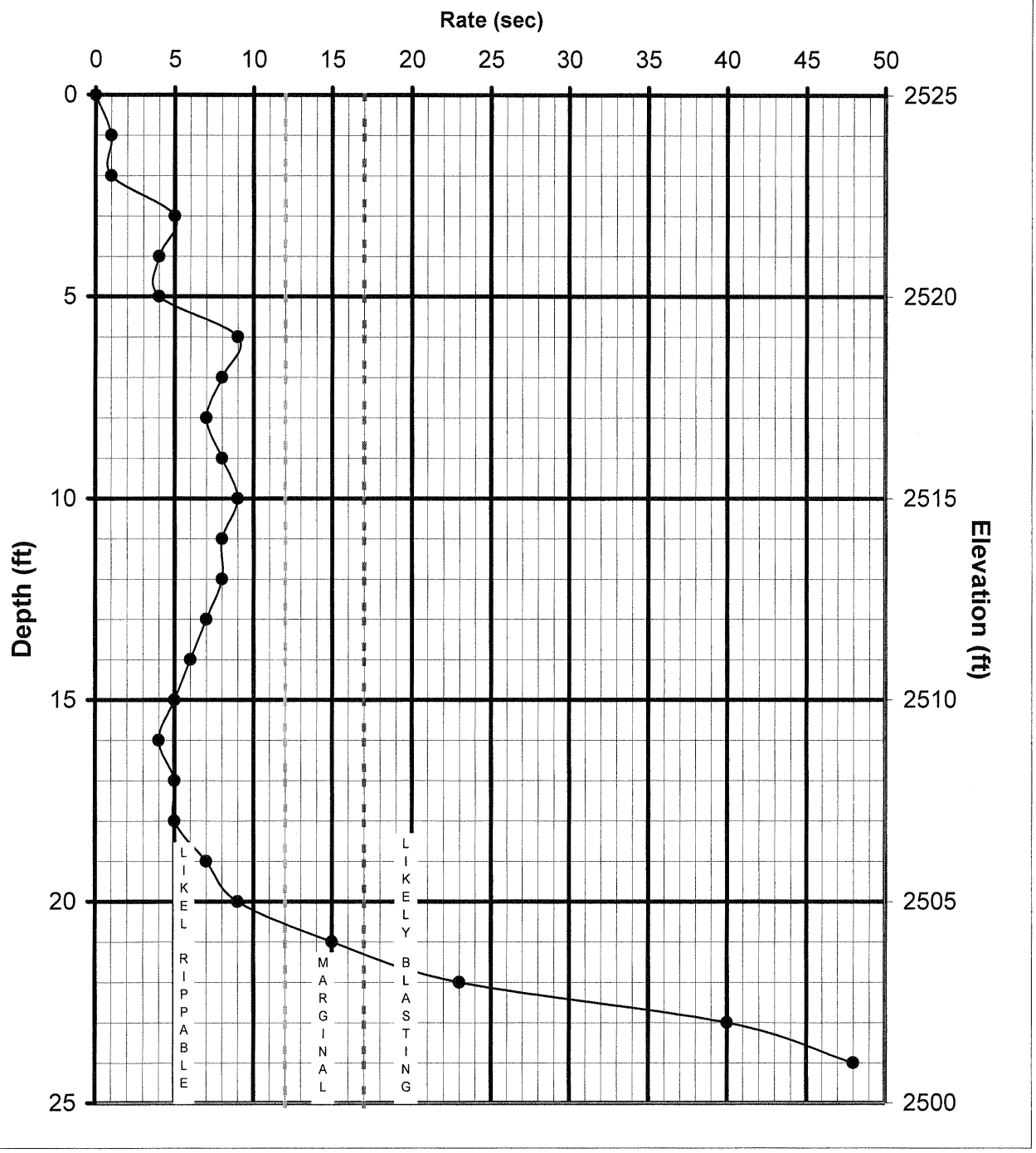
AIR TRACK-15



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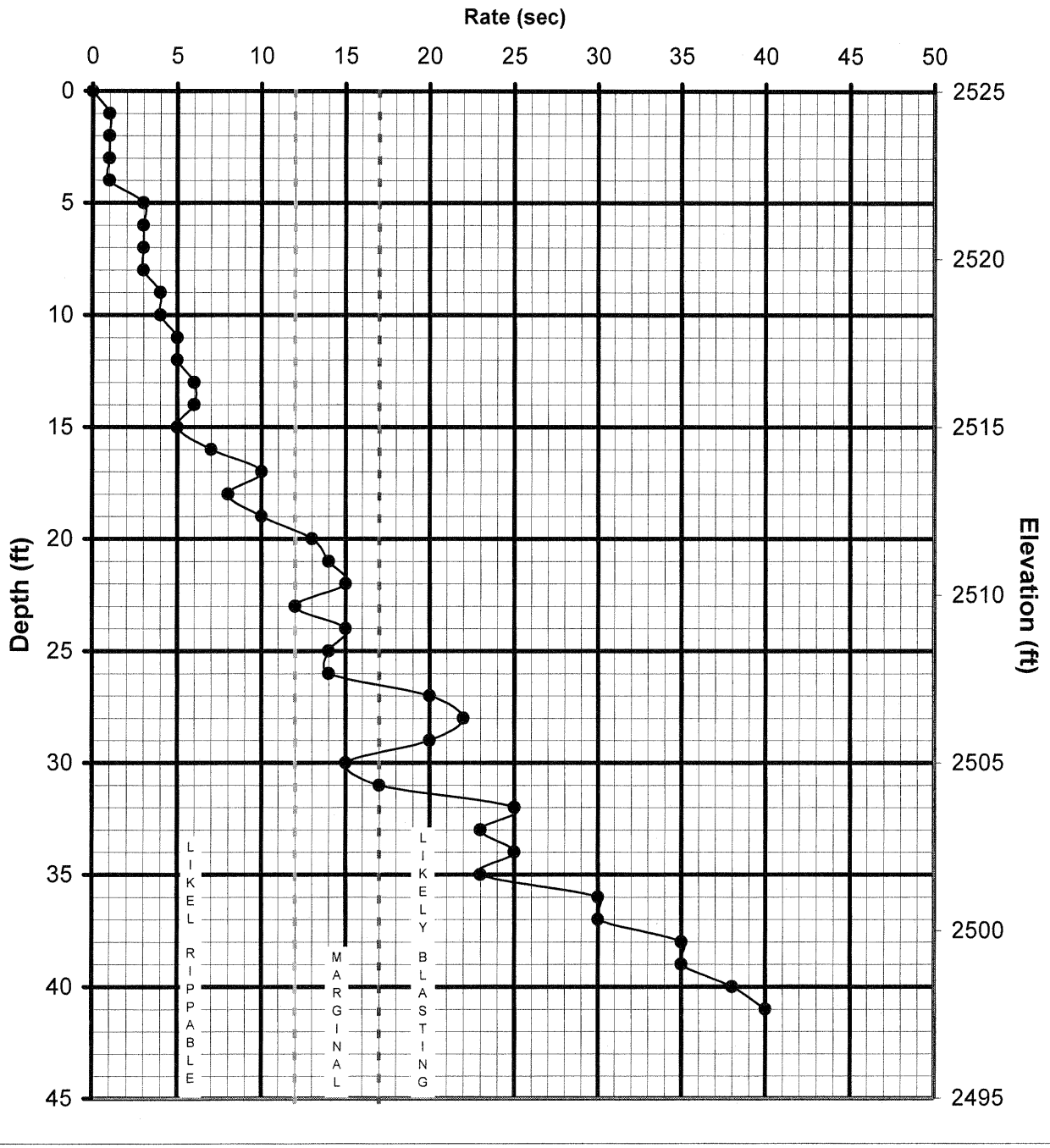
AIR TRACK-16



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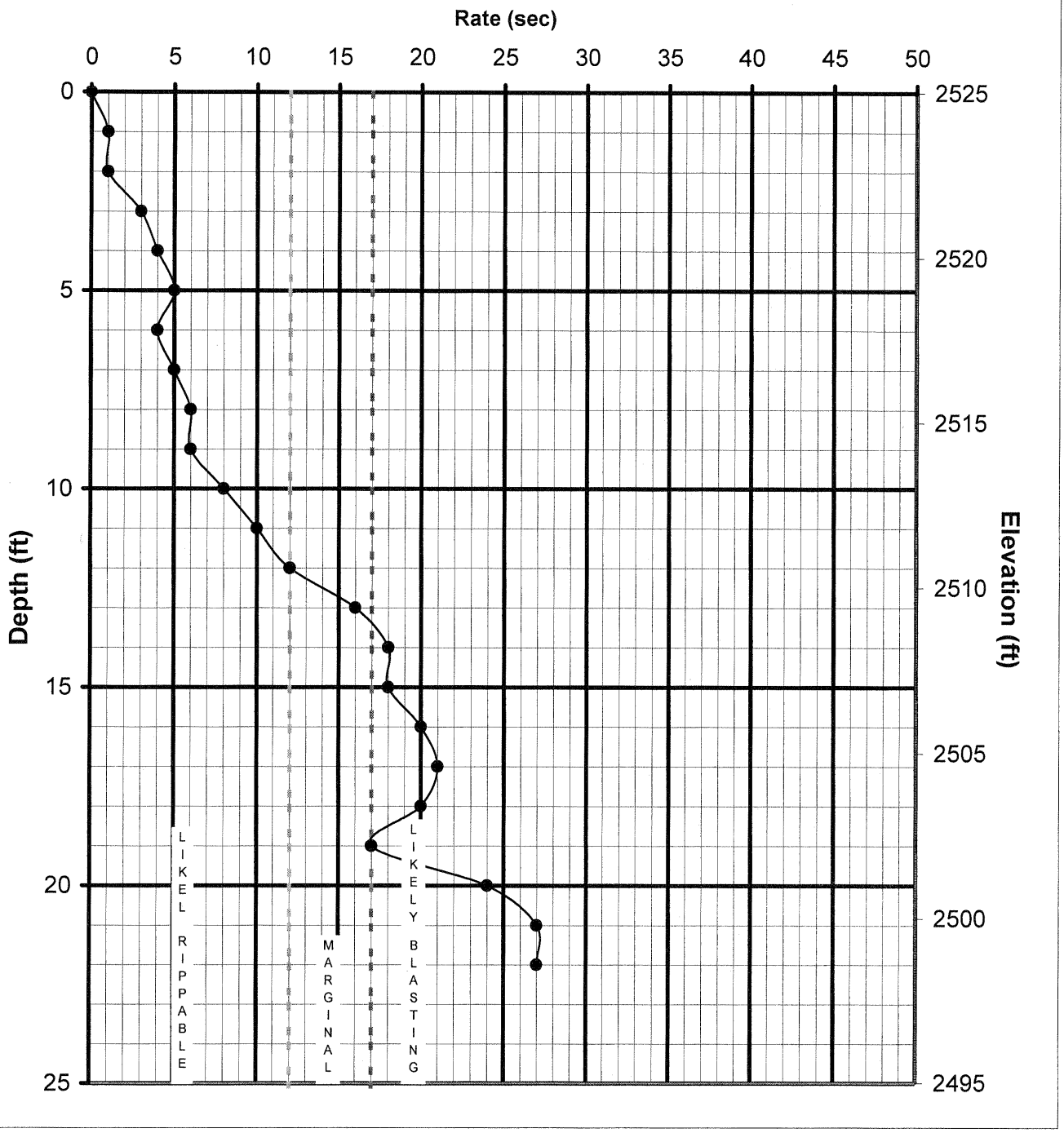
AIR TRACK-17



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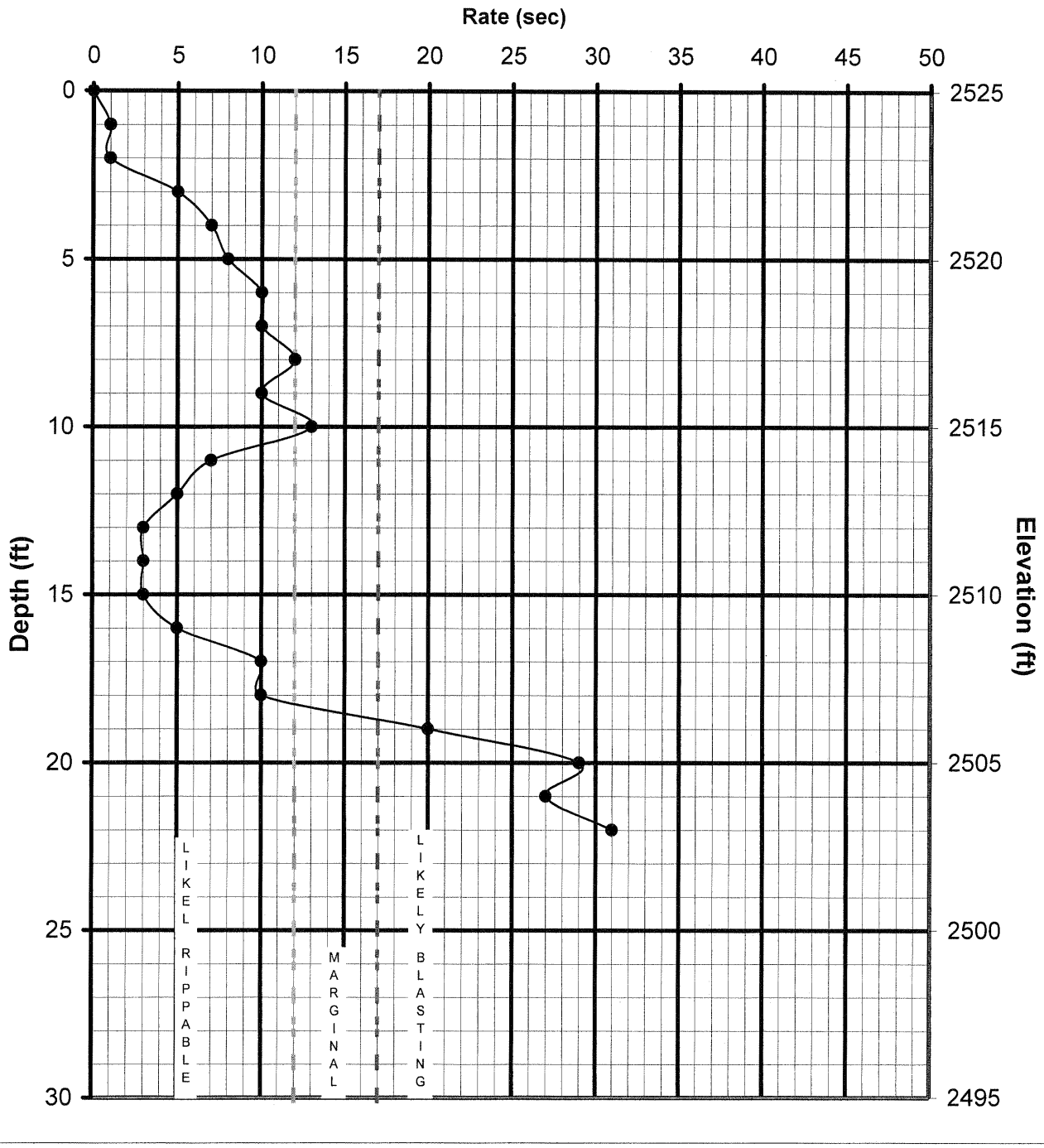
Work Order: 500654 Date: 04/29/04
PLATE B-17

AIR TRACK-18



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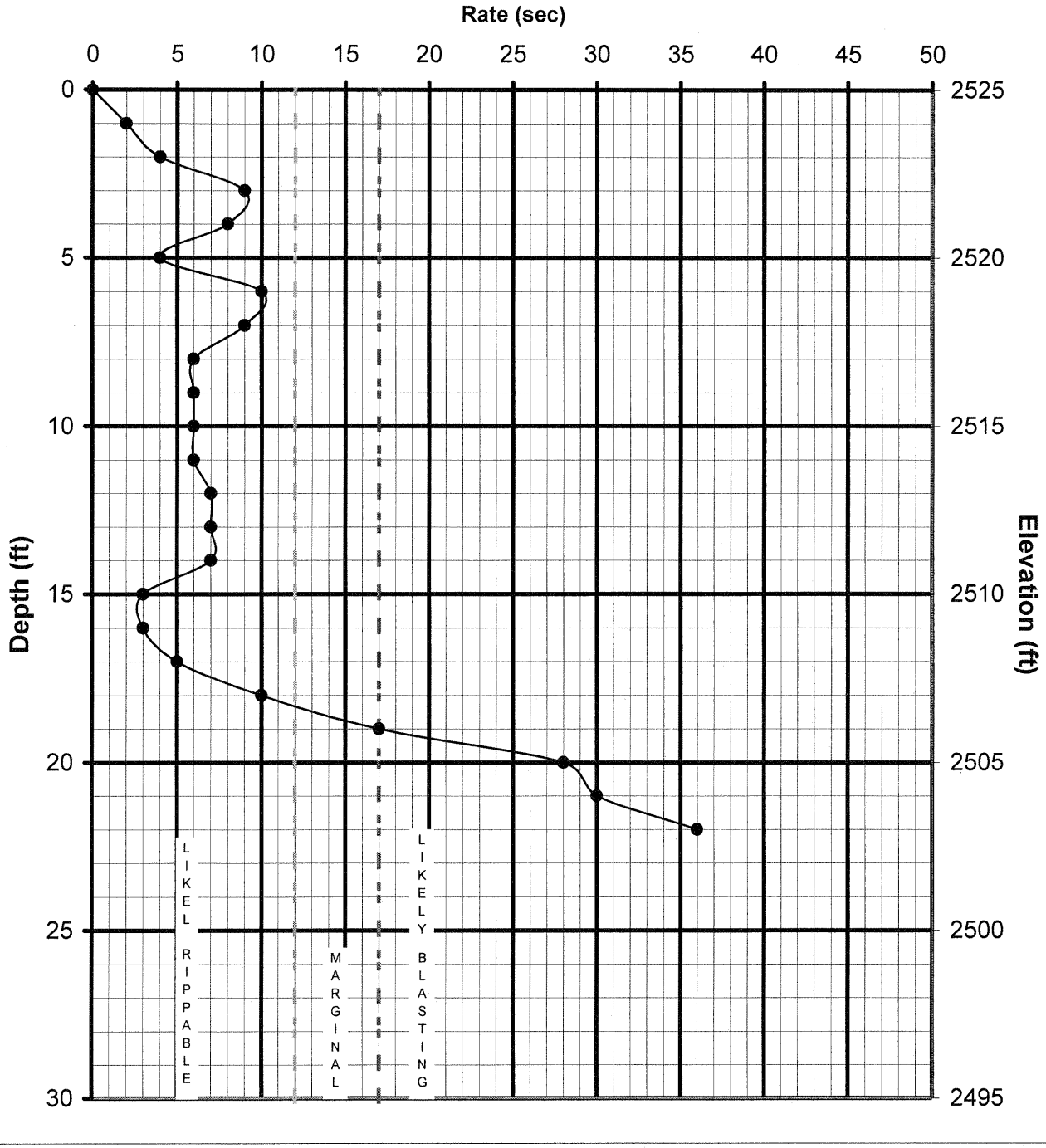
AIR TRACK-19



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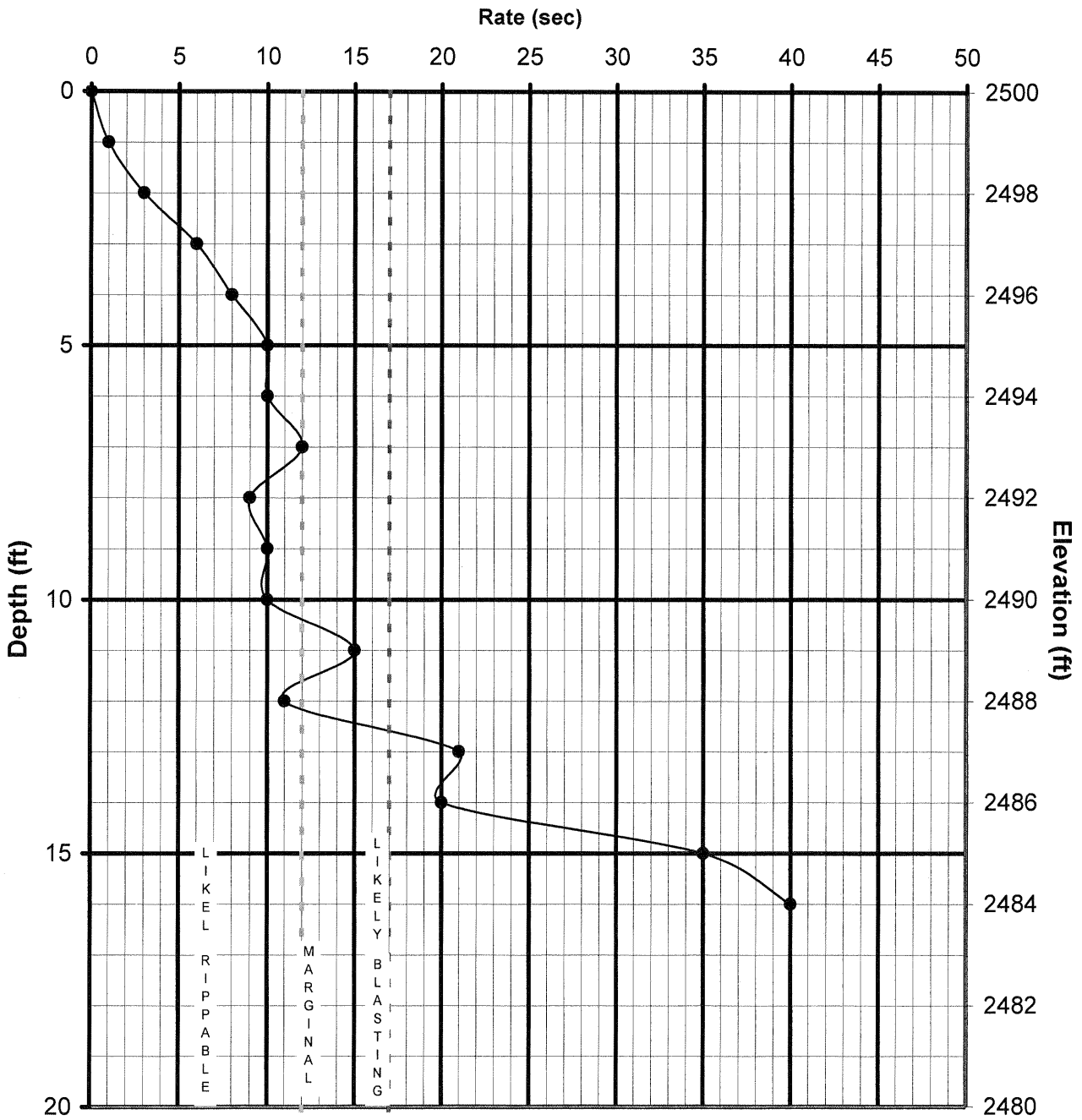
AIR TRACK-20



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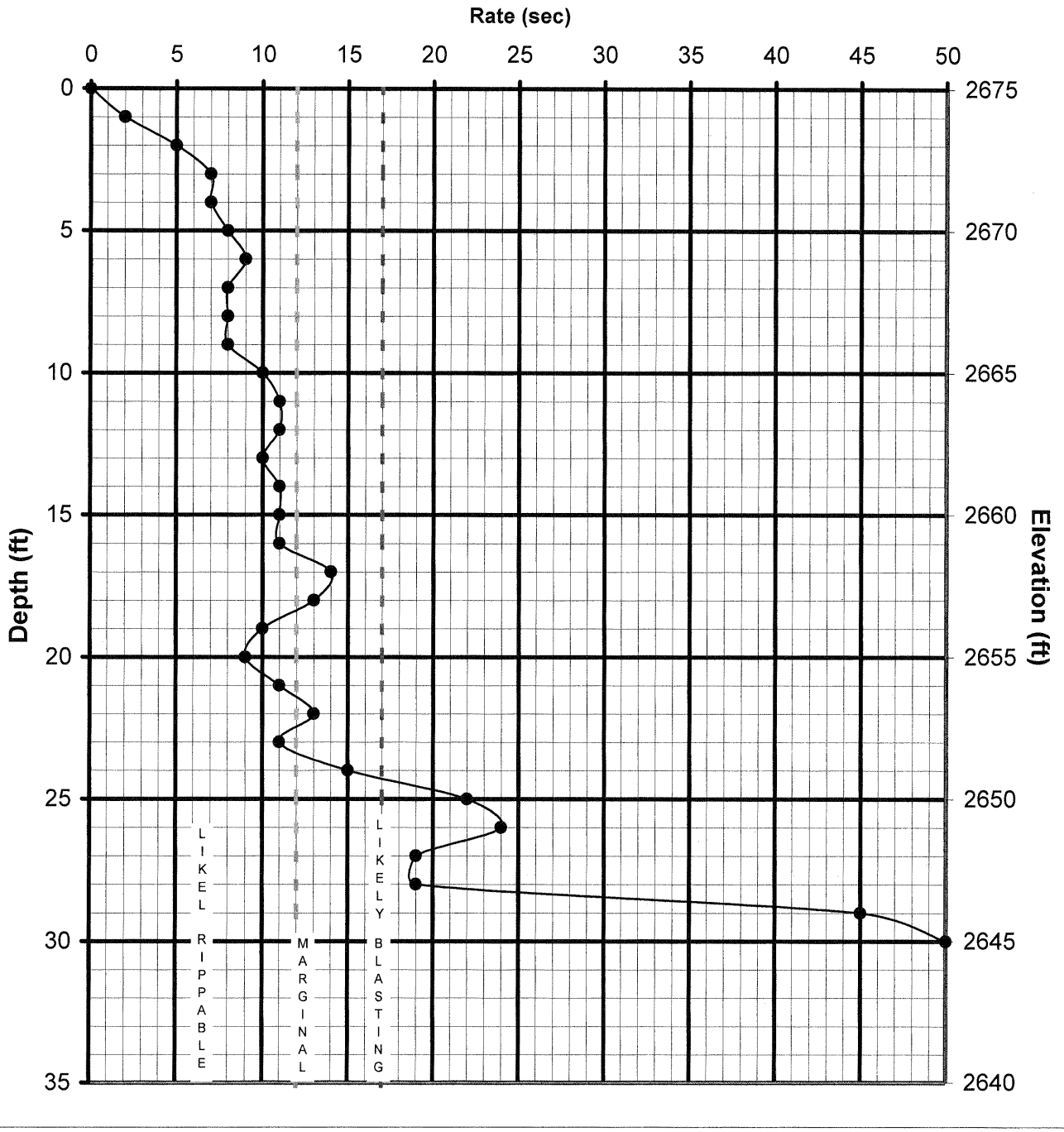
AIR TRACK-21



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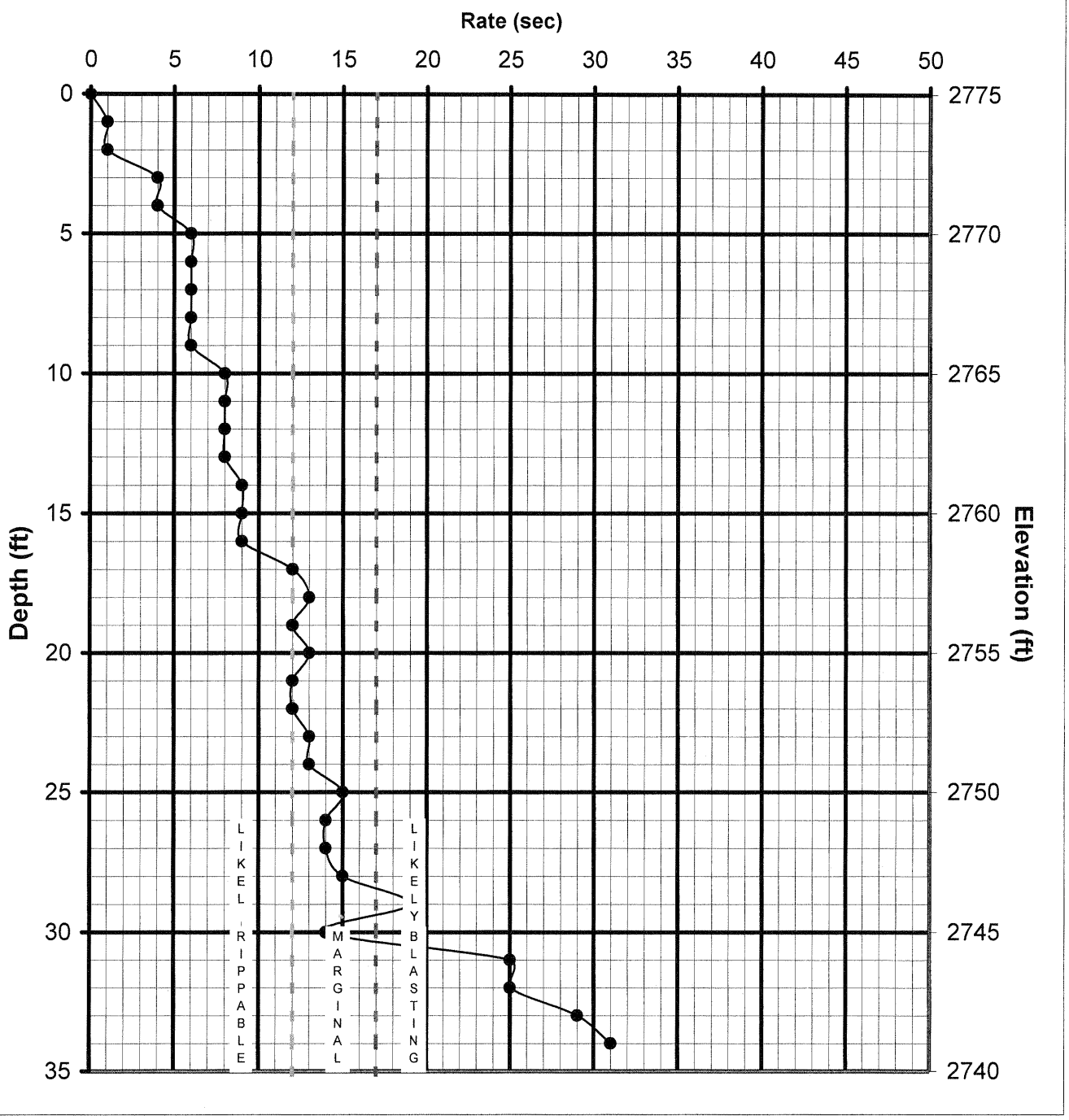
AIR TRACK-22



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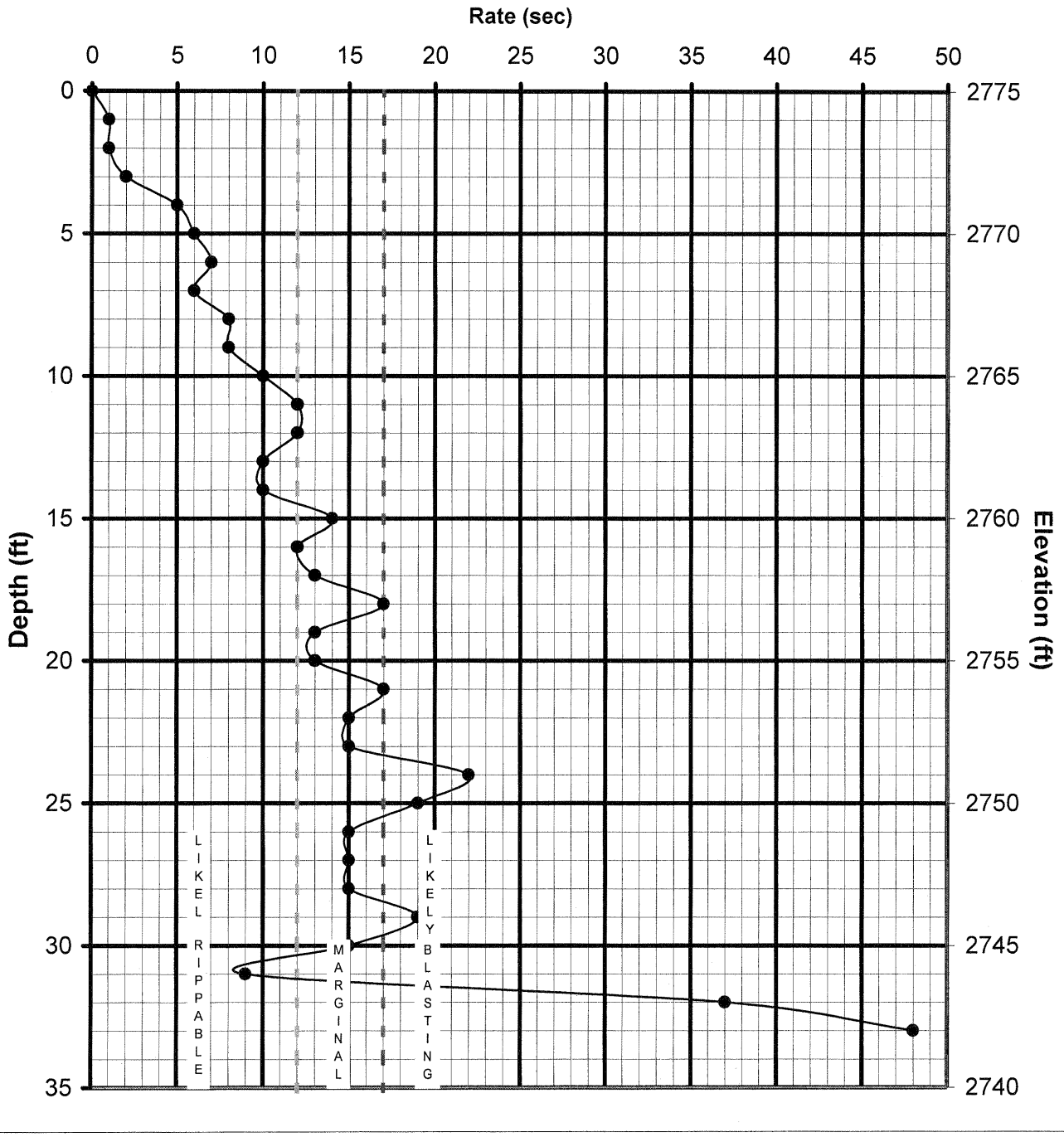
AIR TRACK-23



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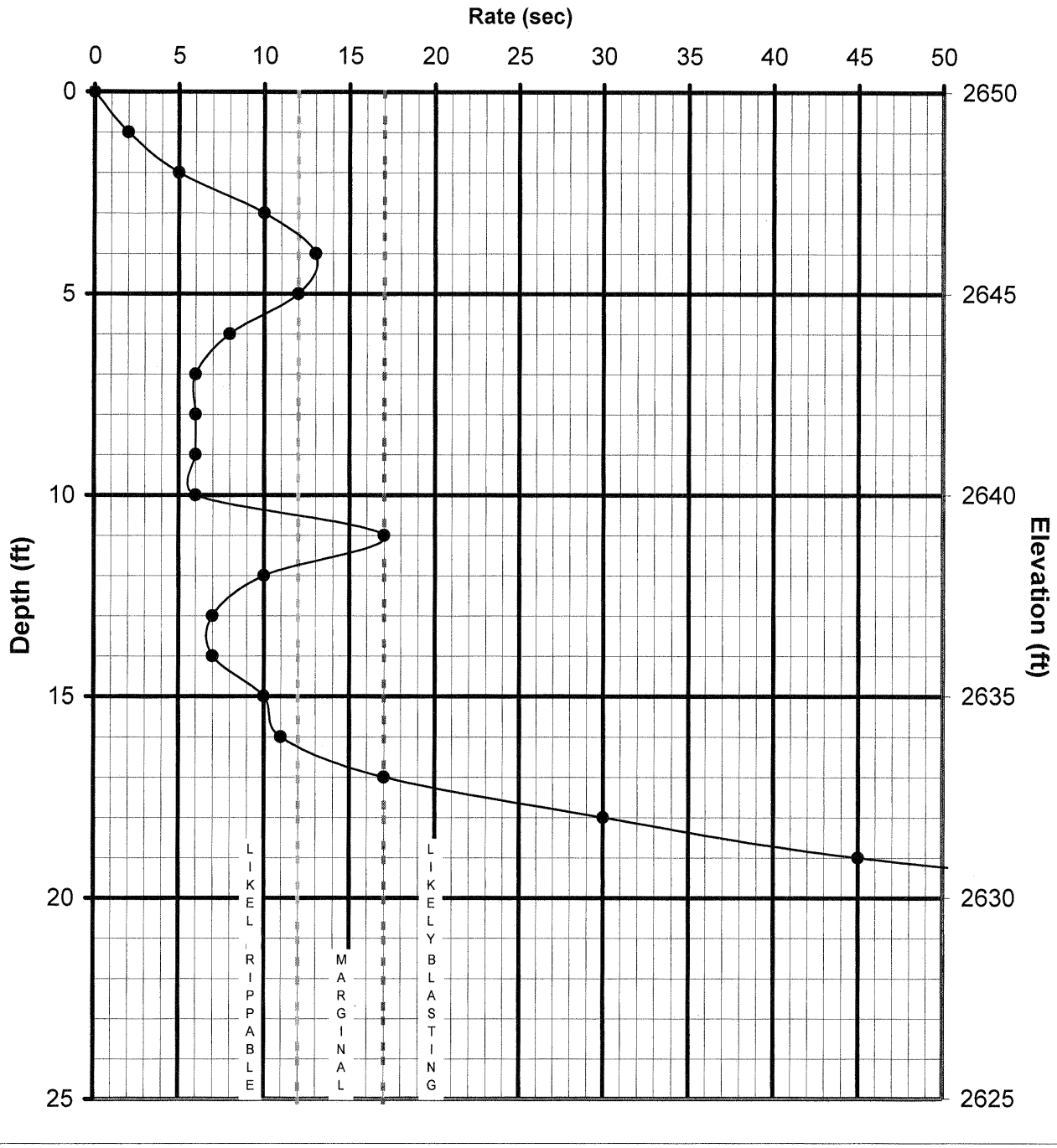
AIR TRACK-24



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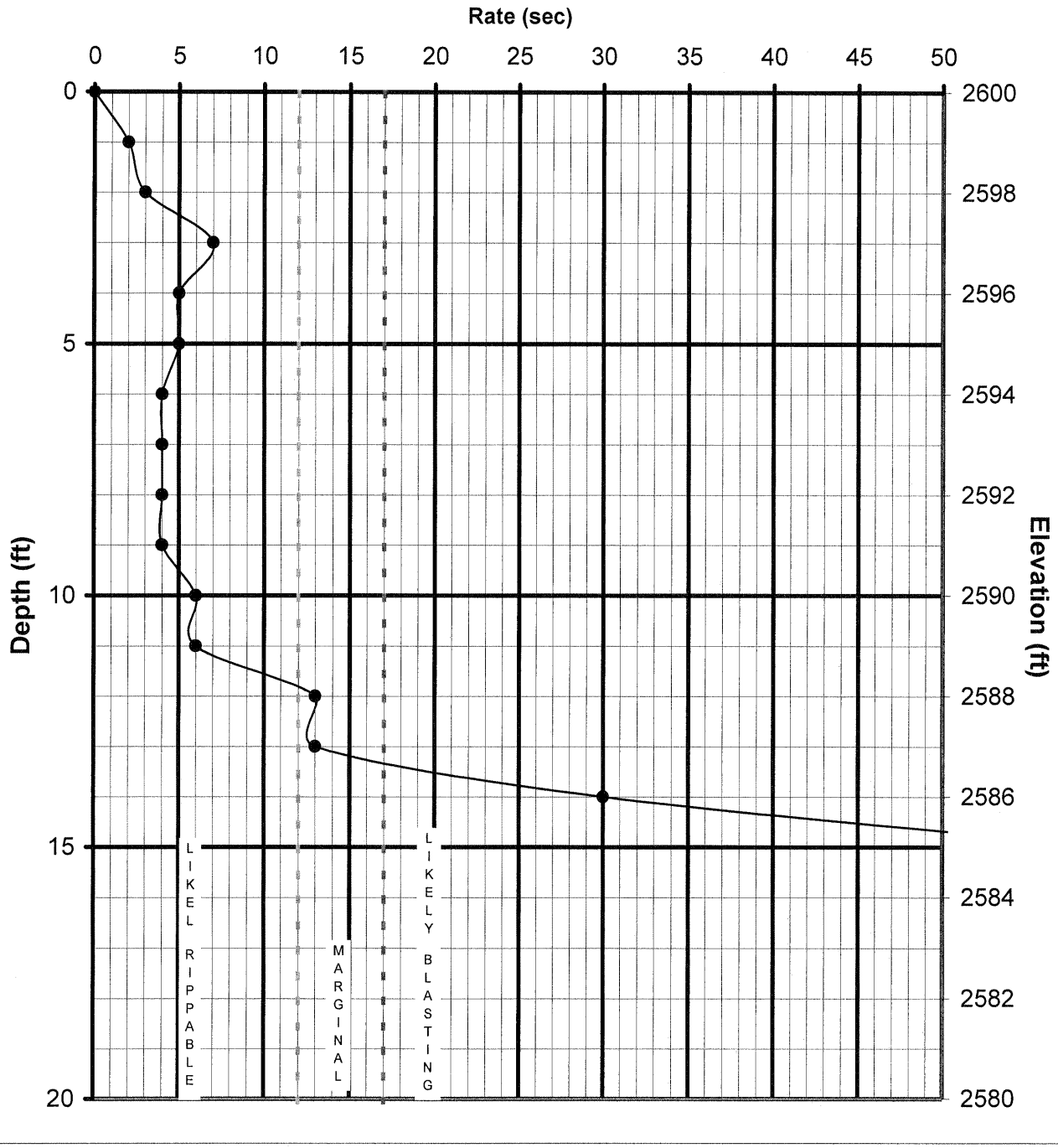
AIR TRACK-25



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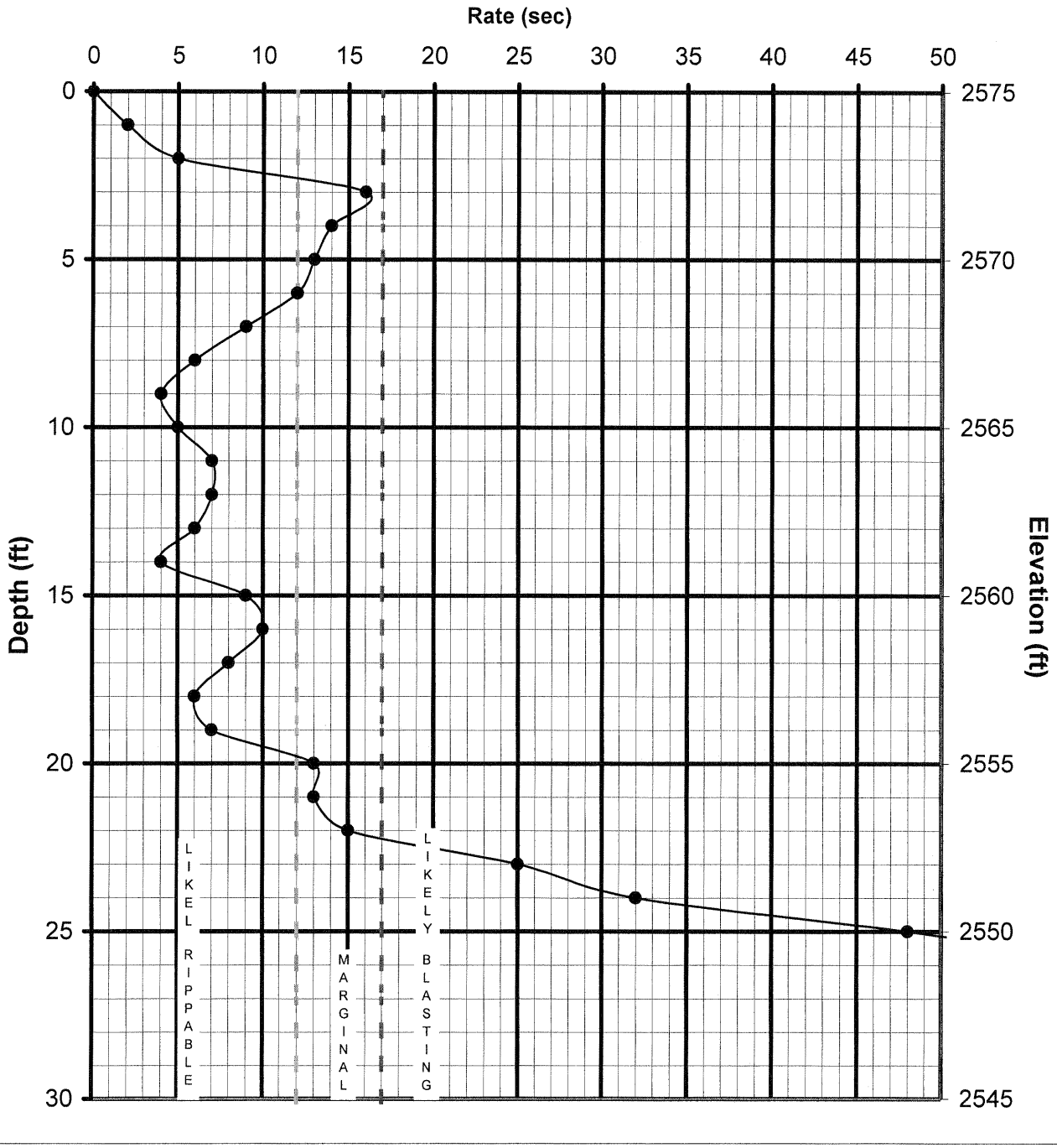
AIR TRACK-26



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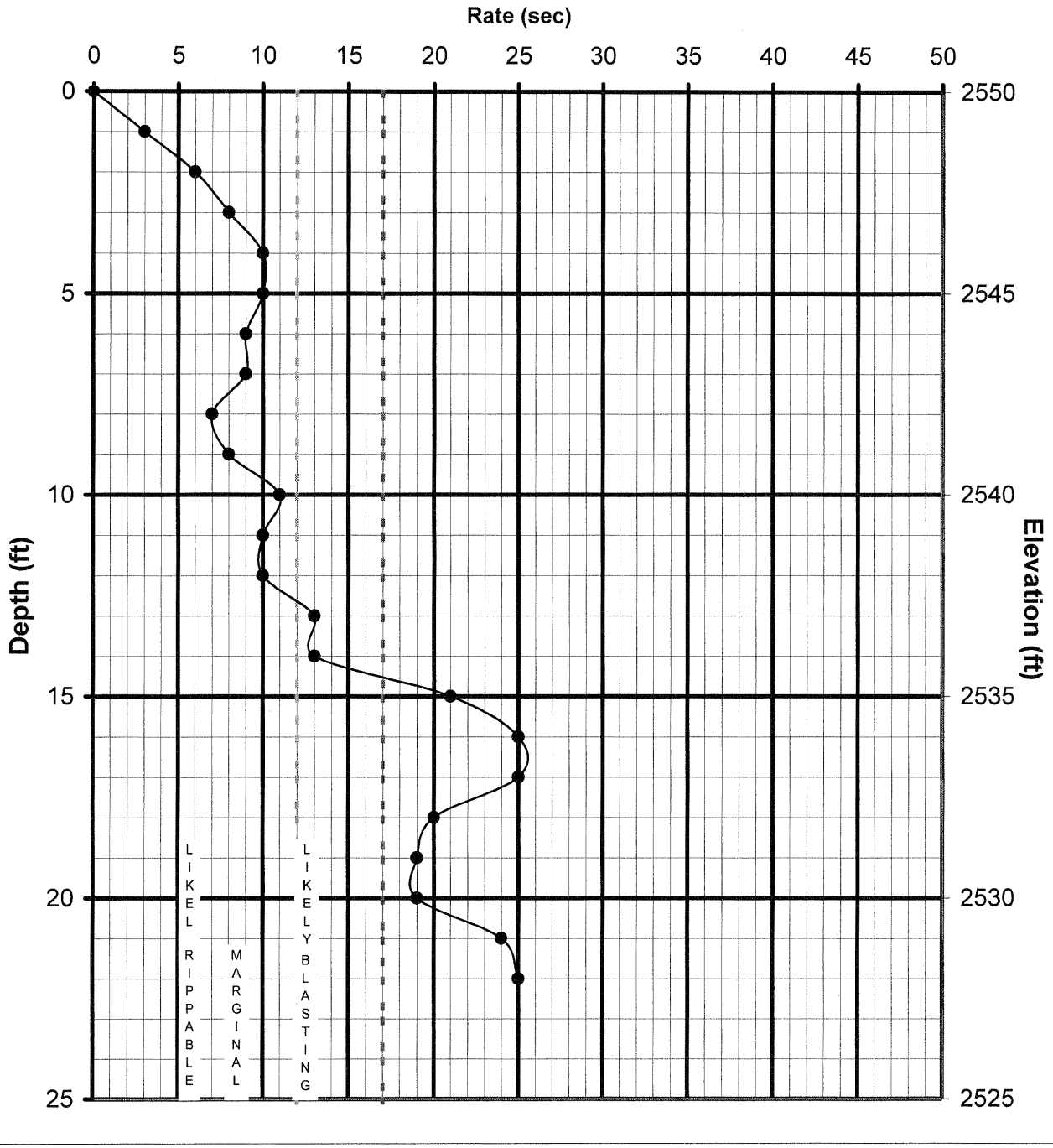
AIR TRACK-27



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AIR TRACK-28

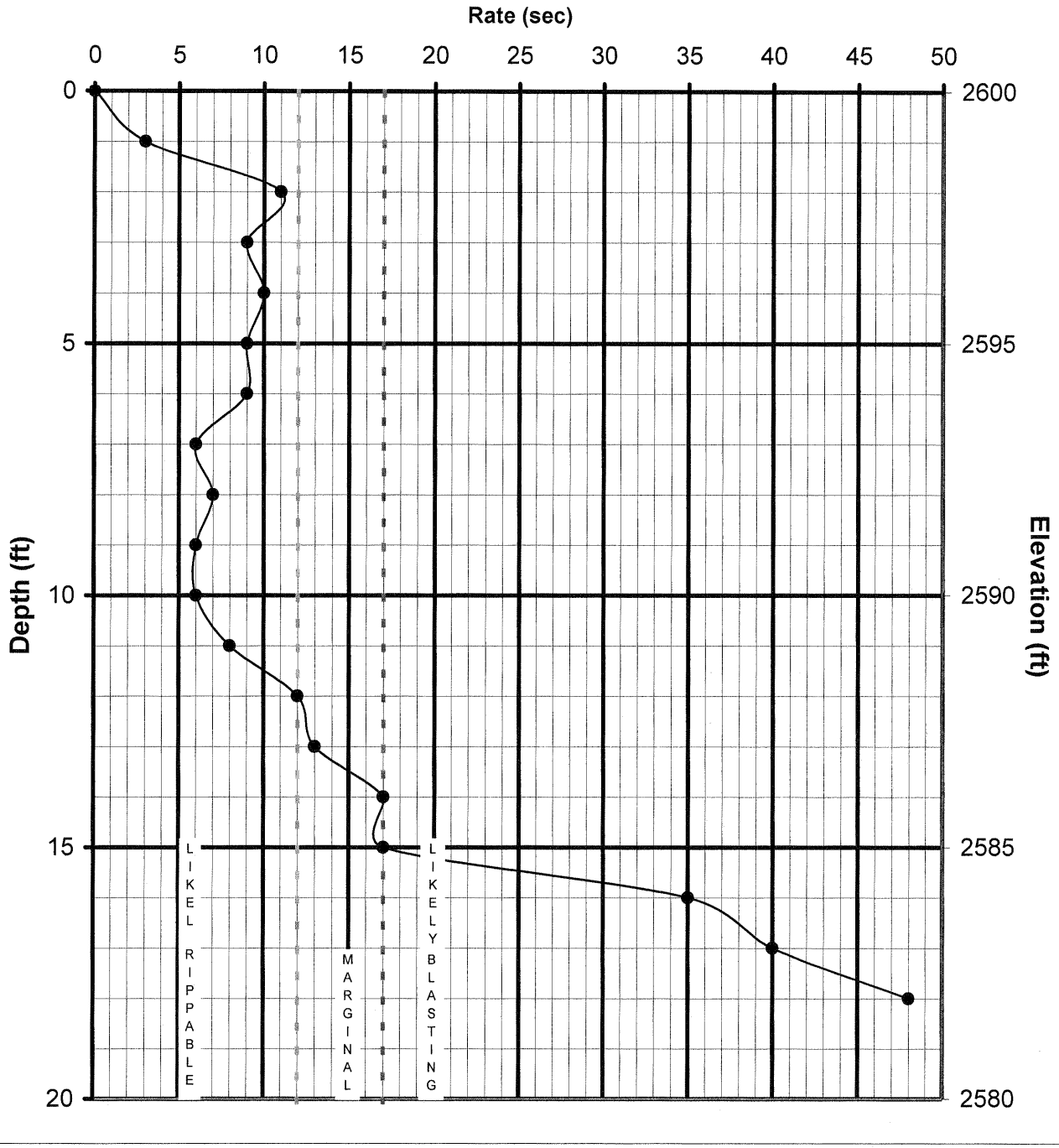

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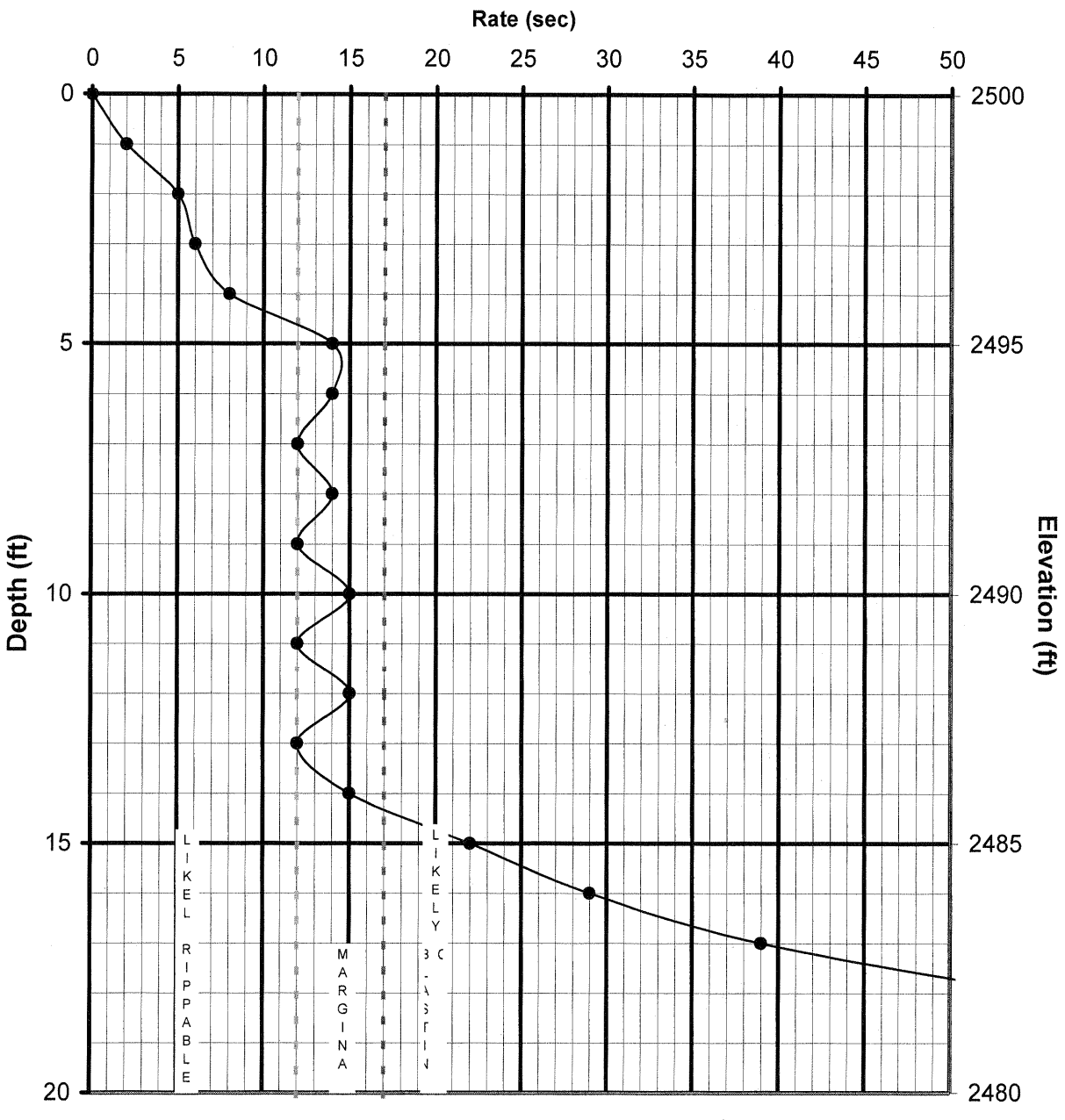
PLATE B-28

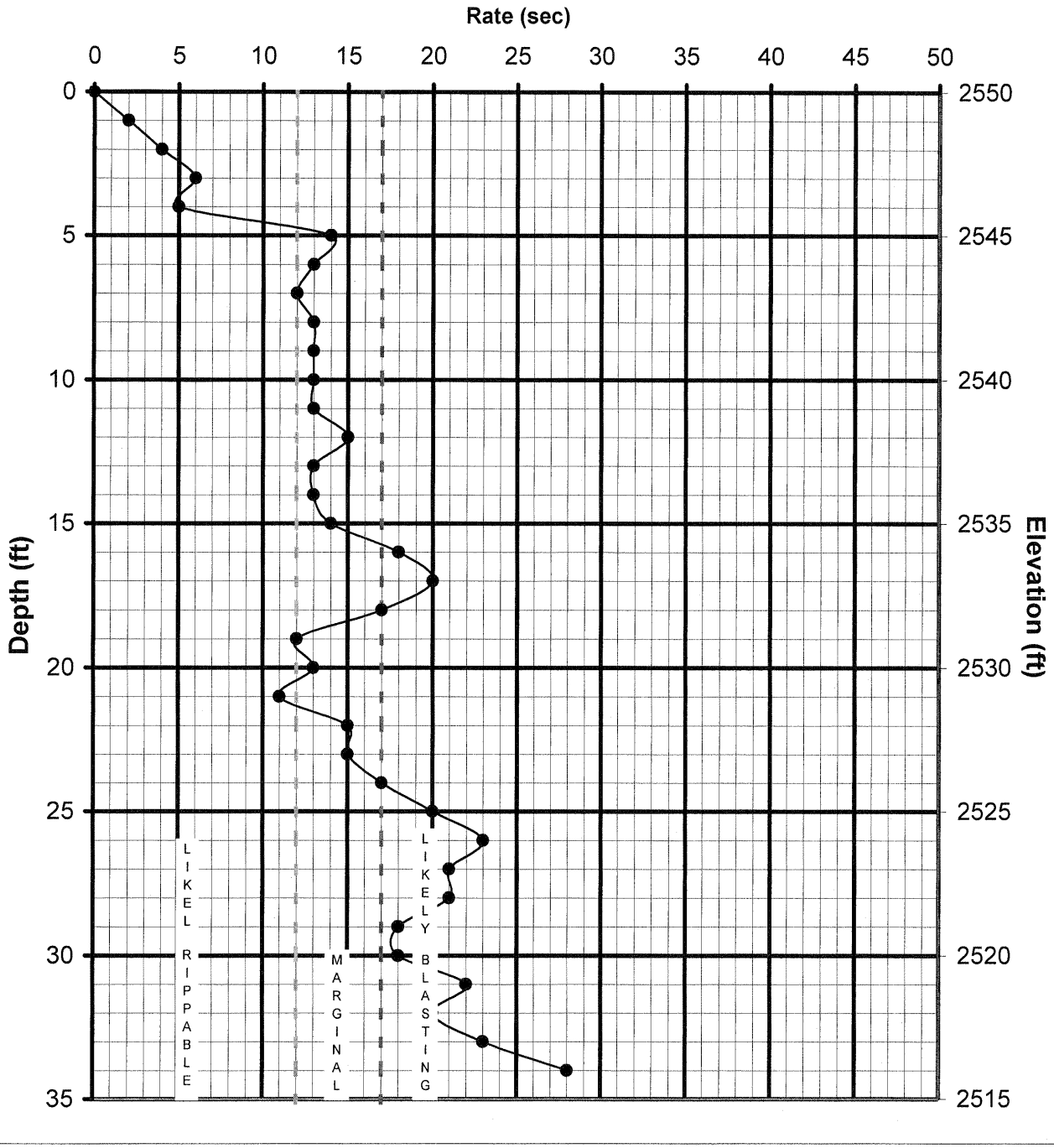
AIR TRACK-29



EQUIPMENT - INGERSOLL-RAND ECM-370

PACIFIC SOILS ENGINEERING, INC.
710 East Parkridge Avenue, Suite 105, Corona, CA 92879
Work Order: 500654 Date: 05/02/04
PLATE B-29

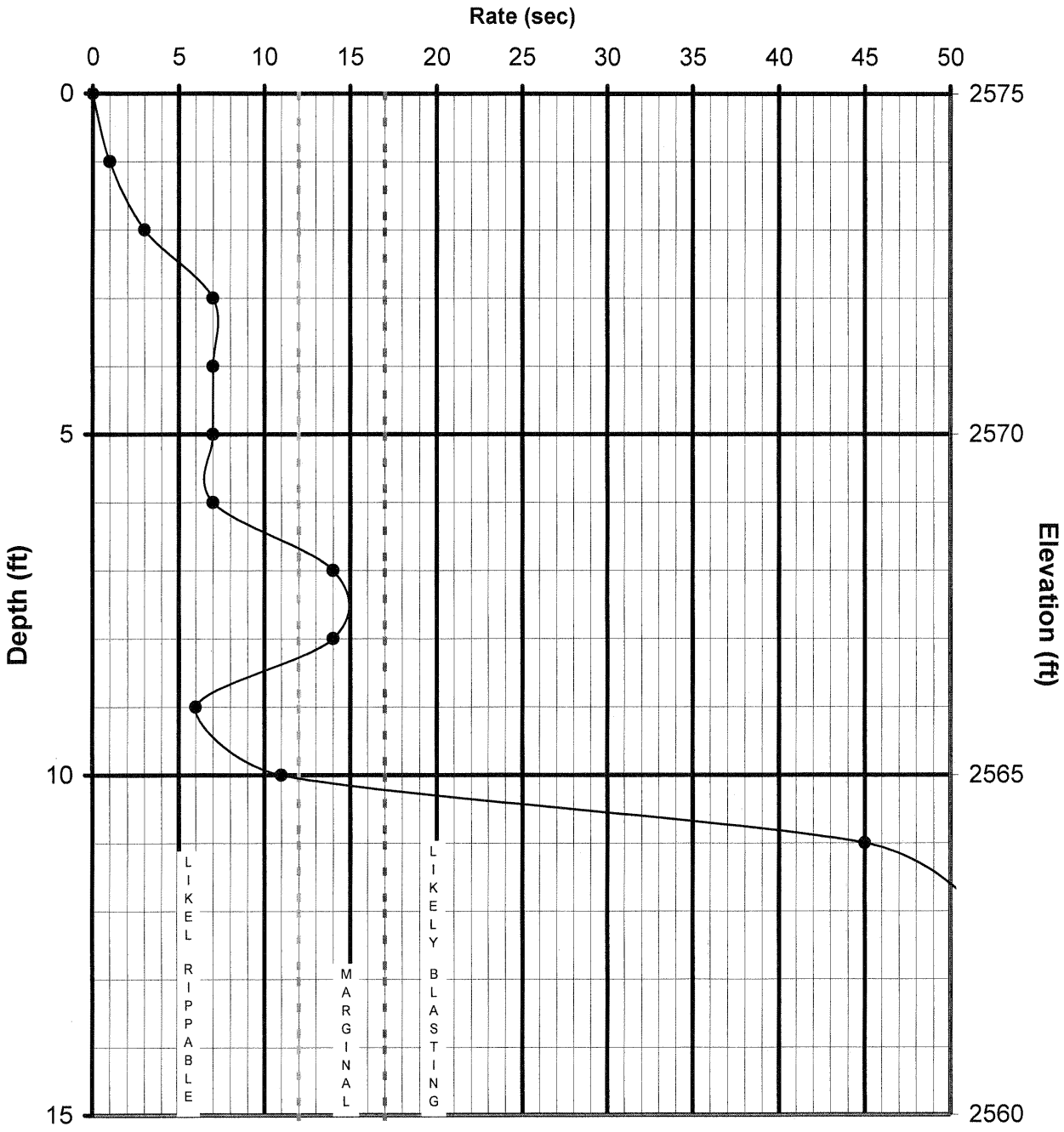
AIR TRACK-30



EQUIPMENT - INGERSOLL-RAND ECM-370

PACIFIC SOILS ENGINEERING, INC.
710 East Parkridge Avenue, Suite 105, Corona, CA 92879
Work Order: 500654 Date: 05/02/04
PLATE B-30

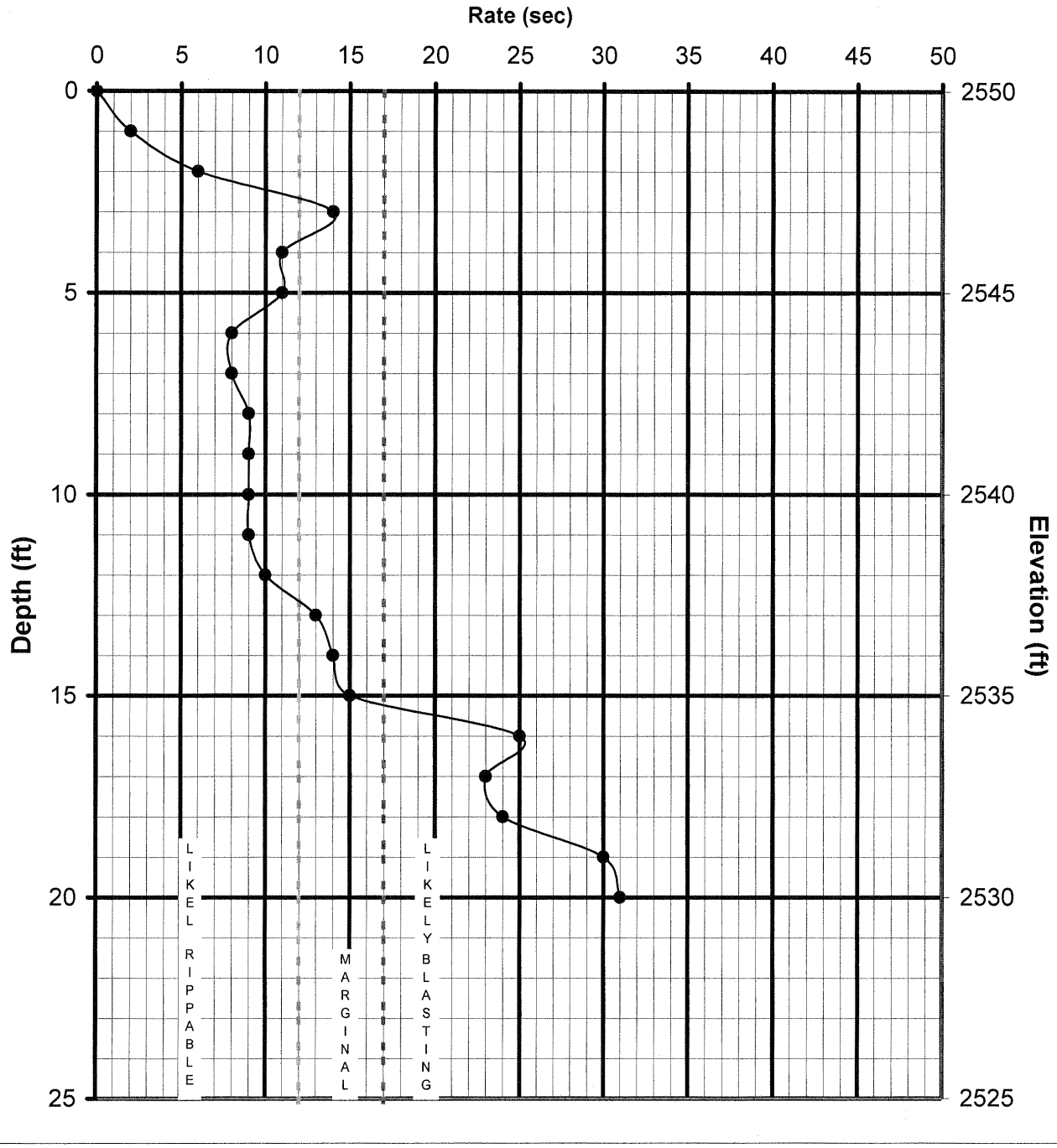
AIR TRACK-31



EQUIPMENT - INGERSOLL-RAND ECM-370

PACIFIC SOILS ENGINEERING, INC.
710 East Parkridge Avenue, Suite 105, Corona, CA 92879
Work Order: 500654 Date: 05/02/04
PLATE B-31

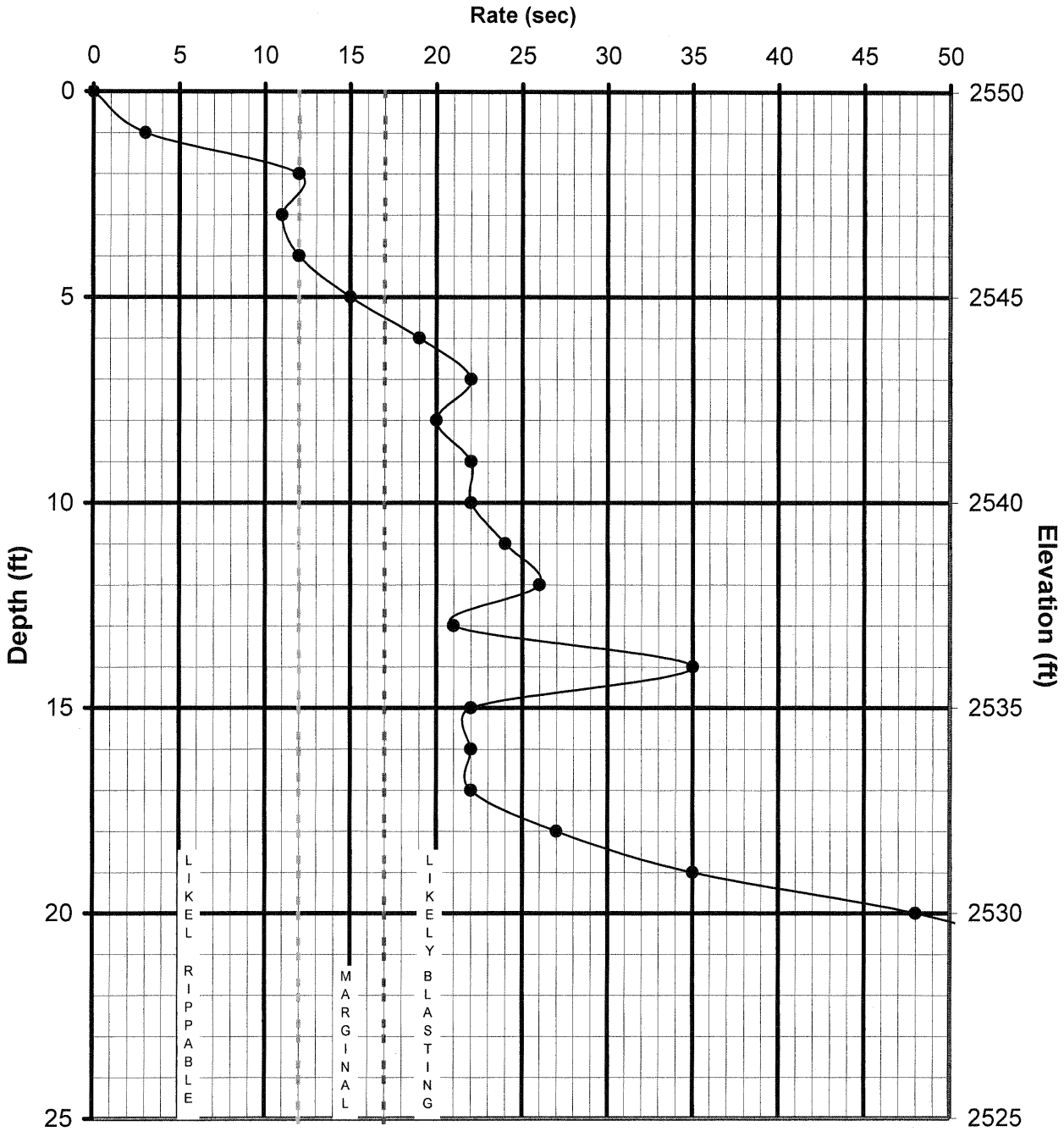
AIR TRACK-32



EQUIPMENT - INGERSOLL-RAND ECM-370

PACIFIC SOILS ENGINEERING, INC.
710 East Parkridge Avenue, Suite 105, Corona, CA 92879
Work Order: 500654 Date: 05/02/04
PLATE B-32

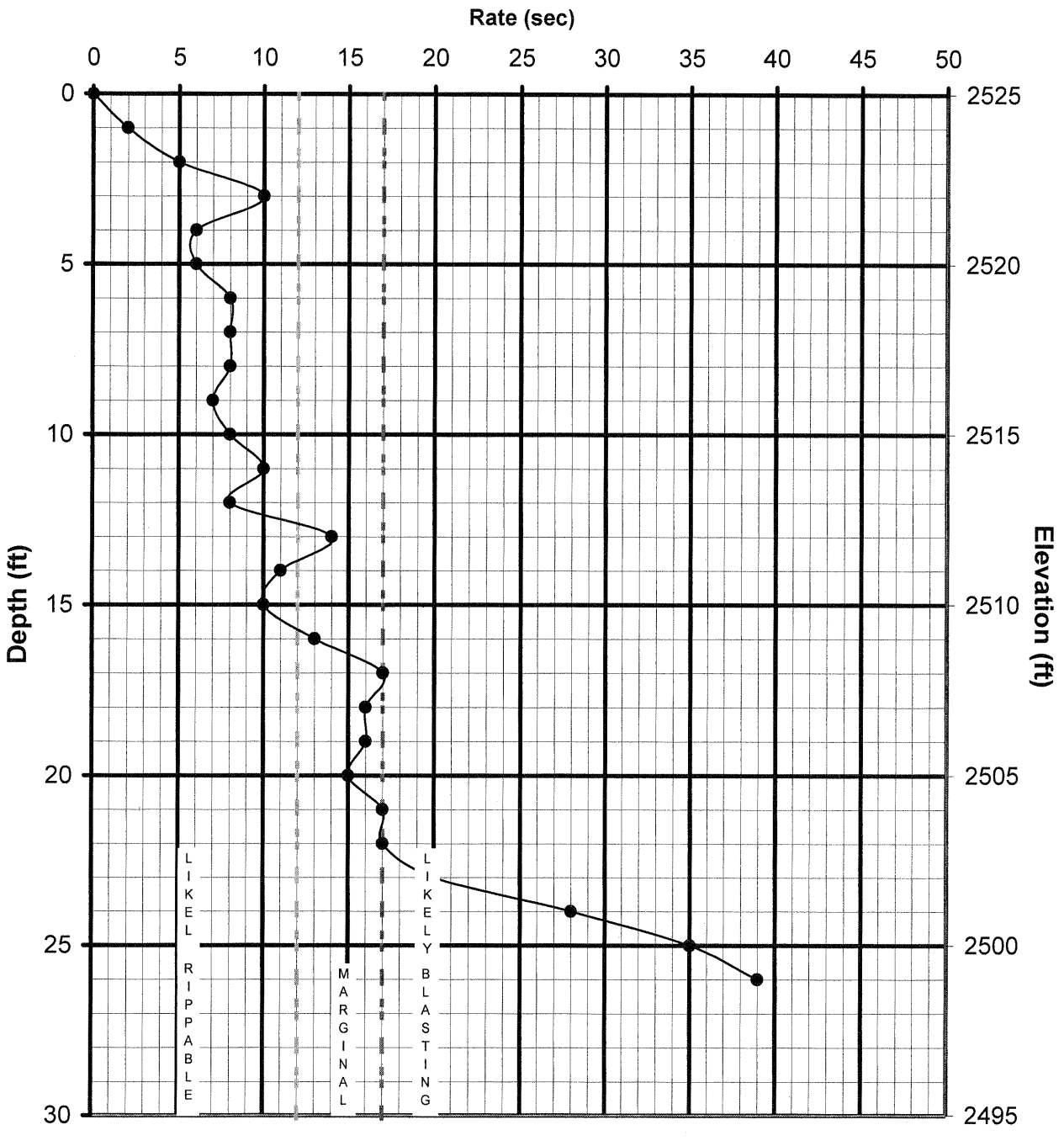
AIR TRACK-33



EQUIPMENT - INGERSOLL-RAND ECM-370

PACIFIC SOILS ENGINEERING, INC.
710 East Parkridge Avenue, Suite 105, Corona, CA 92879
Work Order: 500654 Date: 05/02/04
PLATE B-33

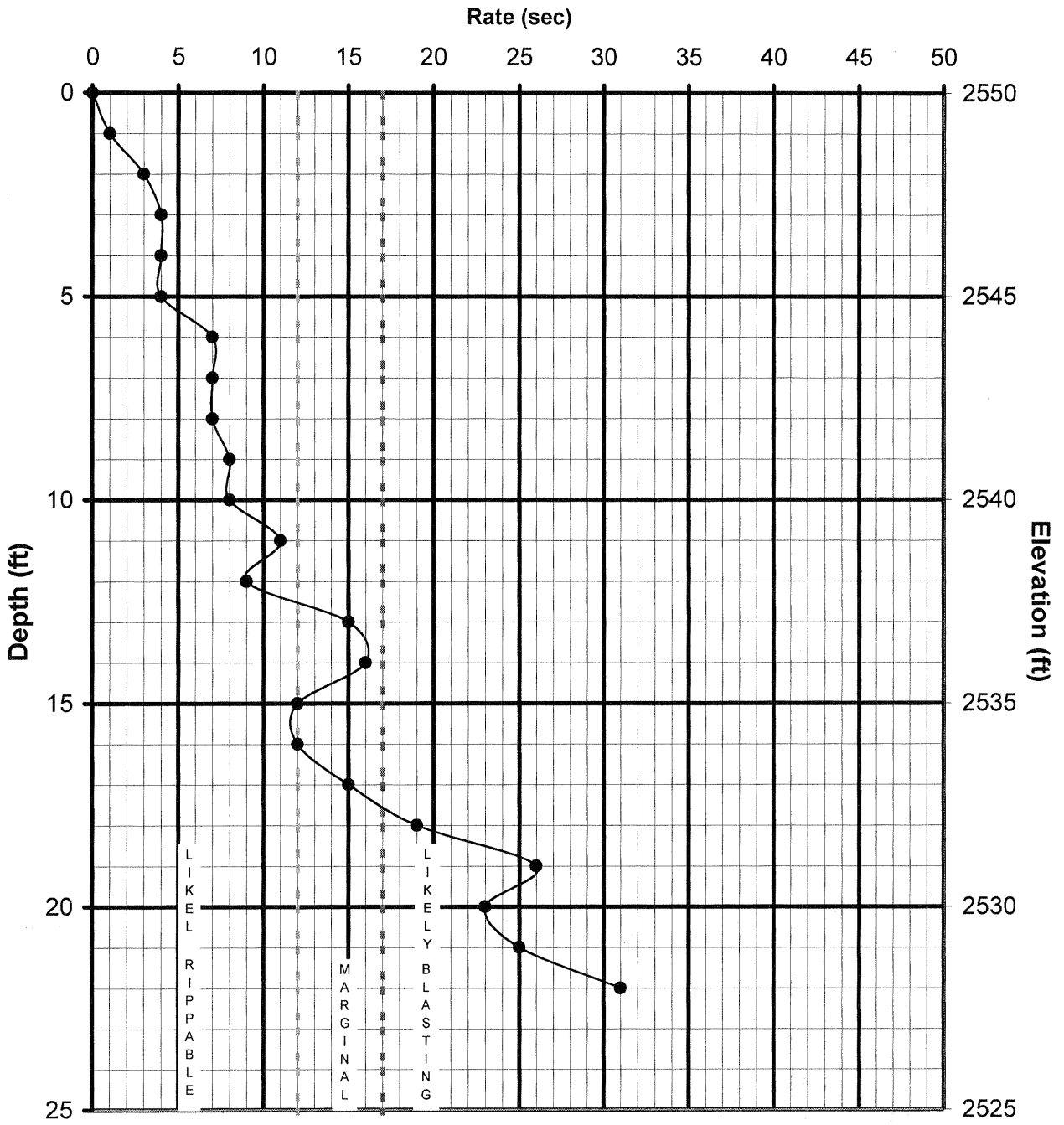
AIR TRACK-34



EQUIPMENT - INGERSOLL-RAND ECM-370

PACIFIC SOILS ENGINEERING, INC.
710 East Parkridge Avenue, Suite 105, Corona, CA 92879
Work Order: 500654 Date: 05/02/04
PLATE B-34

AIR TRACK-35



EQUIPMENT - INGERSOLL-RAND ECM-370

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Work Order: 500654 Date: 05/02/04
PLATE B-35

APPENDIX B

Subsurface Investigation

TSI's initial investigation was conducted in March and April of 2013 and consisted of excavating 34 trenches with a rubber tired backhoe for the purpose of evaluating the percolation characteristics of the near surface soils. A second phase of investigation (November, 2013) included excavation of 8 additional trenches for exploring subsurface conditions and 34 test pits for conducting percolation testing (TSI, 2014). The logs of these trenches and test pits are presented herein, and their locations are shown on Plates 1, 2A and 2B. Percolation data sheets are also presented in Appendix C.

PSE's subsurface investigation was conducted in April 2005. An approximately 47,000 lbs track-hoe excavator was used to excavate forty-eight (48) test pits to evaluate the near surface earth materials. The test pits ranged from 6 to 18 feet in depth. They were generally extended until the earth materials were too difficult to excavate. Collected bulk samples were delivered to the laboratory for testing to characterize the engineering properties of the near surface earth materials. A representative of PSE logged each test pit. The logs are presented herein and the location of each excavation is shown on Plates 1, 2A and 2B.

PSE advanced thirty-five (35) Air Track holes (Ingersol-Rand EMC-370) at a constant rate and time was recorded for the depth of penetration. The air track holes ranged from 10 to 41 feet in depth. Based on previous experience, the depth to marginal rippability and the depth to likely blasting were estimated for each hole. A log of time versus depth is presented herein with estimated rippability characteristics. The location of each excavation is shown on Plates 1, 2A and 2B.

APPENDIX C

Laboratory and Percolation

Test Results

APPENDIX C
LABORATORY TEST RESULTS

The results of laboratory testing performed during PSE's study are enclosed within this Appendix. Table C-1 presents a summary of PSE's laboratory test results.

The following laboratory tests were performed on representative samples in accordance with the applicable latest standards or methods from the ASTM, Uniform Building Code (UBC), and the California Department of Transportation.

Particle Size Analysis

Modified hydrometer grain size analyses (ASTM D 422-63 (02)) were conducted to aid in classification of the soils. The results of the hydrometer particle size analysis are presented in Table C-1.

Direct Shear Tests

Direct shear tests were performed on relatively "undisturbed" samples and samples that were remolded to 90 percent of the laboratory maximum density. Samples were tested after inundation and confinement for 24 hours. Tests were made under various normal loads at a constant rate of strain of 0.05 inches per minute. Shear test data is presented on Plates C-1 and C-2.

Expansion Tests

Expansion index tests were performed on selected samples in accordance with the expansion index UBC Standard No. 18-2. Results are presented in Table C-1.

Compaction Characteristics

Maximum densities and optimum moistures were determined for selected samples in accordance with ASTM: D 1557-02. Results are presented in Table C-1.

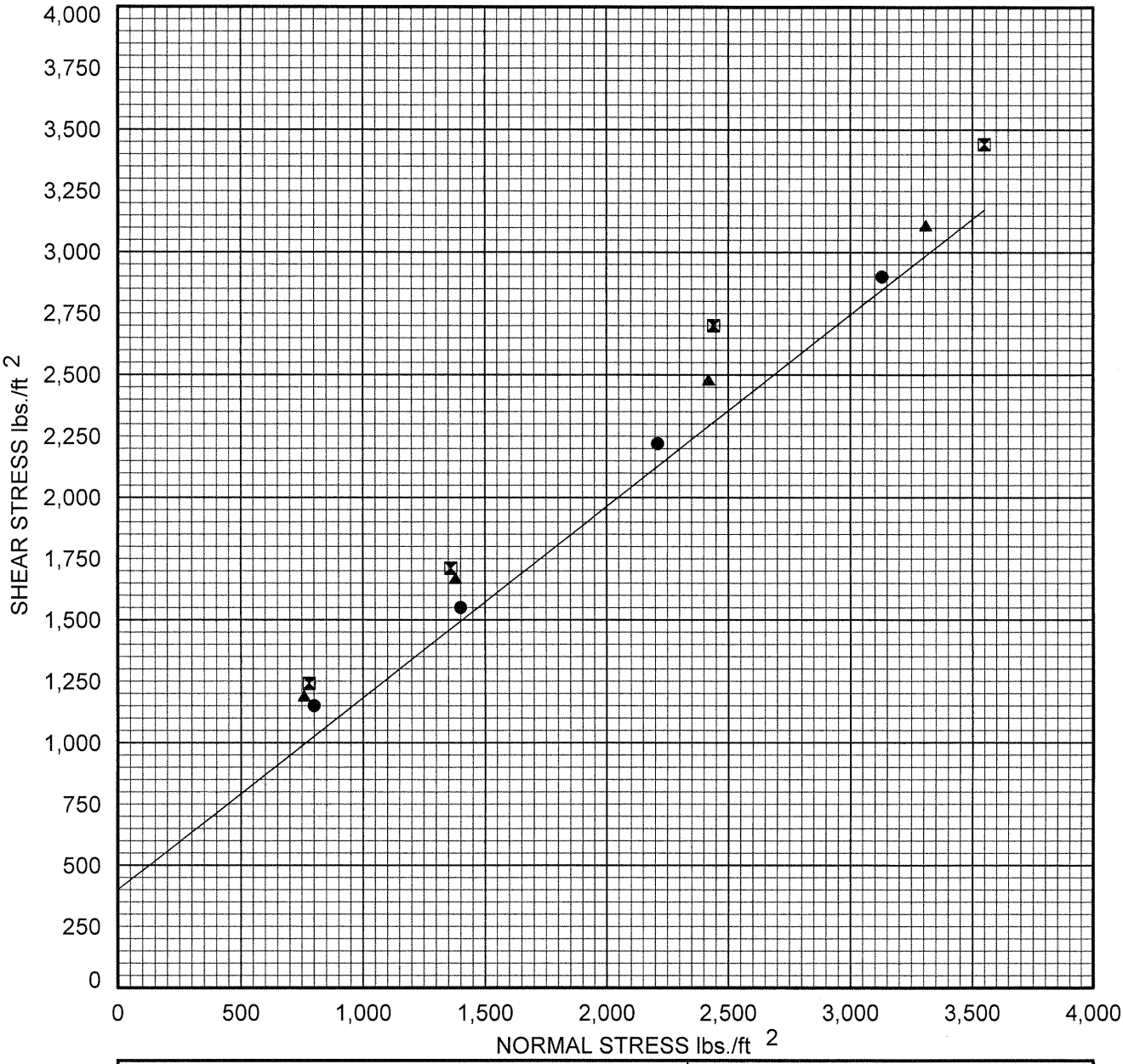
Chemical Testing

Chemical tests were performed to analyze the corrosion potential of the on-site soils on ferrous metals and concrete. As part of this testing, sulfate contents were determined to analyze the potential for sulfate attack on concrete products. Additionally, pH and electrical resistivity were also determined test results are summarized in Table C-1.

TABLE C-1
SUMMARY OF LABORATORY TEST DATA
W.O. 500654

BORING	DEPTH (FEET)	SOIL DESCRIPTION	GROUP SYMBOL	MAXIMUM DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)	DIRECT SHEAR	PLUS NO.4 SEIVE (plus 4.76mm) (%)	SAND (4.76mm-0.075mm) (%)	SILT (0.075mm-0.005mm) (%)	CLAY (minus 0.005mm) (%)	EXPANSION INDEX UBC 18-2	OTHER TESTS REMARKS
TP-13	3	Granodiorite Bedrock (Kgr)		132.9	7.7	SEE PLATE C-1	0	64	22	14	2	Sulfate Content <0.001 (% by wt); pH=7.1; Resistivity=9,100 ohm cm
TP-23	3	Granodiorite Bedrock (Kgr)		127.5	9.7	SEE PLATE C-1	0	86	9	5	0	Sulfate Content <0.001 (% by wt); pH=6.6; Resistivity=10,600 ohm cm
TP-4	6	Granodiorite Bedrock (Kgr)		120.6	11.5	SEE PLATE C-1	0	86	10	4	0	Sulfate Content <0.001 (% by wt); pH=6.8; Resistivity=8,550 ohm cm

DIRECT SHEAR TEST
Remolded at 90% Relative Compaction - Peak Strength



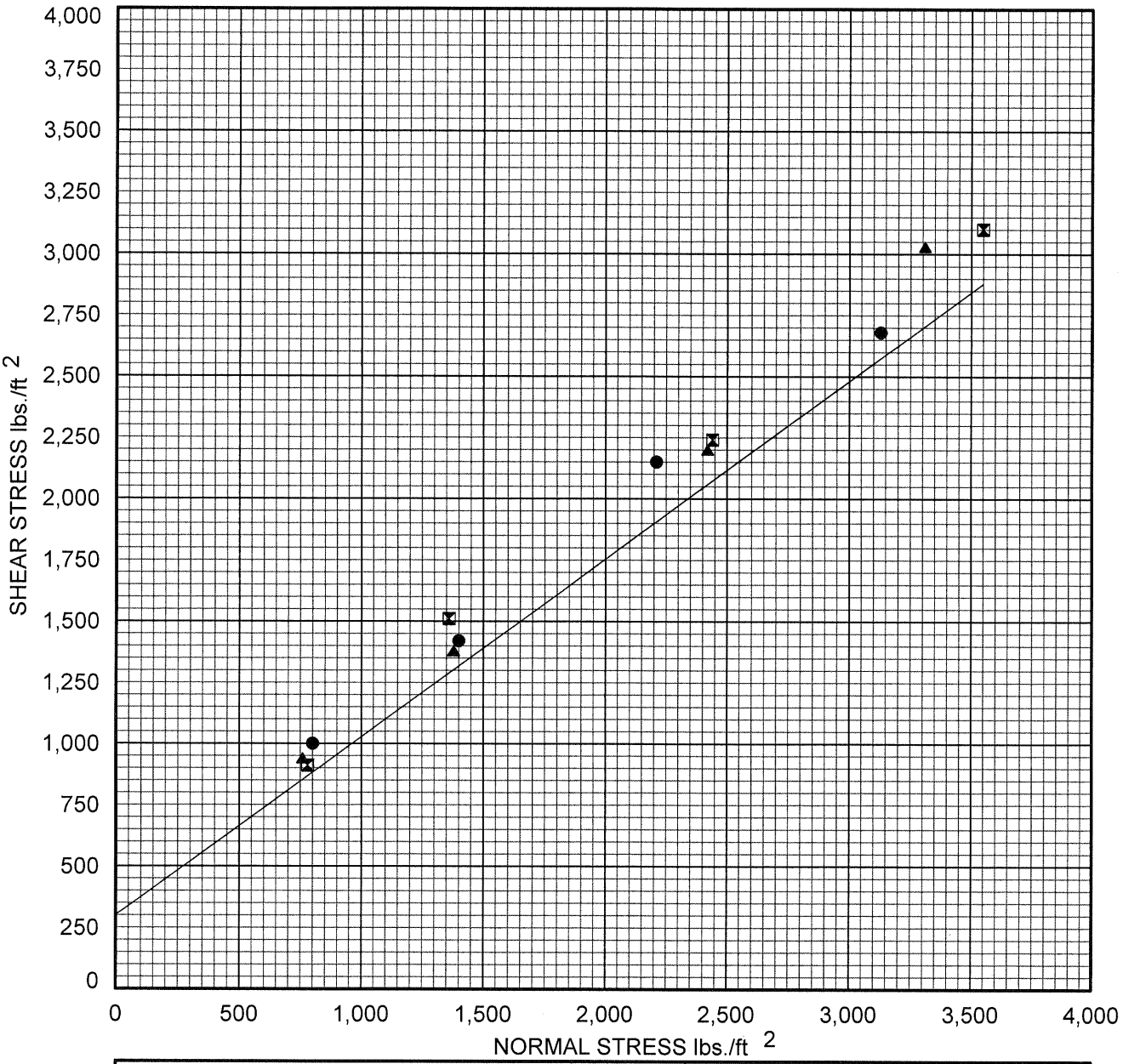
TYPICAL NAME: Remolded Bedrock (Kgr)	COHESION 400 psf.
GROUP SYMBOL:	FRICTION ANGLE 38 degrees

symbol	boring	depth	symbol	boring	depth	symbol	boring	depth	symbol	boring	depth
●	TP-13	3.0	⊗			◆			✳		
⊠	TP-23	3.0	⊕			◇			◘		
▲	TP-4	6.0	□			×			◪		
★			◓			✖			⊟		
✕			◔			⊡			▥		
✿			☆								
○			⊠								
△			■								

PACIFIC SOILS ENGINEERING, INC.

W.O. 500654 PLATE C-1

DIRECT SHEAR TEST
Remolded at 90% Relative Compaction - Residual Strength



TYPICAL NAME: Remolded Bedrock (Kgr)	COHESION 300 psf.
GROUP SYMBOL:	FRICTION ANGLE 36 degrees

symbol	boring	depth	symbol	boring	depth	symbol	boring	depth	symbol	boring	depth
●	TP-13	3.1	⊗			◆			✳		
⧓	TP-23	3.1	⊕			◇			◘		
▲	TP-4	6.1	□			×			◪		
★			⊖			✖			⊟		
✕			◒			◙			▥		
✿			☆								
○			⊠								
△			■								

PACIFIC SOILS ENGINEERING, INC.

W.O. 500654 PLATE C-2

Percolation Summary sheet — Test Hole No. **PT-1**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate minutes per inch
0	0	--				
1	30 (.5 hr)	30	4.5	7.8	3.3	9.2
2	60 (1 hr)	30	3.5	6.5	3.0	10.0
3	90 (1.5 hr)	30	3.0	6.0	3.0	10.0
4	120 (2 hr)	30	3.0	5.5	2.5	12.0
5	150 (2.5 hr)	30	2.5	5.5	3.0	10.0
6	180 (3 hr)	30	2.5	5.0	2.5	12.0
7	210 (3.5 hr)	30	3.0	5.0	2.0	15.0
8	240 (4 hr)	30	2.5	5.0	2.5	12.0
9	270 (4.5 hr)	30	2.0	5.0	3.0	10.0
10	300 (5 hr)	30	3.0	5.0	2.0	15.0
11	330 (5.5 hr)	30	2.8	5.0	2.3	13.3
12	360 (6 hr)	30	3.0	5.0	2.0	15.0

Percolation Summary sheet — Test Hole No. **PT-3**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate - minutes per inch
0	0	--				
1	30 (.5 hr)	30	4.00	4.50	0.50	60.0
2	60 (1 hr)	30	4.00	4.00	0.00	0.0
3	90 (1.5 hr)	30	4.00	4.25	0.25	120.0
4	120 (2 hr)	30	4.25	4.50	0.25	120.0
5	150 (2.5 hr)	30	3.50	3.75	0.25	120.0
6	180 (3 hr)	30	3.75	4.00	0.25	120.0
7	210 (3.5 hr)	30	4.00	4.00	0.00	0.0
8	240 (4 hr)	30	4.00	4.50	0.50	60.0
9	270 (4.5 hr)	30	4.00	4.25	0.25	120.0
10	300 (5 hr)	30	4.25	4.50	0.25	120.0
11	330 (5.5 hr)	30	3.00	3.50	0.50	60.0
12	360 (6 hr)	30	3.50	3.75	0.25	120.0

Percolation Summary sheet — Test Hole No. **PT-5**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate minutes per inch
0	0	--				
1	30 (.5 hr)	30	1.5	2.0	0.5	**60.0**
2	60 (1 hr)	30	2.0	2.0	0.0	**0.0**
3	90 (1.5 hr)	30	2.5	2.5	0.0	**0.0**
4	120 (2 hr)	30	2.5	2.5	0.0	**0.0**
5	150 (2.5 hr)	30	2.5	3.0	0.5	**60.0**
6	180 (3 hr)	30	3.0	3.0	0.0	**0.0**
7	210 (3.5 hr)	30	3.0	3.0	0.0	**0.0**
8	240 (4 hr)	30	3.0	3.0	0.0	**0.0**
9	270 (4.5 hr)	30	1.5	1.8	0.3	**120.0**
10	300 (5 hr)	30	1.8	2.0	0.3	**120.0**
11	330 (5.5 hr)	30	2.0	2.0	0.0	**0.0**
12	360 (6 hr)	30	2.0	2.3	0.3	**120.0**

Percolation Summary sheet — Test Hole No. **PT-8**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate - minutes per inch
0	0	--				
1	30 (.5 hr)	30	2.50	4.50	2.00	**15.0**
2	60 (1 hr)	30	3.00	4.00	1.00	**30.0**
3	90 (1.5 hr)	30	4.00	5.00	1.00	**30.0**
4	120 (2 hr)	30	3.50	4.25	0.75	**40.0**
5	150 (2.5 hr)	30	3.50	4.50	1.00	**30.0**
6	180 (3 hr)	30	3.00	3.75	0.75	**40.0**
7	210 (3.5 hr)	30	3.75	4.50	0.75	**40.0**
8	240 (4 hr)	30	3.00	4.00	1.00	**30.0**
9	270 (4.5 hr)	30	2.50	3.75	1.25	**24.0**
10	300 (5 hr)	30	3.75	4.50	0.75	**40.0**
11	330 (5.5 hr)	30	3.00	4.00	1.00	**30.0**
12	360 (6 hr)	30	4.00	5.00	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **PT-9**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate minutes per inch
0	0	--				
1	30 (.5 hr)	30	4.0	5.0	1.0	**30.0**
2	60 (1 hr)	30	4.0	5.0	1.0	**30.0**
3	90 (1.5 hr)	30	3.0	3.8	0.8	**40.0**
4	120 (2 hr)	30	3.8	4.5	0.8	**40.0**
5	150 (2.5 hr)	30	3.5	3.8	0.3	**120.0**
6	180 (3 hr)	30	3.8	4.5	0.8	**40.0**
7	210 (3.5 hr)	30	3.5	4.0	0.5	**60.0**
8	240 (4 hr)	30	4.0	4.8	0.8	**40.0**
9	270 (4.5 hr)	30	2.8	3.5	0.8	**40.0**
10	300 (5 hr)	30	3.5	4.0	0.5	**60.0**
11	330 (5.5 hr)	30	3.0	4.0	1.0	**30.0**
12	360 (6 hr)	30	4.0	4.5	0.5	**60.0**

Percolation Summary sheet — Test Hole No. **PT-11**

Project No. 12-054

Project: The Preserve — Date: 3/28/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate - minutes per inch
0	0	--				
1	30 (.5 hr)	30	2.50	6.50	4.00	**7.5**
2	60 (1 hr)	30	2.50	5.50	3.00	**10.0**
3	90 (1.5 hr)	30	2.50	5.50	3.00	**10.0**
4	120 (2 hr)	30	2.50	5.50	3.00	**10.0**
5	150 (2.5 hr)	30	2.50	5.50	3.00	**10.0**
6	180 (3 hr)	30	2.50	4.50	2.00	**15.0**
7	210 (3.5 hr)	30	2.00	4.00	2.00	**15.0**
8	240 (4 hr)	30	4.00	5.00	1.00	**30.0**
9	270 (4.5 hr)	30	2.50	4.00	1.50	**20.0**
10	300 (5 hr)	30	4.00	5.00	1.00	**30.0**
11	330 (5.5 hr)	30	2.50	3.75	1.25	**24.0**
12	360 (6 hr)	30	3.75	4.75	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **PT-13**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate minutes per inch
0	0	--				
1	30 (.5 hr)	30	3.00	5.5	2.5	**12.0**
2	60 (1 hr)	30	3.00	5.0	2.0	**15.0**
3	90 (1.5 hr)	30	3.50	5.5	2.0	**15.0**
4	120 (2 hr)	30	2.50	5.0	2.5	**12.0**
5	150 (2.5 hr)	30	3.00	4.8	1.8	**17.1**
6	180 (3 hr)	30	3.00	4.8	1.8	**17.1**
7	210 (3.5 hr)	30	4.75	6.5	1.8	**17.1**
8	240 (4 hr)	30	3.25	5.3	2.0	**15.0**
9	270 (4.5 hr)	30	3.00	4.8	1.8	**17.1**
10	300 (5 hr)	30	3.00	5.0	2.0	**15.0**
11	330 (5.5 hr)	30	3.00	5.0	2.0	**15.0**
12	360 (6 hr)	30	3.75	5.5	1.8	**17.1**

Percolation Summary sheet — Test Hole No. **PT-14**

Project No. 12-054

Project: The Preserve — Date: 3/28/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate - minutes per inch
0	0	--				
1	30 (.5 hr)	30	4.00	5.50	1.50	**20.0**
2	60 (1 hr)	30	3.00	4.50	1.50	**20.0**
3	90 (1.5 hr)	30	3.00	4.50	1.50	**20.0**
4	120 (2 hr)	30	3.00	4.50	1.50	**20.0**
5	150 (2.5 hr)	30	3.00	4.50	1.50	**20.0**
6	180 (3 hr)	30	4.50	5.50	1.00	**30.0**
7	210 (3.5 hr)	30	3.50	4.50	1.00	**30.0**
8	240 (4 hr)	30	3.00	4.00	1.00	**30.0**
9	270 (4.5 hr)	30	3.00	4.00	1.00	**30.0**
10	300 (5 hr)	30	4.00	5.00	1.00	**30.0**
11	330 (5.5 hr)	30	3.00	4.25	1.25	**24.0**
12	360 (6 hr)	30	4.25	5.25	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **PT-16**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate minutes per inch
0	0	--				
1	30 (.5 hr)	30	3.00	3.50	0.50	**60.0**
2	60 (1 hr)	30	3.50	3.50	0.00	**0.0**
3	90 (1.5 hr)	30	3.50	4.00	0.50	**60.0**
4	120 (2 hr)	30	3.00	3.25	0.25	**120.0**
5	150 (2.5 hr)	30	3.25	3.50	0.25	**120.0**
6	180 (3 hr)	30	3.50	4.00	0.50	**60.0**
7	210 (3.5 hr)	30	4.00	4.00	0.00	**0.0**
8	240 (4 hr)	30	2.50	3.00	0.50	**60.0**
9	270 (4.5 hr)	30	3.00	3.25	0.25	**120.0**
10	300 (5 hr)	30	3.25	3.50	0.25	**120.0**
11	330 (5.5 hr)	30	3.50	4.00	0.50	**60.0**
12	360 (6 hr)	30	4.00	4.25	0.25	**120.0**

Percolation Summary sheet — Test Hole No. **PT-18**

Project No. 12-054

Project: The Preserve — Date: 3/28/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate - minutes per inch
0	0	--				
1	30 (.5 hr)	30	5.00	6.00	1.00	**30.0**
2	60 (1 hr)	30	4.00	5.00	1.00	**30.0**
3	90 (1.5 hr)	30	5.00	6.25	1.25	**24.0**
4	120 (2 hr)	30	3.50	4.50	1.00	**30.0**
5	150 (2.5 hr)	30	4.50	6.00	1.50	**20.0**
6	180 (3 hr)	30	3.00	4.00	1.00	**30.0**
7	210 (3.5 hr)	30	4.00	5.25	1.25	**24.0**
8	240 (4 hr)	30	2.75	4.00	1.25	**24.0**
9	270 (4.5 hr)	30	4.00	5.25	1.25	**24.0**
10	300 (5 hr)	30	3.00	4.00	1.00	**30.0**
11	330 (5.5 hr)	30	3.00	4.00	1.00	**30.0**
12	360 (6 hr)	30	4.00	5.00	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **PT-20**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate minutes per inch
0	0	--				
1	30 (.5 hr)	30	4.50	5.50	1.00	**30.0**
2	60 (1 hr)	30	4.50	5.00	0.50	**0.0**
3	90 (1.5 hr)	30	3.00	4.00	1.00	**30.0**
4	120 (2 hr)	30	4.00	5.00	1.00	**30.0**
5	150 (2.5 hr)	30	3.50	4.50	1.00	**30.0**
6	180 (3 hr)	30	4.50	5.50	1.00	**30.0**
7	210 (3.5 hr)	30	5.50	6.00	0.50	**0.0**
8	240 (4 hr)	30	3.25	4.00	0.75	**40.0**
9	270 (4.5 hr)	30	4.00	5.00	1.00	**30.0**
10	300 (5 hr)	30	3.00	4.00	1.00	**30.0**
11	330 (5.5 hr)	30	4.00	5.25	1.25	**24.0**
12	360 (6 hr)	30	3.50	4.50	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **PT-21**

Project No. 12-054

Project: The Preserve — Date: 3/28/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate - minutes per inch
0	0	--				
1	30 (.5 hr)	30	3.00	5.00	2.00	**15.0**
2	60 (1 hr)	30	6.00	9.00	3.00	**10.0**
3	90 (1.5 hr)	30	6.50	9.00	2.50	**12.0**
4	120 (2 hr)	30	5.00	8.00	3.00	**10.0**
5	150 (2.5 hr)	30	3.00	6.50	3.50	**8.6**
6	180 (3 hr)	30	6.50	9.00	2.50	**12.0**
7	210 (3.5 hr)	30	6.00	8.25	2.25	**13.3**
8	240 (4 hr)	30	4.00	6.50	2.50	**12.0**
9	270 (4.5 hr)	30	3.00	6.00	3.00	**10.0**
10	300 (5 hr)	30	3.50	6.25	2.75	**10.9**
11	330 (5.5 hr)	30	4.00	6.75	2.75	**10.9**
12	360 (6 hr)	30	5.00	7.50	2.50	**12.0**

Percolation Summary sheet — Test Hole No. **PT-22**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate minutes per inch
0	0	--				
1	30 (.5 hr)	30	4.50	7.50	3.00	**10.0**
2	60 (1 hr)	30	4.50	5.00	0.50	**0.0**
3	90 (1.5 hr)	30	5.00	5.50	0.50	**60.0**
4	120 (2 hr)	30	3.00	3.50	0.50	**60.0**
5	150 (2.5 hr)	30	3.50	4.00	0.50	**60.0**
6	180 (3 hr)	30	4.00	4.25	0.25	**120.0**
7	210 (3.5 hr)	30	3.00	3.25	0.25	**0.0**
8	240 (4 hr)	30	3.25	3.50	0.25	**120.0**
9	270 (4.5 hr)	30	3.50	4.00	0.50	**60.0**
10	300 (5 hr)	30	4.00	4.25	0.25	**120.0**
11	330 (5.5 hr)	30	2.25	2.75	0.50	**60.0**
12	360 (6 hr)	30	2.75	3.00	0.25	**120.0**

Percolation Summary sheet — Test Hole No. **PT-23**

Project No. 12-054

Project: The Preserve — Date: 3/28/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate - minutes per inch
0	0	--				
1	30 (.5 hr)	30	4.00	8.00	4.00	**7.5**
2	60 (1 hr)	30	4.50	8.25	3.75	**8.0**
3	90 (1.5 hr)	30	4.50	8.00	3.50	**8.6**
4	120 (2 hr)	30	5.00	8.00	3.00	**10.0**
5	150 (2.5 hr)	30	5.50	8.50	3.00	**10.0**
6	180 (3 hr)	30	6.00	8.50	2.50	**12.0**
7	210 (3.5 hr)	30	6.00	8.50	2.50	**12.0**
8	240 (4 hr)	30	6.00	9.00	3.00	**10.0**
9	270 (4.5 hr)	30	5.00	8.00	3.00	**10.0**
10	300 (5 hr)	30	5.00	8.00	3.00	**10.0**
11	330 (5.5 hr)	30	4.00	7.00	3.00	**10.0**
12	360 (6 hr)	30	5.00	8.25	3.25	**9.2**

Percolation Summary sheet — Test Hole No. **PT-24**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate minutes per inch
0	0	--				
1	30 (.5 hr)	30	3.75	4.75	1.00	**30.0**
2	60 (1 hr)	30	4.75	5.75	1.00	**0.0**
3	90 (1.5 hr)	30	3.50	4.50	1.00	**30.0**
4	120 (2 hr)	30	4.50	5.25	0.75	**40.0**
5	150 (2.5 hr)	30	4.00	4.75	0.75	**40.0**
6	180 (3 hr)	30	4.75	5.25	0.50	**60.0**
7	210 (3.5 hr)	30	3.25	4.00	0.75	**0.0**
8	240 (4 hr)	30	4.00	4.75	0.75	**40.0**
9	270 (4.5 hr)	30	4.75	5.25	0.50	**60.0**
10	300 (5 hr)	30	3.25	4.00	0.75	**40.0**
11	330 (5.5 hr)	30	4.00	4.50	0.50	**60.0**
12	360 (6 hr)	30	4.00	4.50	0.50	**60.0**

Percolation Summary sheet — Test Hole No. **PT-26**

Project No. 12-054

Project: The Preserve — Date: 3/28/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate - minutes per inch
0	0	--				
1	30 (.5 hr)	30	3.50	6.75	3.25	**9.2**
2	60 (1 hr)	30	4.00	6.25	2.25	**13.3**
3	90 (1.5 hr)	30	4.50	6.50	2.00	**15.0**
4	120 (2 hr)	30	4.25	6.50	2.25	**13.3**
5	150 (2.5 hr)	30	5.00	7.00	2.00	**15.0**
6	180 (3 hr)	30	5.00	7.00	2.00	**15.0**
7	210 (3.5 hr)	30	3.00	5.50	2.50	**12.0**
8	240 (4 hr)	30	5.50	7.50	2.00	**15.0**
9	270 (4.5 hr)	30	3.00	5.25	2.25	**13.3**
10	300 (5 hr)	30	3.25	5.50	2.25	**13.3**
11	330 (5.5 hr)	30	3.50	5.75	2.25	**13.3**
12	360 (6 hr)	30	3.50	5.50	2.00	**15.0**

Percolation Summary sheet — Test Hole No. **PT-33**

Project No. 12-054

Project: The Preserve — Date: 3/27/2013

Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level	water level @ time interval	Change water level	Rate minutes per inch
0	0	--				
1	30 (.5 hr)	30	3.50	4.00	0.50	**60.0**
2	60 (1 hr)	30	4.00	4.25	0.25	**0.0**
3	90 (1.5 hr)	30	4.25	4.50	0.25	**120.0**
4	120 (2 hr)	30	2.75	3.00	0.25	**120.0**
5	150 (2.5 hr)	30	3.00	3.25	0.25	**120.0**
6	180 (3 hr)	30	3.25	3.75	0.50	**60.0**
7	210 (3.5 hr)	30	3.75	4.00	0.25	**0.0**
8	240 (4 hr)	30	4.00	4.50	0.50	**60.0**
9	270 (4.5 hr)	30	4.50	4.50	0.00	**0.0**
10	300 (5 hr)	30	3.10	3.50	0.40	**75.0**
11	330 (5.5 hr)	30	3.50	4.00	0.50	**60.0**
12	360 (6 hr)	30	4.00	4.25	0.25	**120.0**

Percolation Summary sheet — Test Hole No. **1A-1**
Project No. 12-054
Project: The Preserve — Date: 11/13/2013
Depth of Hole from GS 4.5'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	11.5			
1	30 (.5 hr)	30	4.50	5.25	0.75	**40.0**
2	60 (1 hr)	30	3.00	3.75	0.75	**40.0**
3	90 (1.5 hr)	30	3.75	4.50	0.75	**40.0**
4	120 (2 hr)	30	3.50	4.00	0.50	**60.0**
5	150 (2.5 hr)	30	4.00	4.75	0.75	**40.0**
6	180 (3 hr)	30	3.00	3.75	0.75	**40.0**
7	210 (3.5 hr)	30	3.75	4.50	0.75	**40.0**
8	240 (4 hr)	30	3.00	3.75	0.75	**40.0**
9	270 (4.5 hr)	30	3.75	4.25	0.50	**60.0**
10	300 (5 hr)	30	3.00	3.50	0.50	**60.0**
11	330 (5.5 hr)	30	3.50	4.25	0.75	**40.0**
12	360 (6 hr)	30	3.00	3.75	0.75	**40.0**

Percolation Summary sheet — Test Hole No. **1A-2**
Project No. 12-054
Project: The Preserve — Date: 11/13/2013
Depth of Hole from GS 4.0 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	12.5			
1	30 (.5 hr)	30	5.50	6.00	0.50	**60.0**
2	60 (1 hr)	30	4.50	5.00	0.50	**60.0**
3	90 (1.5 hr)	30	5.00	5.25	0.25	**120.0**
4	120 (2 hr)	30	3.50	4.00	0.50	**60.0**
5	150 (2.5 hr)	30	4.00	4.50	0.50	**60.0**
6	180 (3 hr)	30	4.00	5.00	1.00	**30.0**
7	210 (3.5 hr)	30	4.00	4.50	0.50	**60.0**
8	240 (4 hr)	30	4.50	5.00	0.50	**60.0**
9	270 (4.5 hr)	30	4.50	5.00	0.50	**60.0**
10	300 (5 hr)	30	5.00	5.50	0.50	**60.0**
11	330 (5.5 hr)	30	5.00	5.75	0.75	**40.0**
12	360 (6 hr)	30	4.25	4.75	0.50	**60.0**

Percolation Summary sheet — Test Hole No. **1A-3**
Project No. 12-054
Project: The Preserve — Date: 11/13/2013
Depth of Hole from GS 4.0'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	13.5			
1	30 (.5 hr)	30	6.50	7.50	1.00	**30.0**
2	60 (1 hr)	30	5.50	6.00	0.50	**60.0**
3	90 (1.5 hr)	30	6.00	6.50	0.50	**60.0**
4	120 (2 hr)	30	5.00	5.75	0.75	**40.0**
5	150 (2.5 hr)	30	4.00	5.00	1.00	**30.0**
6	180 (3 hr)	30	5.50	6.00	0.50	**60.0**
7	210 (3.5 hr)	30	5.00	5.50	0.50	**60.0**
8	240 (4 hr)	30	5.50	6.25	0.75	**40.0**
9	270 (4.5 hr)	30	4.75	5.25	0.50	**60.0**
10	300 (5 hr)	30	5.00	5.50	0.50	**60.0**
11	330 (5.5 hr)	30	5.00	5.75	0.75	**40.0**
12	360 (6 hr)	30	4.50	5.25	0.75	**40.0**

Percolation Summary sheet — Test Hole No. **1A-4**
Project No. 12-054
Project: The Preserve — Date: 11/13/2013
Depth of Hole from GS 4.0 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	12.5			
1	30 (.5 hr)	30	7.00	7.50	0.50	**60.0**
2	60 (1 hr)	30	5.00	5.75	0.75	**40.0**
3	90 (1.5 hr)	30	5.75	6.25	0.50	**60.0**
4	120 (2 hr)	30	4.50	5.00	0.50	**60.0**
5	150 (2.5 hr)	30	5.00	5.50	0.50	**60.0**
6	180 (3 hr)	30	5.50	6.00	0.50	**60.0**
7	210 (3.5 hr)	30	4.50	5.25	0.75	**40.0**
8	240 (4 hr)	30	5.25	5.50	0.25	**120.0**
9	270 (4.5 hr)	30	4.00	4.75	0.75	**40.0**
10	300 (5 hr)	30	4.75	5.00	0.25	**120.0**
11	330 (5.5 hr)	30	5.00	5.75	0.75	**40.0**
12	360 (6 hr)	30	4.00	4.50	0.50	**60.0**

Percolation Summary sheet — Test Hole No. **1A-5**

Project No. 12-054

Project: The Preserve — Date: 11/13/2013

Depth of Hole from GS 4.75'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	11.5			
1	30 (.5 hr)	30	4.50	5.50	1.00	**30.0**
2	60 (1 hr)	30	3.50	4.50	1.00	**30.0**
3	90 (1.5 hr)	30	4.50	5.50	1.00	**30.0**
4	120 (2 hr)	30	3.00	4.25	1.25	**24.0**
5	150 (2.5 hr)	30	4.25	5.25	1.00	**30.0**
6	180 (3 hr)	30	4.00	5.00	1.00	**30.0**
7	210 (3.5 hr)	30	5.00	6.00	1.00	**30.0**
8	240 (4 hr)	30	4.00	5.00	1.00	**30.0**
9	270 (4.5 hr)	30	5.00	5.75	0.75	**40.0**
10	300 (5 hr)	30	3.75	4.75	1.00	**30.0**
11	330 (5.5 hr)	30	4.75	5.50	0.75	**40.0**
12	360 (6 hr)	30	3.50	4.25	0.75	**40.0**

Percolation Summary sheet — Test Hole No. **1B-1**

Project No. 12-054

Project: The Preserve — Date: 11/13/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	12.0			
1	30 (.5 hr)	30	5.50	7.25	1.75	**17.1**
2	60 (1 hr)	30	4.50	6.00	1.50	**20.0**
3	90 (1.5 hr)	30	6.00	7.50	1.50	**20.0**
4	120 (2 hr)	30	5.50	6.75	1.25	**24.0**
5	150 (2.5 hr)	30	5.50	6.50	1.00	**30.0**
6	180 (3 hr)	30	4.25	6.00	1.75	**17.1**
7	210 (3.5 hr)	30	6.00	7.00	1.00	**30.0**
8	240 (4 hr)	30	5.50	6.75	1.25	**24.0**
9	270 (4.5 hr)	30	4.50	6.00	1.50	**20.0**
10	300 (5 hr)	30	6.00	7.00	1.00	**30.0**
11	330 (5.5 hr)	30	4.75	6.00	1.25	**24.0**
12	360 (6 hr)	30	6.00	7.00	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **1B-2**

Project No. 12-054

Project: The Preserve — Date: 11/13/2013

Depth of Hole from GS 5.0'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	18.5			
1	30 (.5 hr)	30	11.00	14.00	3.00	**10.0**
2	60 (1 hr)	30	8.00	12.00	4.00	**7.5**
3	90 (1.5 hr)	30	9.00	12.50	3.50	**8.6**
4	120 (2 hr)	30	9.25	12.25	3.00	**10.0**
5	150 (2.5 hr)	30	10.00	12.50	2.50	**12.0**
6	180 (3 hr)	30	10.00	12.50	2.50	**12.0**
7	210 (3.5 hr)	30	10.00	12.50	2.50	**12.0**
8	240 (4 hr)	30	9.50	11.75	2.25	**13.3**
9	270 (4.5 hr)	30	9.50	11.50	2.00	**15.0**
10	300 (5 hr)	30	10.25	12.25	2.00	**15.0**
11	330 (5.5 hr)	30	10.75	12.75	2.00	**15.0**
12	360 (6 hr)	30	9.75	12.00	2.25	**13.3**

Percolation Summary sheet — Test Hole No. **1B-3**

Project No. 12-054

Project: The Preserve — Date: 11/13/2013

Depth of Hole from GS 4.0 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	11.0			
1	30 (.5 hr)	30	3.00	4.00	1.00	**30.0**
2	60 (1 hr)	30	4.00	4.75	0.75	**40.0**
3	90 (1.5 hr)	30	2.50	3.50	1.00	**30.0**
4	120 (2 hr)	30	3.50	4.25	0.75	**40.0**
5	150 (2.5 hr)	30	4.25	4.75	0.50	**60.0**
6	180 (3 hr)	30	3.50	4.25	0.75	**40.0**
7	210 (3.5 hr)	30	4.25	5.00	0.75	**40.0**
8	240 (4 hr)	30	3.00	3.75	0.75	**40.0**
9	270 (4.5 hr)	30	3.75	4.50	0.75	**40.0**
10	300 (5 hr)	30	4.50	5.00	0.50	**60.0**
11	330 (5.5 hr)	30	2.75	3.50	0.75	**40.0**
12	360 (6 hr)	30	3.50	4.25	0.75	**40.0**

Percolation Summary sheet — Test Hole No. **1C-1**
Project No. 12-054
Project: The Preserve — Date: 11/14/2013
Depth of Hole from GS 4.5'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	12.25			
1	30 (.5 hr)	30	5.25	9.5	4.25	**7.1**
2	60 (1 hr)	30	7.00	9.5	2.50	**12.0**
3	90 (1.5 hr)	30	7.25	9.75	2.50	**12.0**
4	120 (2 hr)	30	7.00	9.5	2.50	**12.0**
5	150 (2.5 hr)	30	6.25	9.0	2.75	**10.9**
6	180 (3 hr)	30	7.25	9.75	2.50	**12.0**
7	210 (3.5 hr)	30	7.50	9.50	2.00	**15.0**
8	240 (4 hr)	30	7.00	9.25	2.25	**13.3**
9	270 (4.5 hr)	30	7.25	9.50	2.25	**13.3**
10	300 (5 hr)	30	6.00	8.50	2.50	**12.0**
11	330 (5.5 hr)	30	8.00	10.00	2.00	**15.0**
12	360 (6 hr)	30	5.50	8.00	2.50	**12.0**

Percolation Summary sheet — Test Hole No. **1C-2**
Project No. 12-054
Project: The Preserve — Date: 11/14/2013
Depth of Hole from GS 4.75 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	15.3			
1	30 (.5 hr)	30	8.25	11.50	3.25	**9.2**
2	60 (1 hr)	30	9.50	11.50	2.00	**15.0**
3	90 (1.5 hr)	30	9.50	11.50	2.00	**15.0**
4	120 (2 hr)	30	9.00	11.00	2.00	**15.0**
5	150 (2.5 hr)	30	9.00	11.50	2.50	**12.0**
6	180 (3 hr)	30	8.00	10.50	2.50	**12.0**
7	210 (3.5 hr)	30	7.50	9.50	2.00	**15.0**
8	240 (4 hr)	30	8.00	10.00	2.00	**15.0**
9	270 (4.5 hr)	30	7.75	9.75	2.00	**15.0**
10	300 (5 hr)	30	6.50	9.00	2.50	**12.0**
11	330 (5.5 hr)	30	5.75	8.25	2.50	**12.0**
12	360 (6 hr)	30	4.00	6.50	2.50	**12.0**

Percolation Summary sheet — Test Hole No. **1C-3**

Project No. 12-054

Project: The Preserve — Date: 11/14/2013

Depth of Hole from GS 4.5'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	12.5			
1	30 (.5 hr)	30	5.50	6.00	0.50	**60.0**
2	60 (1 hr)	30	6.00	6.00	0.00	**0.0**
3	90 (1.5 hr)	30	4.00	4.25	0.25	**120.0**
4	120 (2 hr)	30	4.25	4.50	0.25	**120.0**
5	150 (2.5 hr)	30	3.25	3.50	0.25	**120.0**
6	180 (3 hr)	30	3.50	3.75	0.25	**120.0**
7	210 (3.5 hr)	30	3.75	4.00	0.25	**120.0**
8	240 (4 hr)	30	4.00	4.25	0.25	**120.0**
9	270 (4.5 hr)	30	3.00	3.50	0.50	**60.0**
10	300 (5 hr)	30	3.50	3.50	0.00	**0.0**
11	330 (5.5 hr)	30	3.50	3.75	0.25	**120.0**
12	360 (6 hr)	30	3.75	4.00	0.25	**120.0**

Percolation Summary sheet — Test Hole No. **1C-4**

Project No. 12-054

Project: The Preserve — Date: 11/14/2013

Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	14.0			
1	30 (.5 hr)	30	8.75	12.00	3.25	**9.2**
2	60 (1 hr)	30	8.00	11.00	3.00	**10.0**
3	90 (1.5 hr)	30	9.00	11.50	2.50	**12.0**
4	120 (2 hr)	30	9.00	11.50	2.50	**12.0**
5	150 (2.5 hr)	30	8.00	11.00	3.00	**10.0**
6	180 (3 hr)	30	8.00	11.00	3.00	**10.0**
7	210 (3.5 hr)	30	7.50	10.00	2.50	**12.0**
8	240 (4 hr)	30	7.75	10.25	2.50	**12.0**
9	270 (4.5 hr)	30	6.50	9.50	3.00	**10.0**
10	300 (5 hr)	30	7.50	10.00	2.50	**12.0**
11	330 (5.5 hr)	30	7.75	10.00	2.25	**13.3**
12	360 (6 hr)	30	8.00	10.00	2.00	**15.0**

Percolation Summary sheet — Test Hole No. **1D-1**
Project No. 12-054
Project: The Preserve — Date: 11/14/2013
Depth of Hole from GS 4.5'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	10			
1	30 (.5 hr)	30	3.50	4.00	0.50	**60.0**
2	60 (1 hr)	30	4.00	4.50	0.50	**60.0**
3	90 (1.5 hr)	30	2.50	3.00	0.50	**60.0**
4	120 (2 hr)	30	3.00	3.75	0.75	**40.0**
5	150 (2.5 hr)	30	3.75	4.25	0.50	**60.0**
6	180 (3 hr)	30	2.50	3.00	0.50	**60.0**
7	210 (3.5 hr)	30	3.00	3.50	0.50	**60.0**
8	240 (4 hr)	30	3.50	4.25	0.75	**40.0**
9	270 (4.5 hr)	30	3.00	3.75	0.75	**40.0**
10	300 (5 hr)	30	3.75	4.25	0.50	**60.0**
11	330 (5.5 hr)	30	3.00	3.50	0.50	**60.0**
12	360 (6 hr)	30	3.50	4.00	0.50	**60.0**

Percolation Summary sheet — Test Hole No. **1D-2**
Project No. 12-054
Project: The Preserve — Date: 11/14/2013
Depth of Hole from GS 5.5 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	12.25			
1	30 (.5 hr)	30	6.00	7.00	1.00	**30.0**
2	60 (1 hr)	30	5.25	6.50	1.25	**24.0**
3	90 (1.5 hr)	30	5.00	6.00	1.00	**30.0**
4	120 (2 hr)	30	6.00	7.25	1.25	**24.0**
5	150 (2.5 hr)	30	6.50	7.25	0.75	**40.0**
6	180 (3 hr)	30	4.25	5.25	1.00	**30.0**
7	210 (3.5 hr)	30	5.25	6.00	0.75	**40.0**
8	240 (4 hr)	30	4.50	5.50	1.00	**30.0**
9	270 (4.5 hr)	30	5.50	6.25	0.75	**40.0**
10	300 (5 hr)	30	4.00	4.75	0.75	**40.0**
11	330 (5.5 hr)	30	4.75	5.75	1.00	**30.0**
12	360 (6 hr)	30	4.00	4.75	0.75	**40.0**

Percolation Summary sheet — Test Hole No. **1 E-1**
Project No. 12-054
Project: The Preserve — Date: 11/15/2013
Depth of Hole from GS 4.25'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	12.5			
1	30 (.5 hr)	30	6.00	7.25	1.25	**24.0**
2	60 (1 hr)	30	4.50	5.75	1.25	**24.0**
3	90 (1.5 hr)	30	3.50	4.75	1.25	**24.0**
4	120 (2 hr)	30	4.75	5.75	1.00	**30.0**
5	150 (2.5 hr)	30	3.50	4.75	1.25	**24.0**
6	180 (3 hr)	30	4.75	5.75	1.00	**30.0**
7	210 (3.5 hr)	30	3.75	4.75	1.00	**30.0**
8	240 (4 hr)	30	4.75	6.00	1.25	**24.0**
9	270 (4.5 hr)	30	3.00	4.25	1.25	**24.0**
10	300 (5 hr)	30	4.25	5.25	1.00	**30.0**
11	330 (5.5 hr)	30	2.75	3.75	1.00	**30.0**
12	360 (6 hr)	30	3.75	4.75	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **1 E-2**
Project No. 12-054
Project: The Preserve — Date: 11/15/2013
Depth of Hole from GS 4.5 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	13.0			
1	30 (.5 hr)	30	6.00	7.00	1.00	**30.0**
2	60 (1 hr)	30	4.00	5.75	1.75	**17.1**
3	90 (1.5 hr)	30	4.25	5.75	1.50	**20.0**
4	120 (2 hr)	30	3.50	4.75	1.25	**24.0**
5	150 (2.5 hr)	30	2.75	4.50	1.75	**17.1**
6	180 (3 hr)	30	4.50	5.75	1.25	**24.0**
7	210 (3.5 hr)	30	4.00	5.00	1.00	**30.0**
8	240 (4 hr)	30	3.75	5.25	1.50	**20.0**
9	270 (4.5 hr)	30	4.00	5.25	1.25	**24.0**
10	300 (5 hr)	30	4.50	5.75	1.25	**24.0**
11	330 (5.5 hr)	30	3.00	4.50	1.50	**20.0**
12	360 (6 hr)	30	4.50	5.75	1.25	**24.0**

Percolation Summary sheet — Test Hole No. **1 E-3**

Project No. 12-054

Project: The Preserve — Date: 11/15/2013

Depth of Hole from GS 4.5'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	14.75			
1	30 (.5 hr)	30	8.00	9.25	1.25	**24.0**
2	60 (1 hr)	30	6.00	7.25	1.25	**24.0**
3	90 (1.5 hr)	30	5.50	6.50	1.00	**30.0**
4	120 (2 hr)	30	5.25	6.00	0.75	**40.0**
5	150 (2.5 hr)	30	3.75	5.00	1.25	**24.0**
6	180 (3 hr)	30	3.75	5.00	1.25	**24.0**
7	210 (3.5 hr)	30	4.00	5.00	1.00	**30.0**
8	240 (4 hr)	30	5.00	6.25	1.25	**24.0**
9	270 (4.5 hr)	30	5.00	6.00	1.00	**30.0**
10	300 (5 hr)	30	4.50	5.75	1.25	**24.0**
11	330 (5.5 hr)	30	4.00	5.25	1.25	**24.0**
12	360 (6 hr)	30	4.25	5.25	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **1 E-4**

Project No. 12-054

Project: The Preserve — Date: 11/15/2013

Depth of Hole from GS 4.25 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	9.8			
1	30 (.5 hr)	30	3.00	6.50	3.50	**8.6**
2	60 (1 hr)	30	4.00	6.00	2.00	**15.0**
3	90 (1.5 hr)	30	2.75	5.50	2.75	**10.9**
4	120 (2 hr)	30	4.25	6.00	1.75	**17.1**
5	150 (2.5 hr)	30	3.00	5.25	2.25	**13.3**
6	180 (3 hr)	30	3.00	5.25	2.25	**13.3**
7	210 (3.5 hr)	30	2.50	4.50	2.00	**15.0**
8	240 (4 hr)	30	3.50	5.50	2.00	**15.0**
9	270 (4.5 hr)	30	3.00	5.00	2.00	**15.0**
10	300 (5 hr)	30	2.50	4.50	2.00	**15.0**
11	330 (5.5 hr)	30	2.75	4.75	2.00	**15.0**
12	360 (6 hr)	30	3.00	4.75	1.75	**17.1**

Percolation Summary sheet — Test Hole No. **2A-1**
Project No. 12-054
Project: The Preserve — Date: 11/6/2013
Depth of Hole from GS 4.0 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	7.0"			
1	30 (.5 hr)	30	6.00	7.00	1.00	**30.0**
2	60 (1 hr)	30	4.50	5.50	1.00	**30.0**
3	90 (1.5 hr)	30	3.50	4.50	1.00	**30.0**
4	120 (2 hr)	30	4.00	4.50	0.50	**60.0**
5	150 (2.5 hr)	30	4.00	4.50	0.50	**60.0**
6	180 (3 hr)	30	4.50	5.50	1.00	**30.0**
7	210 (3.5 hr)	30	5.50	6.50	1.00	**30.0**
8	240 (4 hr)	30	3.00	4.00	1.00	**30.0**
9	270 (4.5 hr)	30	4.00	4.75	0.75	**40.0**
10	300 (5 hr)	30	4.75	5.50	0.75	**40.0**
11	330 (5.5 hr)	30	3.25	4.00	0.75	**40.0**
12	360 (6 hr)	30	4.00	4.75	0.75	**40.0**

Percolation Summary sheet — Test Hole No. **2A-2**
Project No. 12-054
Project: The Preserve — Date: 11/6/2013
Depth of Hole from GS 4.0 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	11.0			
1	30 (.5 hr)	30	3.00	5.50	2.50	**12.0**
2	60 (1 hr)	30	4.00	6.00	2.00	**15.0**
3	90 (1.5 hr)	30	4.50	6.00	1.50	**20.0**
4	120 (2 hr)	30	4.50	6.00	1.50	**20.0**
5	150 (2.5 hr)	30	4.50	6.00	1.50	**20.0**
6	180 (3 hr)	30	4.00	5.50	1.50	**20.0**
7	210 (3.5 hr)	30	5.00	6.25	1.25	**24.0**
8	240 (4 hr)	30	4.00	5.50	1.50	**20.0**
9	270 (4.5 hr)	30	4.00	5.50	1.50	**20.0**
10	300 (5 hr)	30	4.25	5.50	1.25	**24.0**
11	330 (5.5 hr)	30	4.00	5.50	1.50	**20.0**
12	360 (6 hr)	30	4.00	5.25	1.25	**24.0**

Percolation Summary sheet — Test Hole No. **2A-3**

Project No. 12-054

Project: The Preserve — Date: 11/6/2013

Depth of Hole from GS 3.5' of AF, TD=6.0' ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	11.5			
1	30 (.5 hr)	30	4.00	7.00	3.00	**10.0**
2	60 (1 hr)	30	4.00	6.50	2.50	**12.0**
3	90 (1.5 hr)	30	4.00	6.50	2.50	**12.0**
4	120 (2 hr)	30	5.00	7.00	2.00	**15.0**
5	150 (2.5 hr)	30	5.00	6.50	1.50	**20.0**
6	180 (3 hr)	30	5.50	7.00	1.50	**20.0**
7	210 (3.5 hr)	30	5.00	6.50	1.50	**20.0**
8	240 (4 hr)	30	5.00	6.50	1.50	**20.0**
9	270 (4.5 hr)	30	4.75	6.00	1.25	**24.0**
10	300 (5 hr)	30	4.50	6.00	1.50	**20.0**
11	330 (5.5 hr)	30	4.50	6.00	1.50	**20.0**
12	360 (6 hr)	30	4.50	5.75	1.25	**24.0**

Percolation Summary sheet — Test Hole No. **2A-4**

Project No. 12-054

Project: The Preserve — Date: 11/20/2013

Depth of Hole from GS 4.25 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	7:50 AM	--	11			
1	30 (.5 hr)	30	5.00	6.25	1.25	**24.0**
2	60 (1 hr)	30	4.00	5.00	1.00	**30.0**
3	90 (1.5 hr)	30	3.00	3.75	0.75	**40.0**
4	120 (2 hr)	30	3.75	4.75	1.00	**30.0**
5	150 (2.5 hr)	30	3.75	4.25	0.50	**60.0**
6	180 (3 hr)	30	1.75	2.75	1.00	**30.0**
7	210 (3.5 hr)	30	2.75	3.75	1.00	**30.0**
8	240 (4 hr)	30	2.75	3.50	0.75	**40.0**
9	270 (4.5 hr)	30	3.50	4.50	1.00	**30.0**
10	300 (5 hr)	30	2.50	3.25	0.75	**40.0**
11	330 (5.5 hr)	30	2.25	3.00	0.75	**40.0**
12	360 (6 hr)	30	3.00	4.00	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **2A-5**

Project No. 12-054

Project: The Preserve — Date: 11/20/2013

Depth of Hole from GS — Af to 4.0 ft, Bx to TD 6.5'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	7:51:30	--	12.0			
1	30 (.5 hr)	30	3.50	6.00	2.50	**12.0**
2	60 (1 hr)	30	4.00	6.00	2.00	**15.0**
3	90 (1.5 hr)	30	4.00	6.00	2.00	**15.0**
4	120 (2 hr)	30	3.00	5.50	2.50	**12.0**
5	150 (2.5 hr)	30	3.00	5.25	2.25	**13.3**
6	180 (3 hr)	30	3.00	5.00	2.00	**15.0**
7	210 (3.5 hr)	30	4.00	5.75	1.75	**17.1**
8	240 (4 hr)	30	4.00	5.75	1.75	**17.1**
9	270 (4.5 hr)	30	4.00	6.00	2.00	**15.0**
10	300 (5 hr)	30	3.50	5.00	1.50	**20.0**
11	330 (5.5 hr)	30	3.50	5.00	1.50	**20.0**
12	360 (6 hr)	30	3.50	5.00	1.50	**20.0**

Percolation Summary sheet — Test Hole No. **2B-1**

Project No. 12-054

Project: The Preserve — Date: 11/7/2013

Depth of Hole from GS — 4.75'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	16			
1	25	25	7.50	16.0	8.50	**2.9**
2	50	25	7.50	16.0	8.50	**2.9**
3*	10	10	8.50	12.5	4.00	**2.5**
4	20	10	8.50	12.0	3.50	**2.9**
5	30	10	8.00	12.0	4.00	**2.5**
6	40	10	7.50	11.00	3.50	**2.9**
7	50	10	8.00	12.00	4.00	**2.5**
8	60	10	8.00	11.50	3.50	**2.9**
*	Start new 1 hour test					

Percolation Summary sheet — Test Hole No. **2B-2**
Project No. 12-054
Project: The Preserve — Date: 11/7/2013
Depth of Hole from GS 4.25 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	13.0			
1	30 (.5 hr)	30	6.00	8.00	2.00	**15.0**
2	60 (1 hr)	30	5.50	7.50	2.00	**15.0**
3	90 (1.5 hr)	30	6.00	8.50	2.50	**12.0**
4	120 (2 hr)	30	7.00	8.75	1.75	**17.1**
5	150 (2.5 hr)	30	7.50	9.25	1.75	**17.1**
6	180 (3 hr)	30	7.00	9.00	2.00	**15.0**
7	210 (3.5 hr)	30	7.00	8.50	1.50	**20.0**
8	240 (4 hr)	30	6.50	8.00	1.50	**20.0**
9	270 (4.5 hr)	30	5.50	7.50	2.00	**15.0**
10	300 (5 hr)	30	6.00	7.75	1.75	**17.1**
11	330 (5.5 hr)	30	5.50	7.25	1.75	**17.1**
12	360 (6 hr)	30	6.25	7.75	1.50	**20.0**

Percolation Summary sheet — Test Hole No. **2B-3**
Project No. 12-054
Project: The Preserve — Date: 11/7/2013
Depth of Hole from GS 4.0'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	14			
1	30 (.5 hr)	30	5.50	7.00	1.50	**20.0**
2	60 (1 hr)	30	5.50	7.00	1.50	**20.0**
3	90 (1.5 hr)	30	6.00	7.00	1.00	**30.0**
4	120 (2 hr)	30	6.00	7.00	1.00	**30.0**
5	150 (2.5 hr)	30	6.50	7.25	0.75	**40.0**
6	180 (3 hr)	30	4.50	6.00	1.50	**20.0**
7	210 (3.5 hr)	30	6.00	7.00	1.00	**30.0**
8	240 (4 hr)	30	4.50	6.00	1.50	**20.0**
9	270 (4.5 hr)	30	6.00	7.00	1.00	**30.0**
10	300 (5 hr)	30	5.00	6.00	1.00	**30.0**
11	330 (5.5 hr)	30	6.00	7.00	1.00	**30.0**
12	360 (6 hr)	30	5.50	6.50	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **2C-1**
Project No. 12-054
Project: The Preserve — Date: 11/6/2013
Depth of Hole from GS 4.0 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	12.0			
1	30 (.5 hr)	30	4.00	5.50	1.50	**20.0**
2	60 (1 hr)	30	3.00	4.50	1.50	**20.0**
3	90 (1.5 hr)	30	3.50	4.50	1.00	**30.0**
4	120 (2 hr)	30	4.00	5.50	1.50	**20.0**
5	150 (2.5 hr)	30	4.50	6.00	1.50	**20.0**
6	180 (3 hr)	30	5.00	6.00	1.00	**30.0**
7	210 (3.5 hr)	30	4.00	5.00	1.00	**30.0**
8	240 (4 hr)	30	3.00	4.50	1.50	**20.0**
9	270 (4.5 hr)	30	4.50	5.50	1.00	**30.0**
10	300 (5 hr)	30	4.50	5.50	1.00	**30.0**
11	330 (5.5 hr)	30	3.50	4.50	1.00	**30.0**
12	360 (6 hr)	30	4.50	5.50	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **2C-2**
Project No. 12-054
Project: The Preserve — Date: 11/6/2013
Depth of Hole from GS 5.0 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	12.5			
1	30 (.5 hr)	30	6.00	9.00	3.00	**10.0**
2	60 (1 hr)	30	6.50	8.50	2.00	**15.0**
3	90 (1.5 hr)	30	6.50	8.50	2.00	**15.0**
4	120 (2 hr)	30	7.50	9.00	1.50	**20.0**
5	150 (2.5 hr)	30	7.25	9.00	1.75	**17.1**
6	180 (3 hr)	30	6.75	8.50	1.75	**17.1**
7	210 (3.5 hr)	30	5.00	7.50	2.50	**12.0**
8	240 (4 hr)	30	4.75	7.00	2.25	**13.3**
9	270 (4.5 hr)	30	4.00	7.00	3.00	**10.0**
10	300 (5 hr)	30	5.00	7.25	2.25	**13.3**
11	330 (5.5 hr)	30	7.25	8.75	1.50	**20.0**
12	360 (6 hr)	30	5.75	7.75	2.00	**15.0**

Percolation Summary sheet				Test Hole No.		2C-3
Project No. 12-054						
Project: The Preserve					Date:	11/7/2013
Depth of Hole from GS	4.25'					
Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level (in.)	Rate minutes per inch
0	0	--	12			
1	30 (.5 hr)	30	4.00	8.25	4.25	**7.1**
2	60 (1 hr)	30	6.00	9.00	3.00	**10.0**
3	90 (1.5 hr)	30	6.50	9.50	3.00	**10.0**
4	120 (2 hr)	30	4.50	8.50	4.00	**7.5**
5	150 (2.5 hr)	30	5.75	8.50	2.75	**10.9**
6	180 (3 hr)	30	6.00	8.50	2.50	**12.0**
7	210 (3.5 hr)	30	6.25	8.75	2.50	**12.0**
8	240 (4 hr)	30	6.00	8.50	2.50	**12.0**
9	270 (4.5 hr)	30	5.25	8.00	2.75	**10.9**
10	300 (5 hr)	30	5.50	8.00	2.50	**12.0**
11	330 (5.5 hr)	30	5.50	8.00	2.50	**12.0**
12	360 (6 hr)	30	6.00	8.00	2.00	**15.0**

Percolation Summary sheet				Test Hole No.		2C-4
Project No. 12-054						
Project: The Preserve					Date:	11/7/2013
Depth of Hole from GS	4.25 ft					
Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	11.5			
1	30 (.5 hr)	30	4.00	6.00	2.00	**15.0**
2	60 (1 hr)	30	4.25	6.00	1.75	**17.1**
3	90 (1.5 hr)	30	4.75	6.00	1.25	**24.0**
4	120 (2 hr)	30	6.00	7.50	1.50	**20.0**
5	150 (2.5 hr)	30	6.00	6.75	0.75	**40.0**
6	180 (3 hr)	30	4.50	5.75	1.25	**24.0**
7	210 (3.5 hr)	30	5.75	7.00	1.25	**24.0**
8	240 (4 hr)	30	4.75	5.25	0.50	**60.0**
9	270 (4.5 hr)	30	5.25	6.25	1.00	**30.0**
10	300 (5 hr)	30	4.50	5.50	1.00	**30.0**
11	330 (5.5 hr)	30	5.50	6.50	1.00	**30.0**
12	360 (6 hr)	30	4.50	5.50	1.00	**30.0**

Percolation Summary sheet — Test Hole No. **2D-1**
Project No. 12-054
Project: The Preserve — Date: 11/6/2013
Depth of Hole from GS 4.0 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	9.5			
1	30 (.5 hr)	30	4.00	6.50	2.50	**12.0**
2	60 (1 hr)	30	4.00	6.50	2.50	**12.0**
3	90 (1.5 hr)	30	4.50	6.50	2.00	**15.0**
4	120 (2 hr)	30	5.50	7.00	1.50	**20.0**
5	150 (2.5 hr)	30	5.50	7.25	1.75	**17.1**
6	180 (3 hr)	30	6.50	8.00	1.50	**20.0**
7	210 (3.5 hr)	30	6.00	7.50	1.50	**20.0**
8	240 (4 hr)	30	4.00	6.25	2.25	**13.3**
9	270 (4.5 hr)	30	5.00	7.00	2.00	**15.0**
10	300 (5 hr)	30	5.50	7.00	1.50	**20.0**
11	330 (5.5 hr)	30	4.00	6.50	2.50	**12.0**
12	360 (6 hr)	30	5.50	7.00	1.50	**20.0**

Percolation Summary sheet — Test Hole No. **2D-2**
Project No. 12-054
Project: The Preserve — Date: 11/6/2013
Depth of Hole from GS 4.5'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	12			
1	30 (.5 hr)	30	4.50	7.00	2.50	**12.0**
2	60 (1 hr)	30	4.50	6.00	1.50	**20.0**
3	90 (1.5 hr)	30	4.00	5.50	1.50	**20.0**
4	120 (2 hr)	30	4.00	5.50	1.50	**20.0**
5	150 (2.5 hr)	30	4.50	6.00	1.50	**20.0**
6	180 (3 hr)	30	5.00	6.25	1.25	**24.0**
7	210 (3.5 hr)	30	5.25	6.50	1.25	**24.0**
8	240 (4 hr)	30	5.00	6.50	1.50	**20.0**
9	270 (4.5 hr)	30	5.00	6.00	1.00	**30.0**
10	300 (5 hr)	30	4.00	5.50	1.50	**20.0**
11	330 (5.5 hr)	30	5.50	6.50	1.00	**30.0**
12	360 (6 hr)	30	4.50	5.75	1.25	**24.0**

Percolation Summary sheet — Test Hole No. **2D-3**

Project No. 12-054

Project: The Preserve — Date: 11/20/2013

Depth of Hole from GS — AF to 1 to 2' Bx to TD - 5.0'

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	10.5			
1	30 (.5 hr)	30	3.50	6.00	**2.50**	12.0
2	60 (1 hr)	30	3.75	5.50	**1.75**	17.1
3	90 (1.5 hr)	30	3.00	5.00	**2.00**	15.0
4	120 (2 hr)	30	3.00	5.00	**2.00**	15.0
5	150 (2.5 hr)	30	3.00	4.50	**1.25**	24.0
6	180 (3 hr)	30	3.25	4.75	**1.25**	24.0
7	210 (3.5 hr)	30	3.50	5.00	**1.75**	17.1
8	240 (4 hr)	30	3.25	4.75	**1.25**	24.0
9	270 (4.5 hr)	30	3.50	5.00	**1.50**	20.0
10	300 (5 hr)	30	3.50	4.75	**1.75**	17.1
11	330 (5.5 hr)	30	3.00	4.25	**1.25**	24.0
12	360 (6 hr)	30	3.25	4.50	**1.25**	24.0

Percolation Summary sheet — Test Hole No. **2D-4**

Project No. 12-054

Project: The Preserve — Date: 11/20/2013

Depth of Hole from GS — AF to 3', Bx to TD - 6.0 ft

Reading No.	Time	Time interval	Start Water Level (in.)	water level @ time interval	Change water level	Rate minutes per inch
0	0	--	14.00			
1	30 (.5 hr)	30	7.00	10.00	3.00	**10.0**
2	60 (1 hr)	30	5.50	8.50	3.00	**10.0**
3	90 (1.5 hr)	30	7.00	9.50	2.50	**12.0**
4	120 (2 hr)	30	6.00	9.00	3.00	**10.0**
5	150 (2.5 hr)	30	5.50	8.00	2.50	**12.0**
6	180 (3 hr)	30	6.00	8.25	2.25	**13.3**
7	210 (3.5 hr)	30	6.00	8.50	2.50	**12.0**
8	240 (4 hr)	30	5.75	8.25	2.50	**12.0**
9	270 (4.5 hr)	30	6.00	8.50	2.50	**12.0**
10	300 (5 hr)	30	6.00	7.50	1.50	**20.0**
11	330 (5.5 hr)	30	5.75	8.00	2.25	**13.3**
12	360 (6 hr)	30	4.50	7.00	2.50	**12.0**

APPENDIX D

Seismic Refraction Survey

By

Subsurface Surveys & Associates, Inc.

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949-201-3388

SubSurface Surveys & Associates, Inc.
An Applied Geophysical Company

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June 4, 2005

Pacific Soils Engineering,Inc. **05-231**
3002 Dow Avenue, Suite 514
Tustin, CA 92680

Attn: Don Terres re: Seismic refraction survey, Sanchez Ranch, McConville Parcels

This brief letter report is to present the results of our geophysical survey on the Sanchez Ranch properties, Santa Ana Mountains, California (Fig. 1). Fourteen seismic refraction lines were shot in three days, April 11-12 and May 9, 2005. Purpose of the survey was to determine depth to rock layers and their rippability in support of planned construction work.

A Bison 24 channel seismograph system was applied to the task. This instrument has DIFP, digital instantaneous floating point. This translates into a computer-controlled seismograph that records incoming signals at all instrument settings, and the records are then analyzed by the computer in virtual real time, which in turn outputs optimum, balanced traces with maximum informational content.

Survey Design – The Line Location Map (Fig. 2) shows the position and layout directions of the fourteen refraction lines. Generally, they were laid out along fire access roads in the Santa Ana Mountains. Because of growth, the equipment had to be packed in to several line positions.

The spreads were laid out in a standard arrangement, namely 10 foot geophone intervals with 10 foot off end shots (hammer blows), forward and reverse. The exceptions were on lines 3 and 9 where outcrops limited layout space resulting in 5 foot off end shots from the near offset geophone. In addition to the off end shots, three split spread shots were fired, a mid split spread shot between geophones 12 and 13 and two asymmetrical split spreads between geophones 6 and 7, and geophones 18 and 19. There is a double interval between geophones 12 and 13. Thus, five shots were fired on each line. Each of the 14 lines are an entity, that is, they do not mutually cross, or extend continuously back-to-back. Each spread is 250 feet long, measured from offend shot to far offset geophone.

Source was a heavy-duty sledge hammer with an inertial switch. The hammer was slammed onto a metal plate that was coupled to the ground. Definitive energy arrivals were recorded at the far offset geophones. There was very little traffic and wind noise. Vertical stacking was carried out to build energy and serve as a further "noise" abatement strategy. Elevations of all shot and geophone positions were surveyed in, and then input

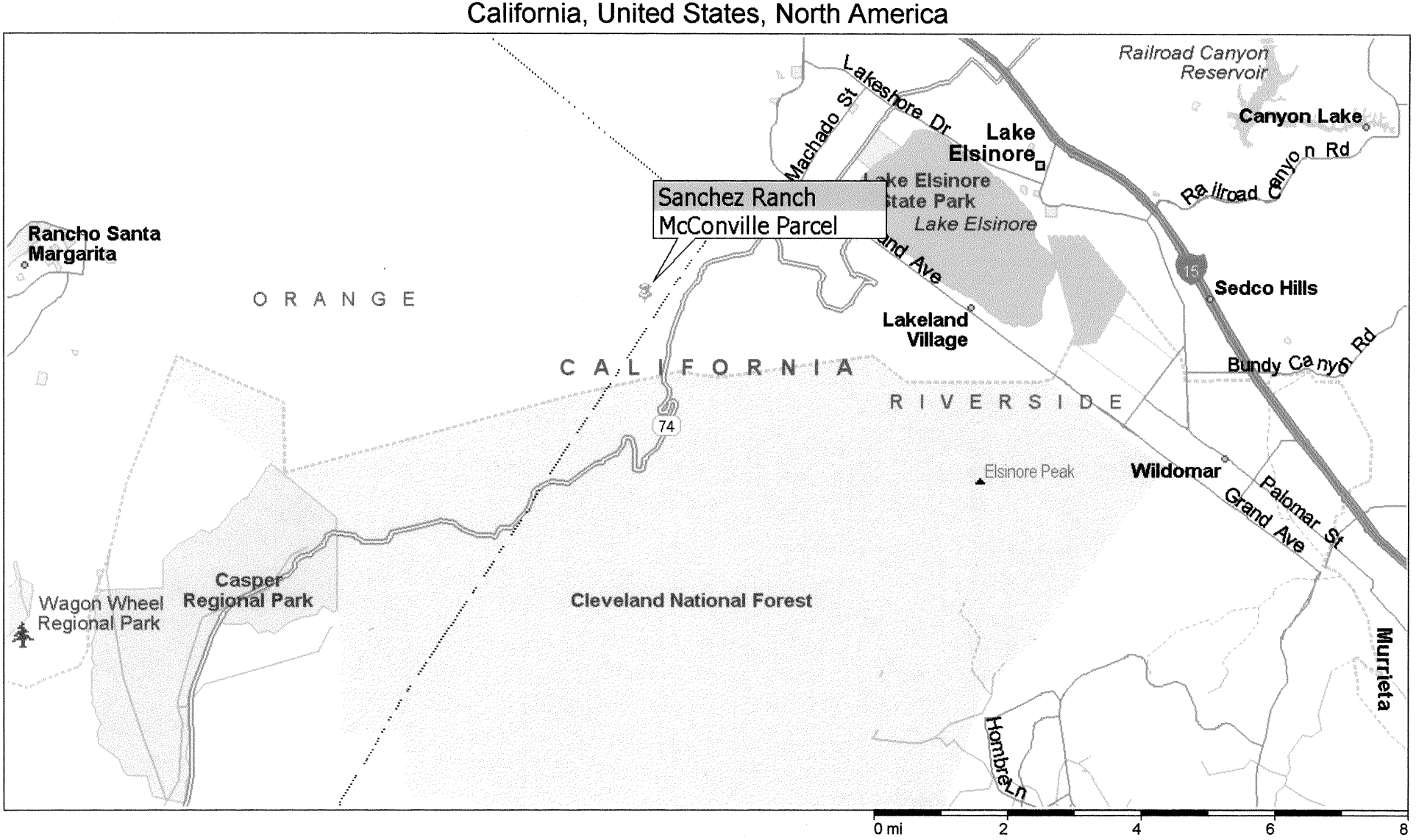


FIGURE 1

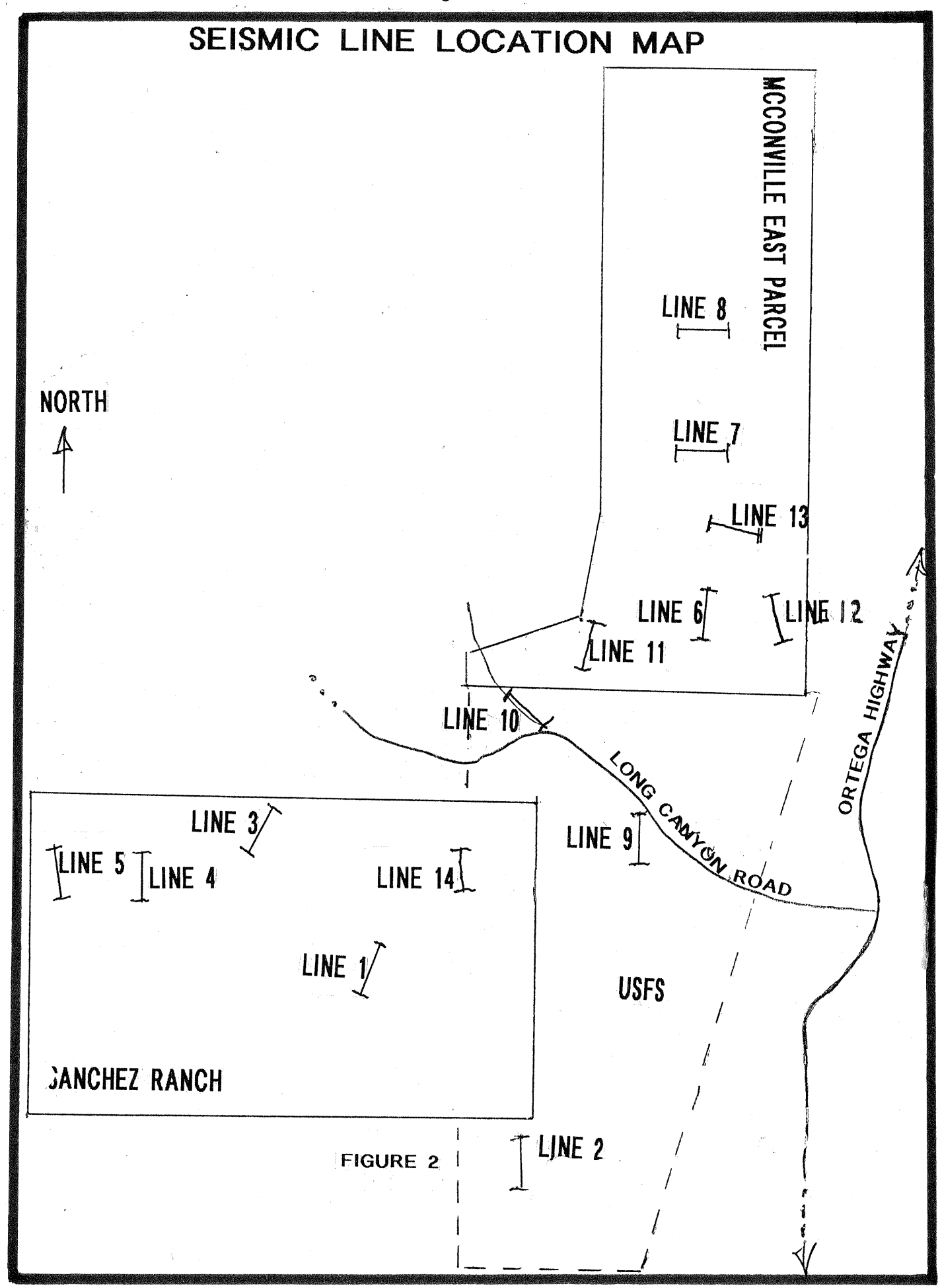

SEISMIC LINE LOCATION MAP
MCCONVILLE EAST PARCEL
LINE 8
NORTH
LINE 7
LINE 13
LINE 6
LINE 12
LINE 11
LINE 10
ORTEGA HIGHWAY
LONG CANYON ROAD
LINE 3
LINE 9
LINE 5
LINE 4
LINE 14
LINE 1
USFS
SANCHEZ RANCH
LINE 2

FIGURE 2

into the modeling program. Elevation of the forward shot point was arbitrarily taken to be zero feet, and then all other elevations along the given line were relative to the assigned value at the forward shot point. A detailed topographic may was not available; consequently, the elevations are all relative. This does not degrade the accuracy of the models.

Geologic Setting – The site lies within the Peninsular Ranges batholith.. The batholith, Mesozoic in age, is a large mass of granitic and metamorphic crystalline rock. Small basic bodies are found here and there; however, none have been mapped in the vicinity of the survey site. Observations are consistent with a continuous mass of granitic clan rocks. The bathlolith is a composite of numerous individual intrusive masses. The containing rock is in the form of roof pendants and host rock. Core rocks are not readily observed at the site.

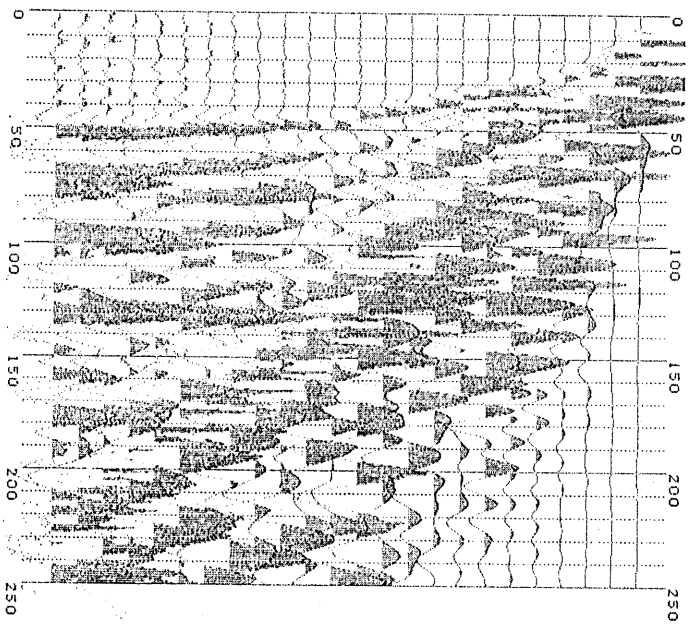
Brief Description of the Geophysical Method Applied – Seismic refraction investigates the subsurface by generating arrival time and offset distance information to determine the path and velocity of an elastic disturbance in the ground. The disturbance is created by shot, hammer, weight drop, or some comparable means of putting impulsive energy into the ground. Detectors are laid out at regular intervals in a line to measure the first arrival energy and the time of its arrival. The data are plotted in time-distance graphs, from which velocity of and depth to layers can be calculated.. This is possible because rays (a continuum point on an expanding wave front) of the disturbance wave follows a direct route, and is a first arrival at the close-in geophones. And the rays are refracted across layer boundaries where there is a difference in elastic and density properties. The critically refracted ray travels along the layer interface, at the speed of the lower layer, and continuously "feeds" energy back to the surface, to be successively detected by the line of geophones.

Shots are normally reversed from one end of the line to the other, to determine whether of not the layering is horizontal or dipping. And the split spread shots give redundancy to improve the interpretation. The acquired data are computationally intense. A ray tracing Computer program, SIPT2 in this instance, is used to iteratively honor all refracting surfaces, velocities and to be able to consider a large number of layers, where they are present. A first energy arrival pick program, with such features as zoom, filtering, time stretching; separation of traces, AGC and the balancing of traces, is also applied.

Interpretation - Monitor records are produced in the field with each shot (e.g., Fig. 3). These are prints of the raw data as it comes in to the recorder. They show the quality of the data, so that the operator can determine whether of not the data are pickable, or shots need to be repeated. Two representative monitor records are illustrated, a forward off end, and a mid-split spread from lines 9 and 8, respectively.

More of the shooting parameters are listed below the monitor records (Fig. 3).

The first pick information, geophone positions, shot locations, and geometry of the spreads are input to a routine that produces a time-distance plot. This plot (Fig. 4)



BISON 9000 SERIES

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Date 04:12:05 Time 09:58
Hi-cut 2000 Lo-cut 16
Sample rt .500ms Stacks 0003
Delay(ms) 0 DFhc Out
Channels 24 DFlc Out
Samples 000500
Rec len 250ms Agc Off
Time scale = 10.0 (ms)/division.

P	CH	GN	STK	EX	P	CH	GN	STK	EX
+	01	M	0003	15	+	13	M	0003	07
+	02	M	0003	14	+	14	M	0003	07
+	03	M	0003	13	+	15	M	0003	06
+	04	M	0003	12	+	16	M	0003	06
+	05	M	0003	11	+	17	M	0003	05
+	06	M	0003	11	+	18	M	0003	05
+	07	M	0003	09	+	19	M	0003	05
+	08	M	0003	09	+	20	M	0003	05
+	09	M	0003	08	+	21	M	0003	05
+	10	M	0003	08	+	22	M	0003	04
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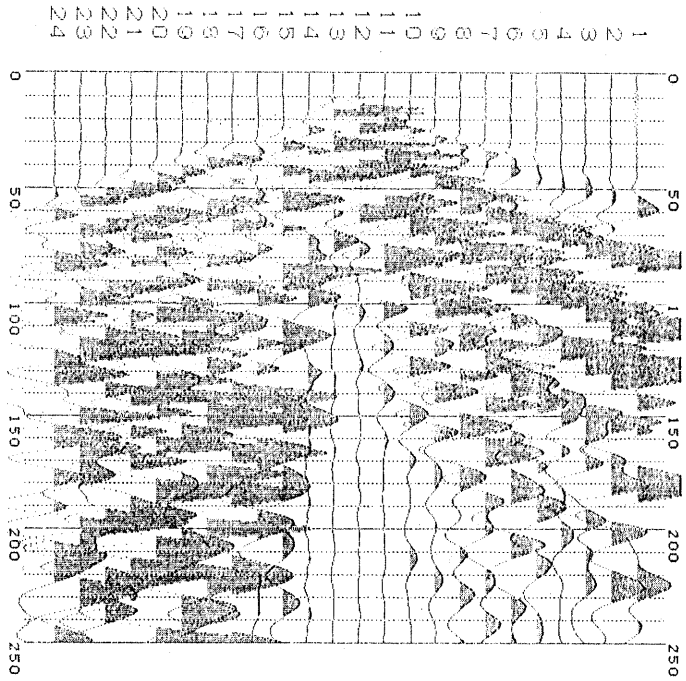
+	12	M	0003	07	+	24	M	0003	04



BISON 9000 SERIES

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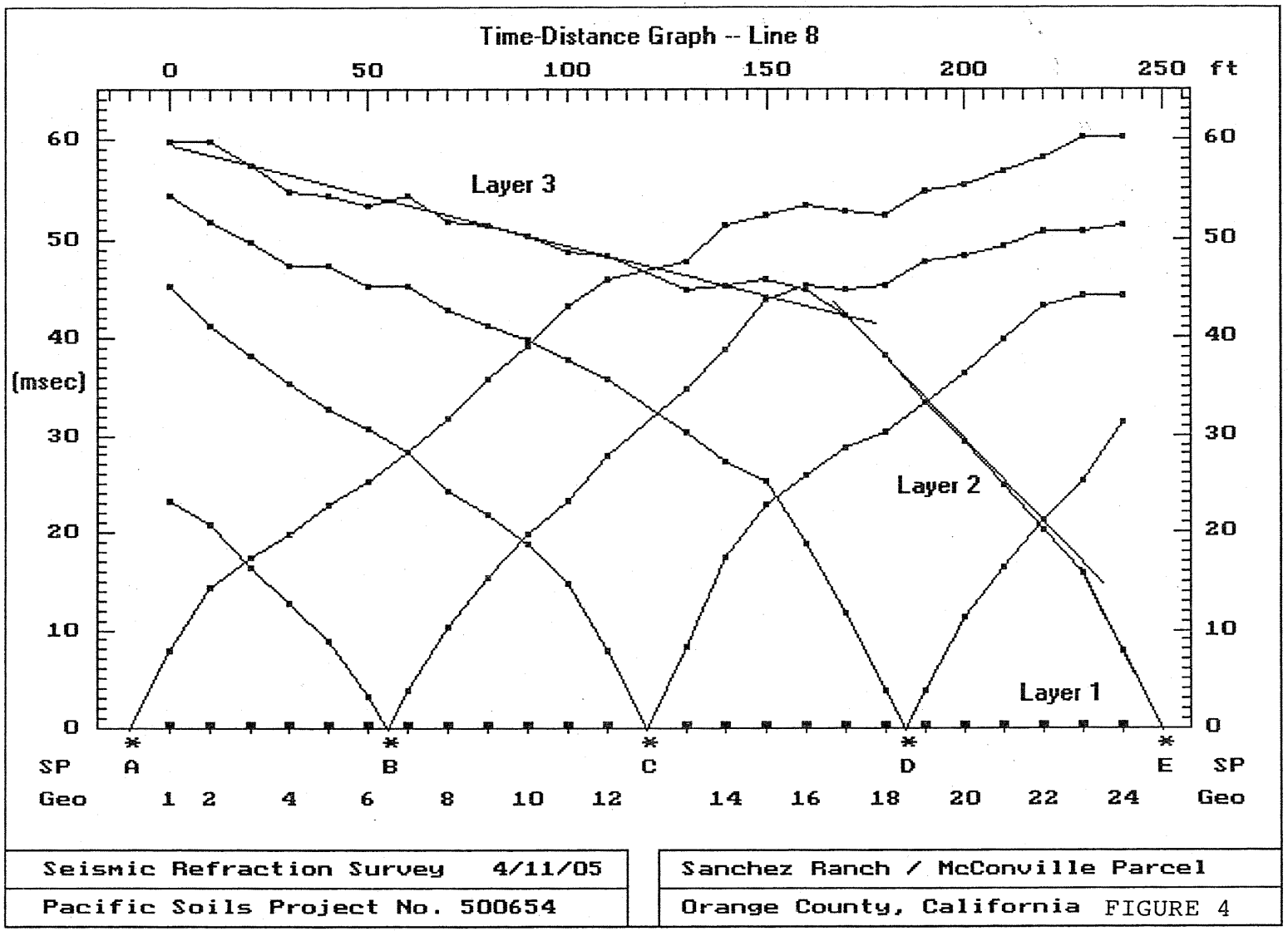
Date 04:12:05 Time 08:33
Hi-cut 2000 Lo-cut 16
Sample rt .500ms Stacks 0002
Delay(ms) 0 DFhc Out
Channels 24 DFlc Out
Samples 000500
Rec len 250ms Agc Off
Time scale = 10.0 (ms)/division.

P	CH	GN	STK	EX	P	CH	GN	STK	EX
+	01	M	0002	07	+	13	M	0002	14
+	02	M	0002	08	+	14	M	0002	14
+	03	M	0002	08	+	15	M	0002	12
+	04	M	0002	09	+	16	M	0002	12
+	05	M	0002	09	+	17	M	0002	10
+	06	M	0002	09	+	18	M	0002	09
+	07	M	0002	09	+	19	M	0002	09
+	08	M	0002	10	+	20	M	0002	08
+	09	M	0002	11	+	21	M	0002	07
+	10	M	0002	12	+	22	M	0002	07
+	11	M	0002	13	+	23	M	0002	06
+	12	M	0002	14	+	24	M	0002	06

FIGURE 3



Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 4

exhibits eight curves that express the first energy arrivals from the five shots, one each, forward off end, reverse off end, and three split spreads. The split spreads, however, produce two curves each going in opposite directions. The data show a somewhat irregular and asymmetrical pattern. The data exhibit a three-layer case, as is indicated by the three generalized straight lines superposed on the reverse off end curve.

There is considerable relief on the surface (see the models (Figs. 5-18). Minor undulations in the curves, based on the raw data, are, to some extent, explained by the fact that elevation corrections are not yet applied to the data in the time-distance plot. And some of the irregularity is explained by lateral velocity changes. Variations in the positions of the "dog legs" in the several curves are mostly an expression of the laterally changing thickness of the upper layers. Models were calculated for each of the spreads (Figs. 5-18).

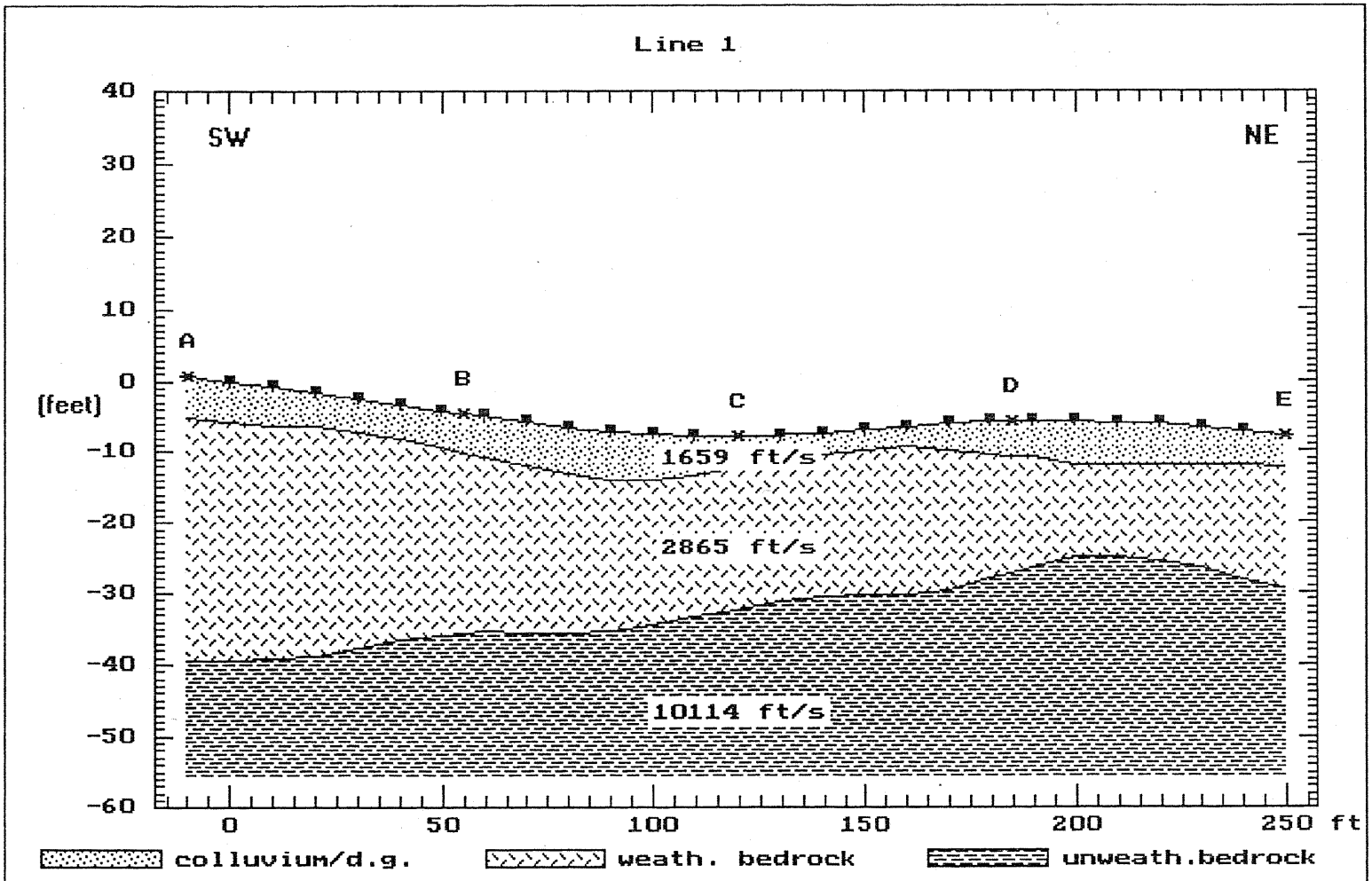
The topmost layer under all lines is soil and colluvium. Average velocity is 1510 ft/sec without much variation. Average thickness is approximately 8 feet with small variation. Observations is the field indicate it is a product of decaying granite.. Inasmuch as most of the lines are laid out on Forest Service fire roads, the minor variations in thickness may be a result of blade work.

The second layer is weathered granite. Observations of outcrops near the lines appear to bear this out, as well as the geophysical data. Average velocity is in the order of 3360 ft/sec, with small variation. Average thickness is approximately 26 feet, but varies from about 7 feet to 55 feet, insofar as the sampling goes.

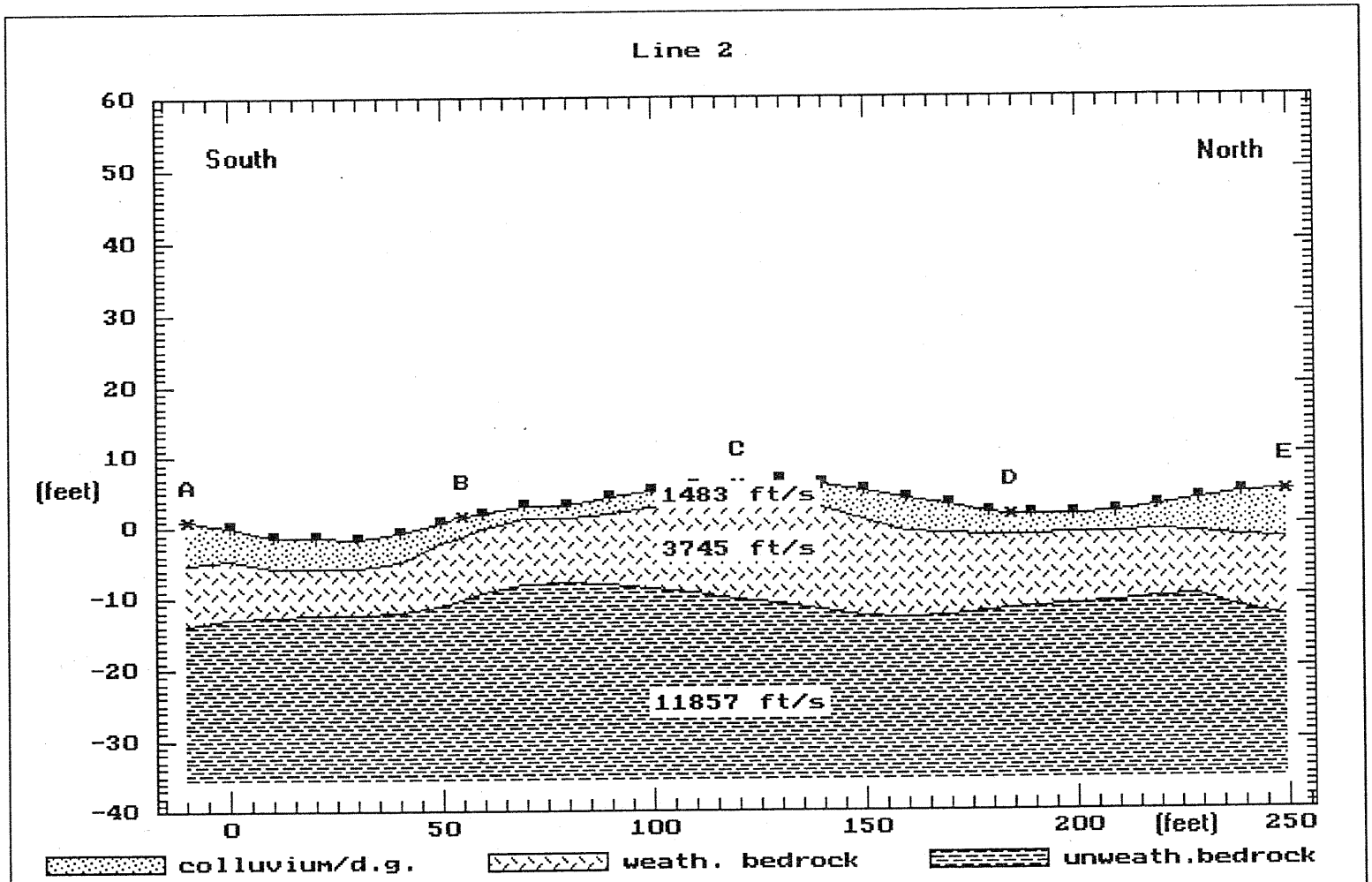
The third layer is unweathered granite. Its average velocity is in the order of 12,000 ft/sec with small to moderate variation. Non-uniform distribution of shearing is probably the preferred explanation of the variation in velocity. The thickness is not determined in the data acquired, but it assumed to be very deep.

It is seen that the layer boundaries tend to mimic the shape of the surface. This is to be expected where the boundaries have developed dominantly by weathering processes. It is a common phenomenon in the batholith. A local hard zone was found in the second layer under line 10. It could be a core rock, but where core rocks are developed, they usually occur in groups.

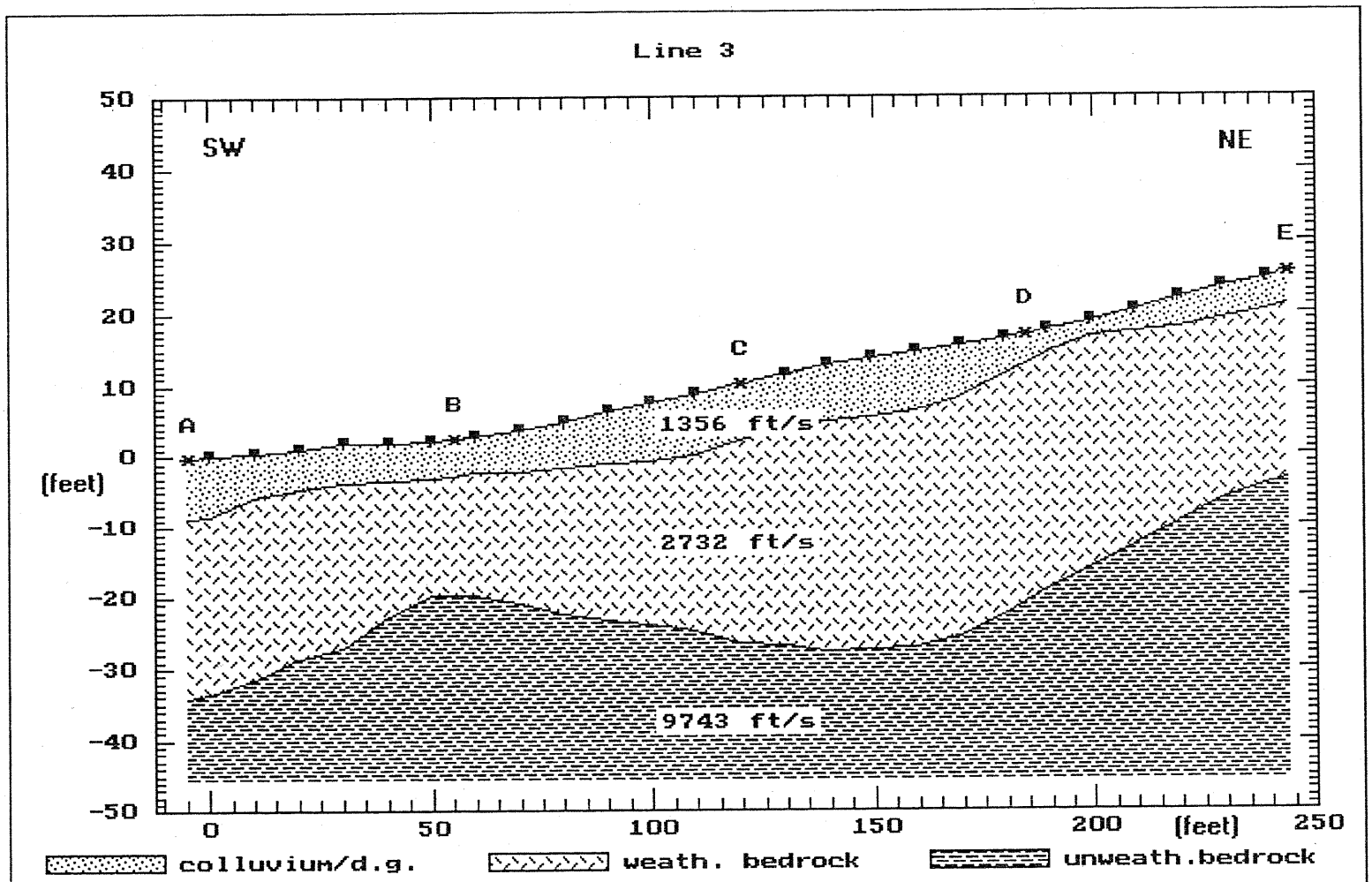
The Caterpillar Rippability Chart (Fig. 19) indicates that layers 1 and 2 are rippable everywhere sampled. Layer 3 should be considered non-rippable everywhere at the site. Depth to the top of layer 3 is approximately 13 feet under line 1; however, it is significantly deeper everywhere else. The chart is empirical, but is based on thousands data pairs of seismic velocity vs caterpillar performance The chart displayed is for a D9 caterpillar.



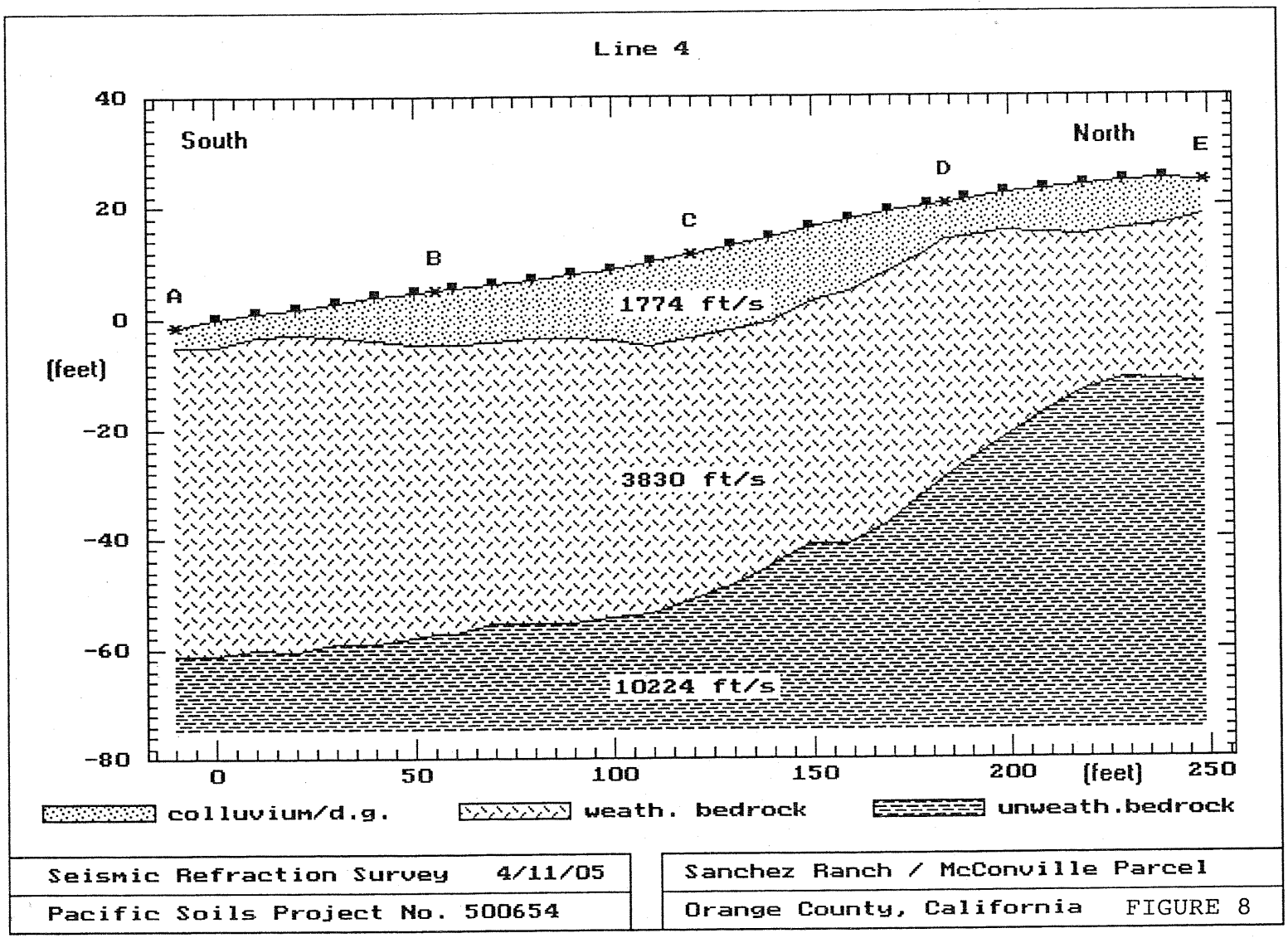
Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 5



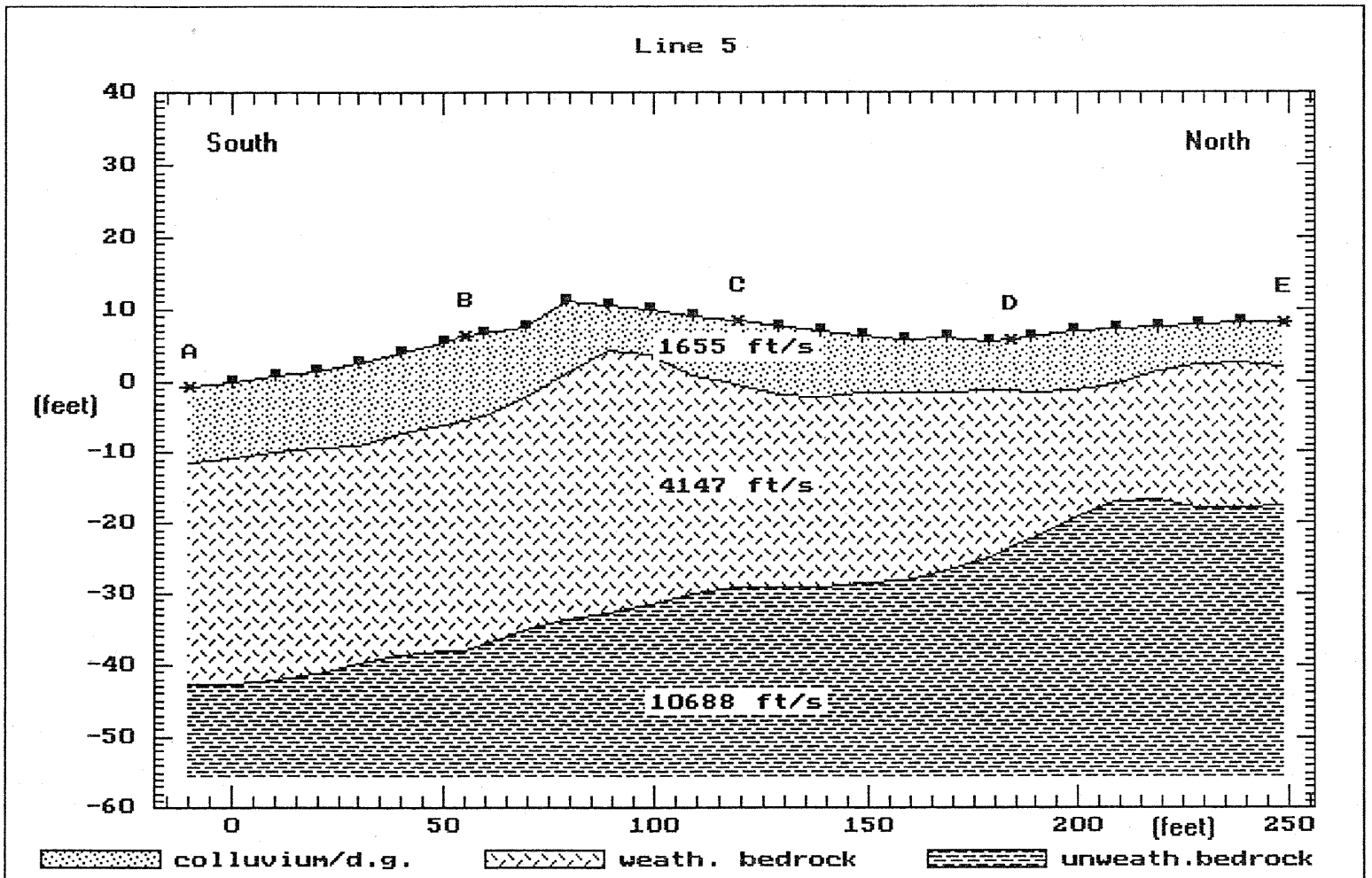
Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 6



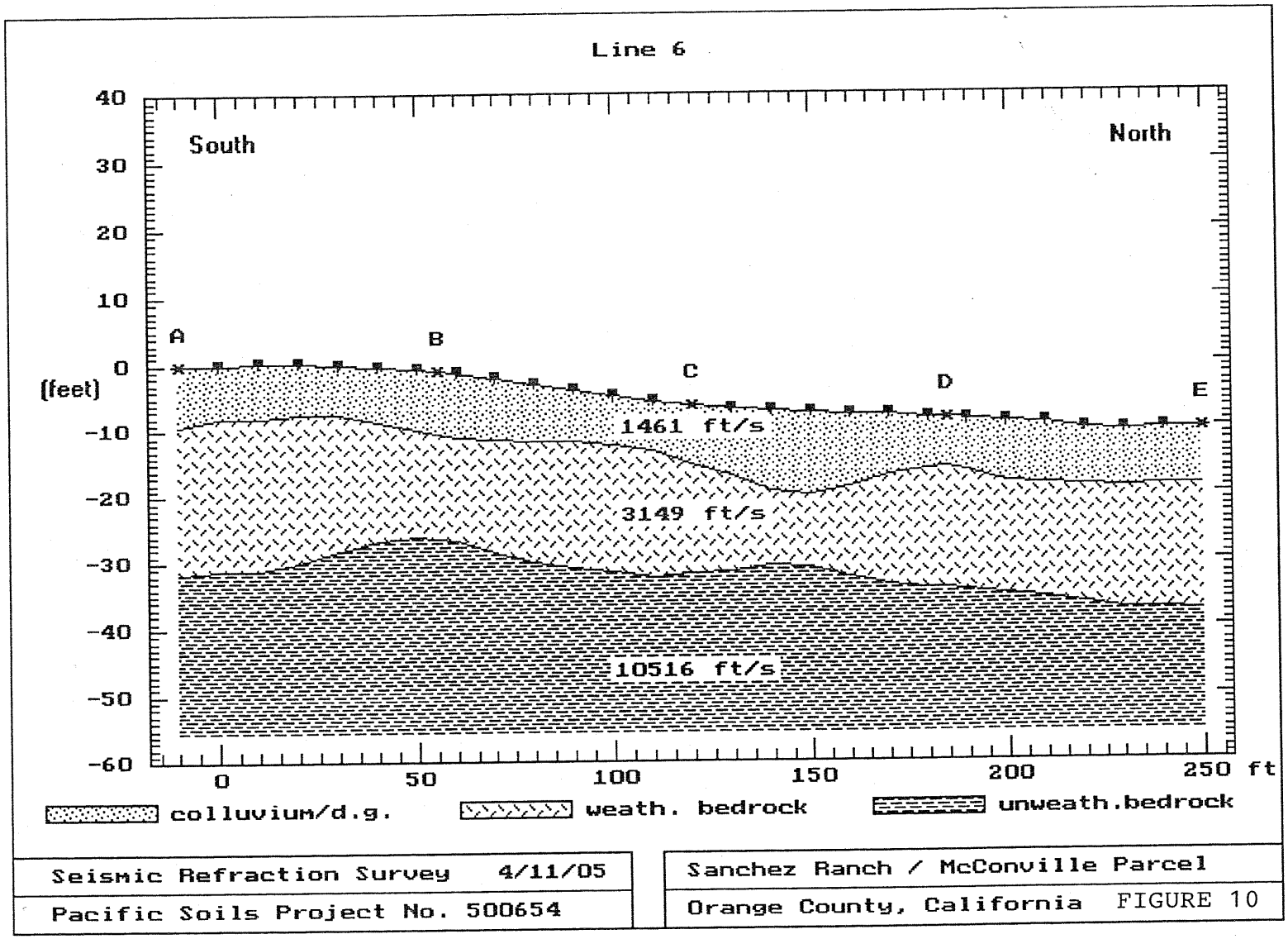
Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 7



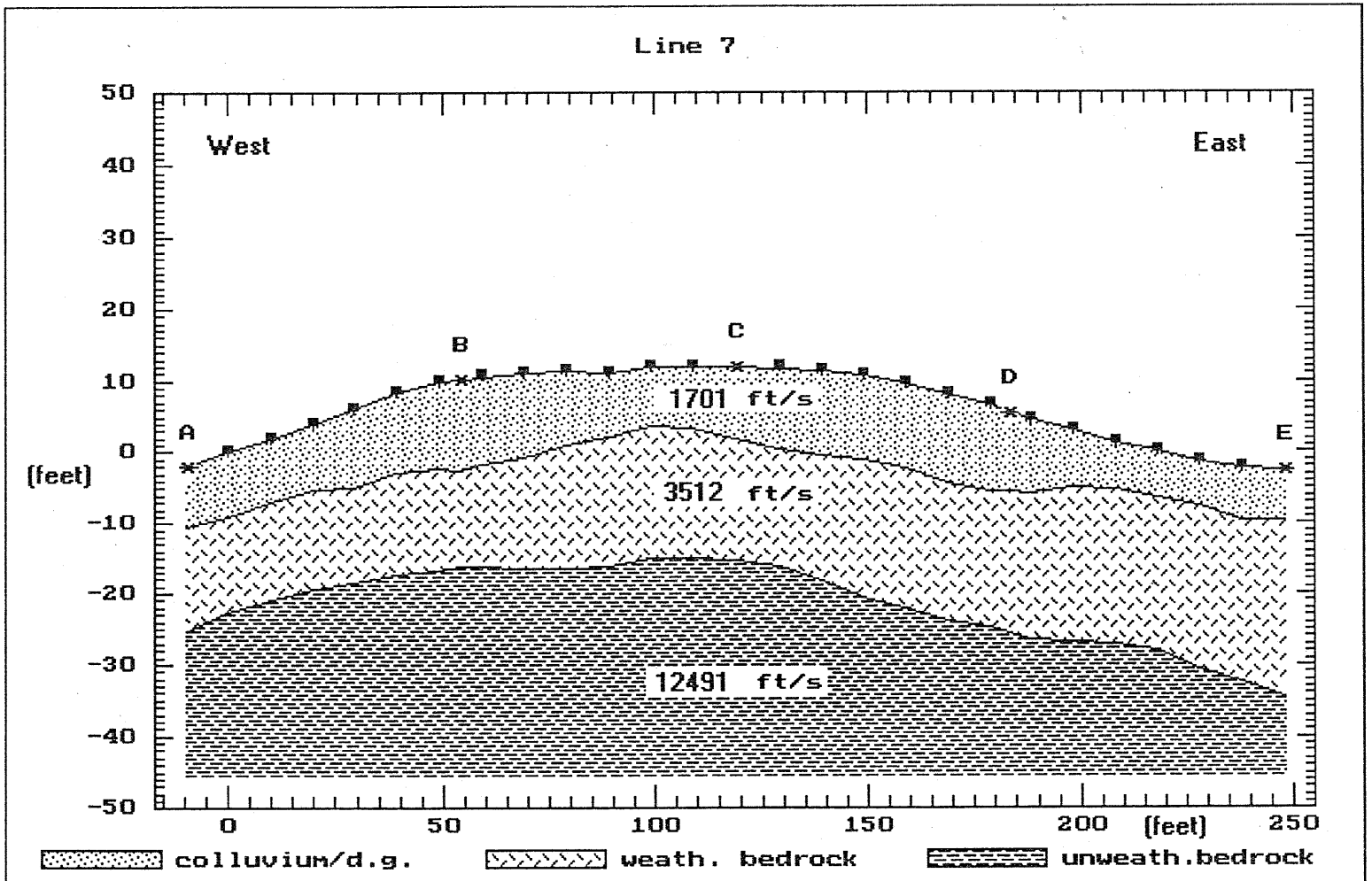
Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 8



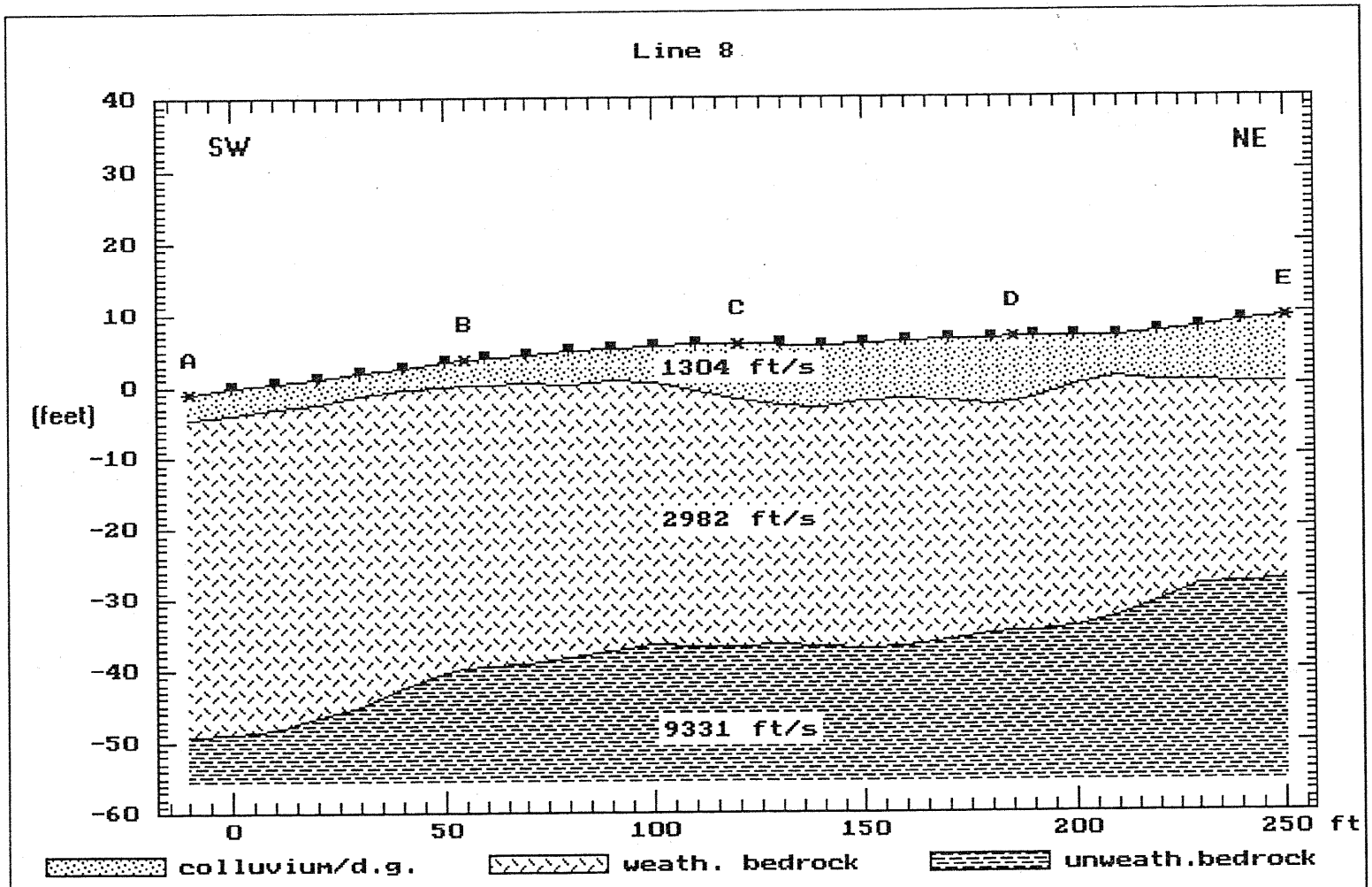
Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 9



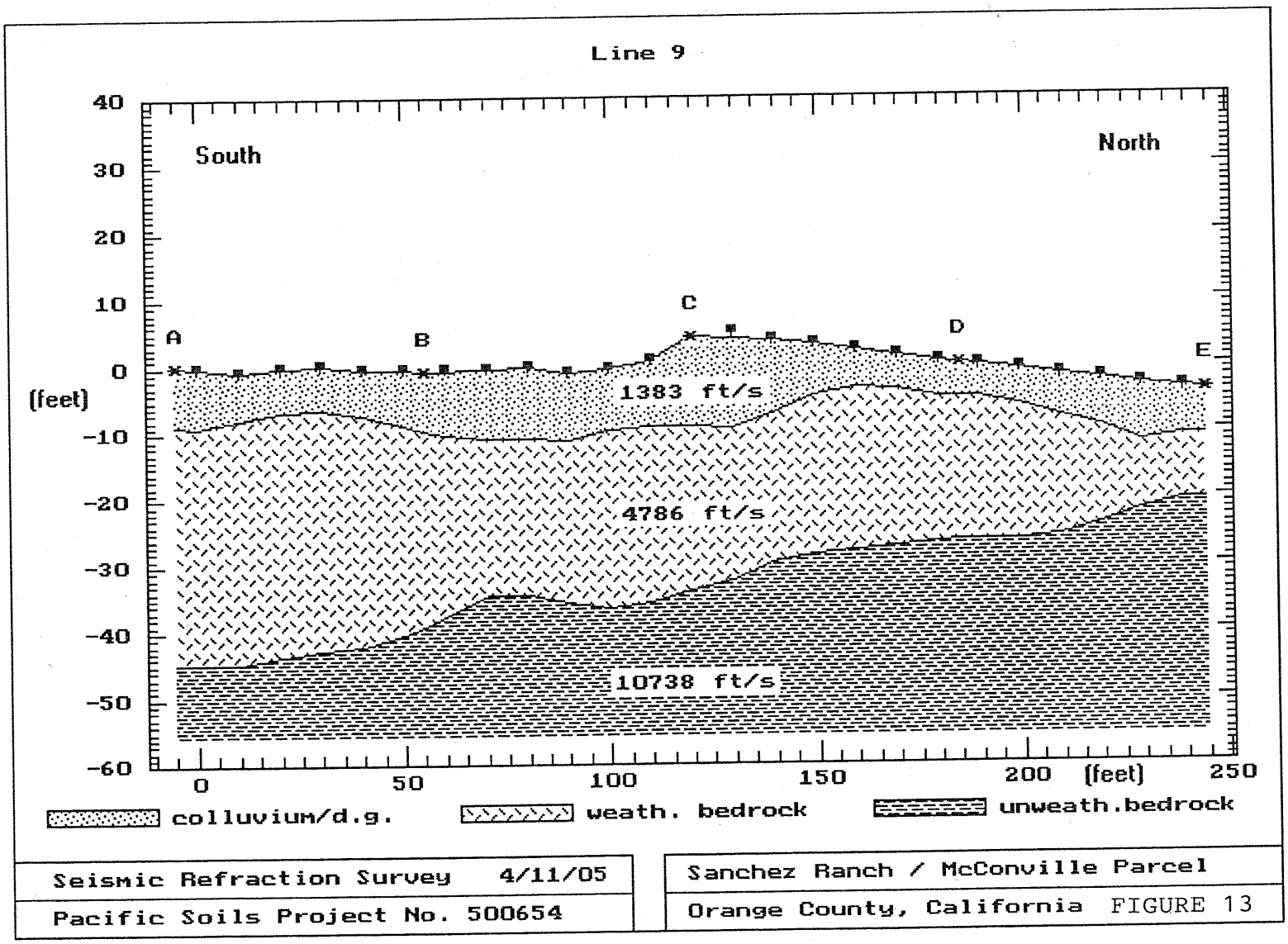
Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 10



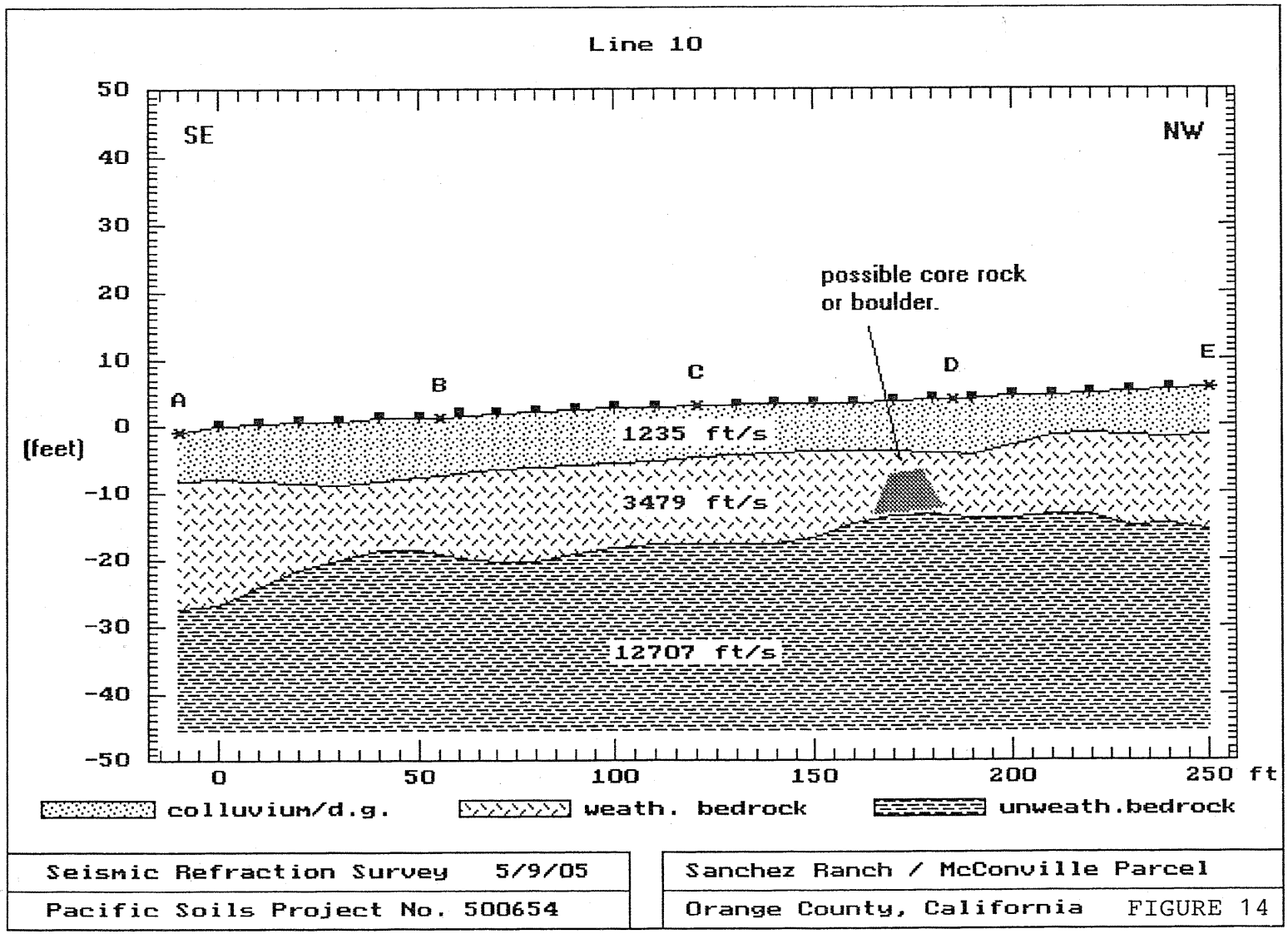
Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 11



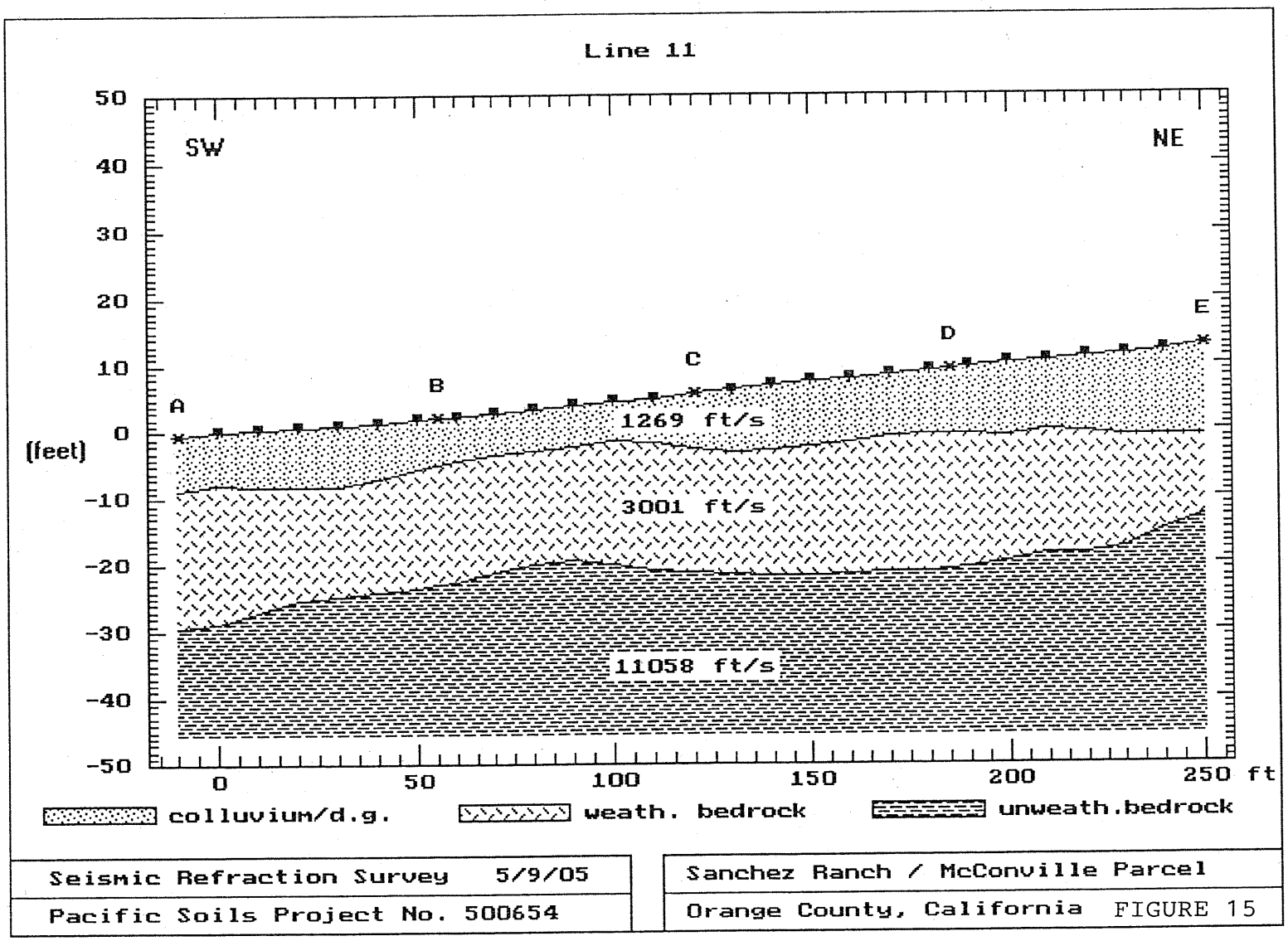
Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 12



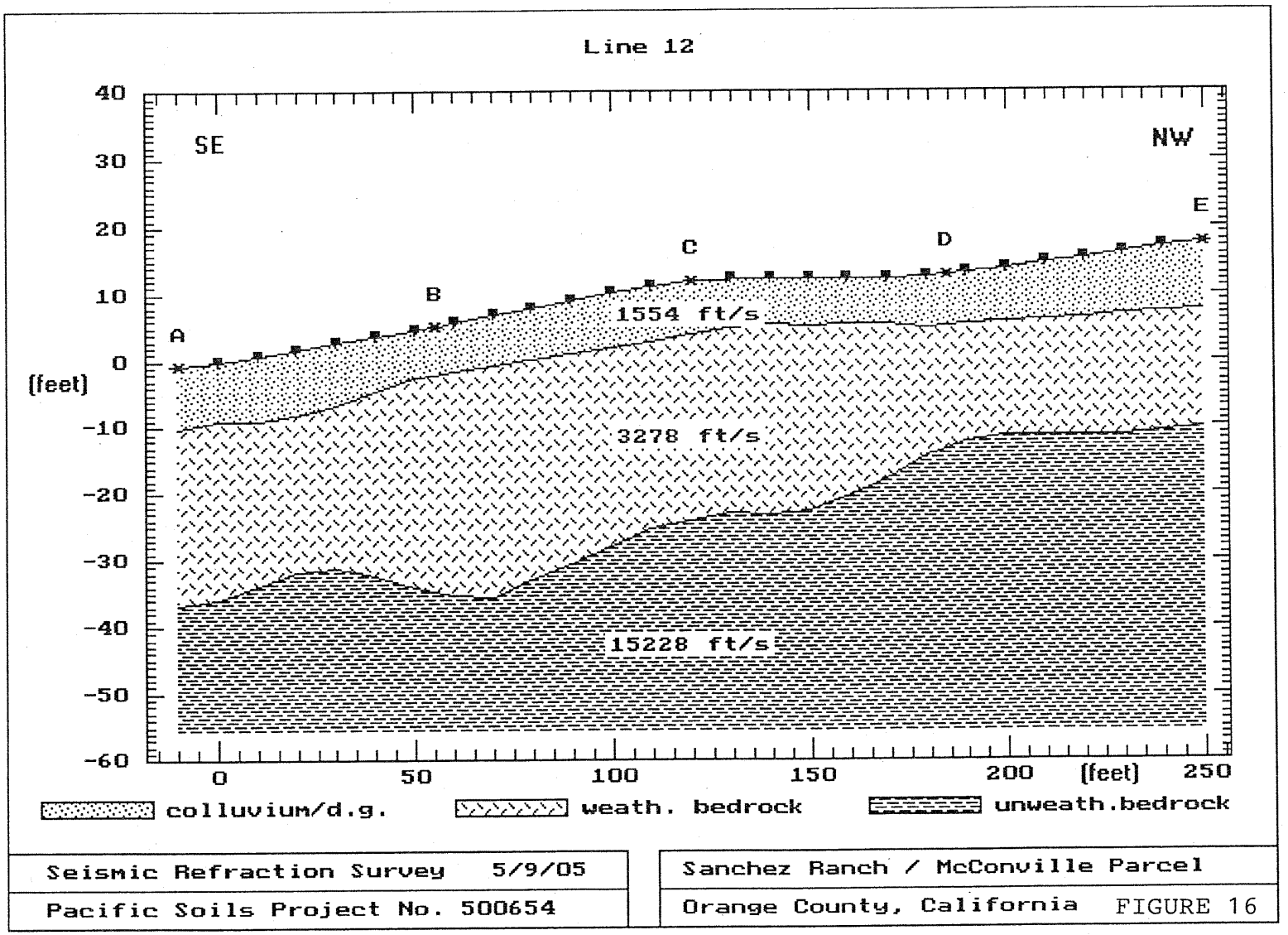
Seismic Refraction Survey 4/11/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 13



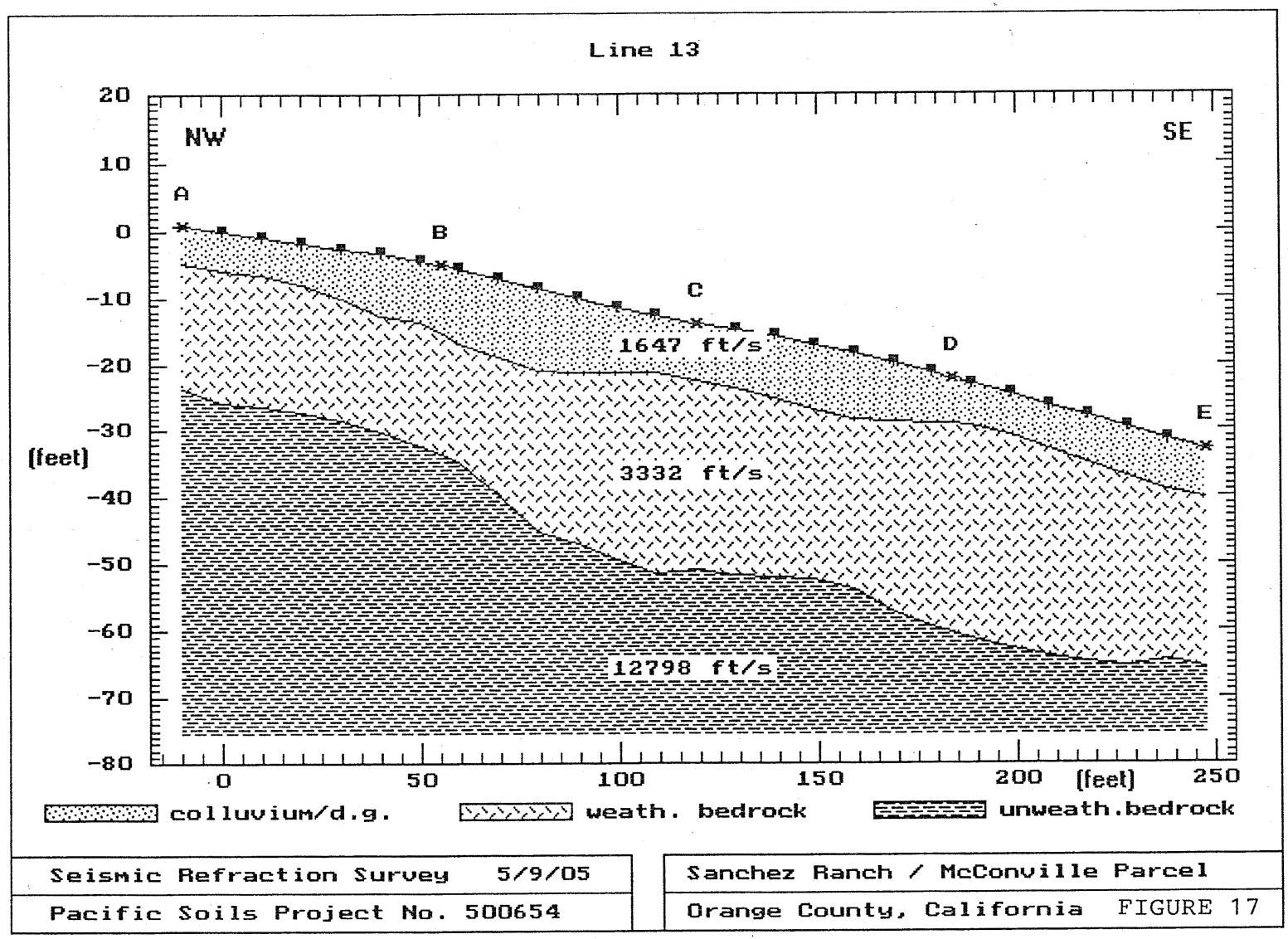
Seismic Refraction Survey 5/9/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 14



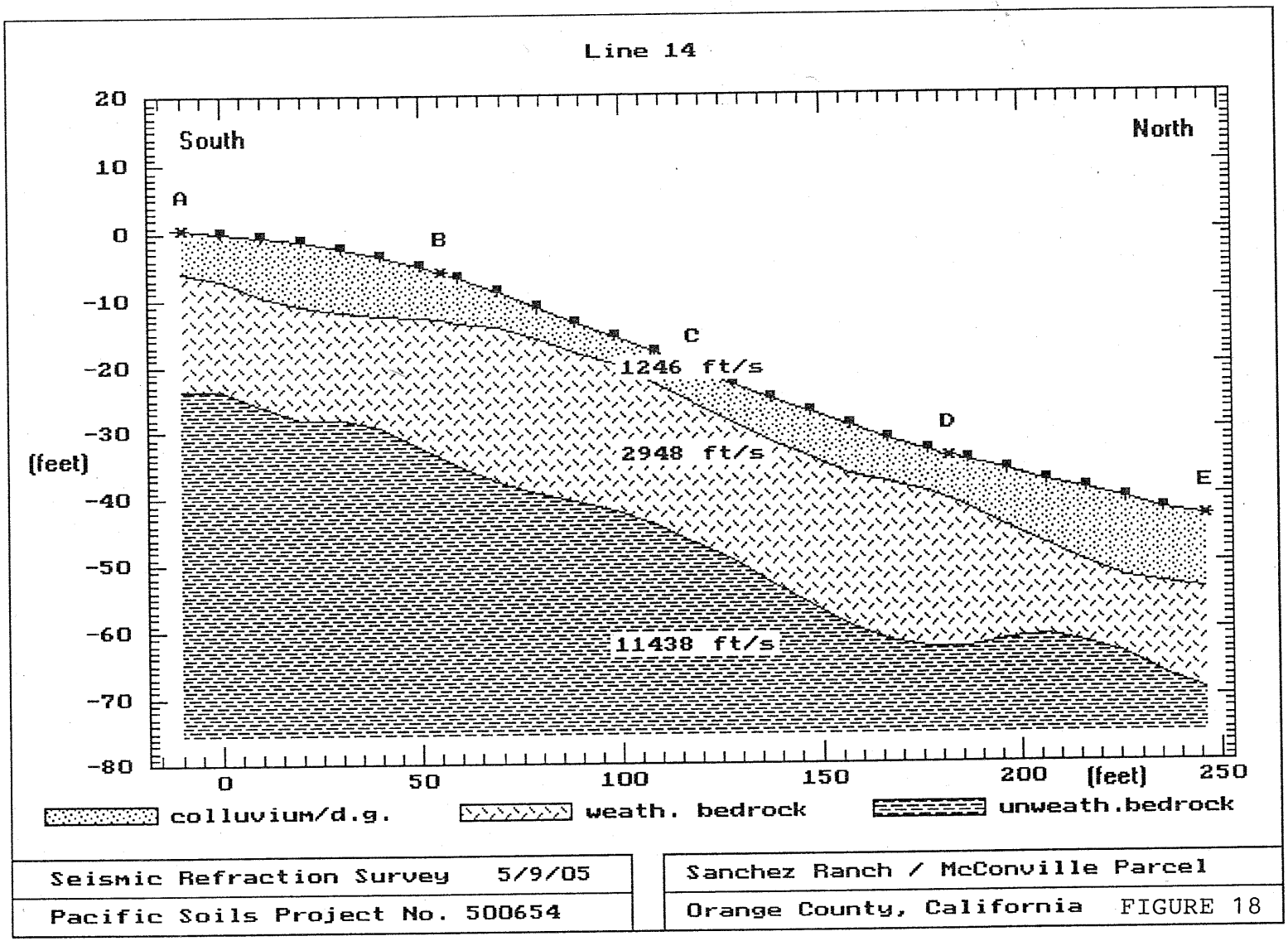
Seismic Refraction Survey 5/9/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 15



Seismic Refraction Survey 5/9/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 16



Seismic Refraction Survey 5/9/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 17



Seismic Refraction Survey 5/9/05	Sanchez Ranch / McConville Parcel
Pacific Soils Project No. 500654	Orange County, California FIGURE 18

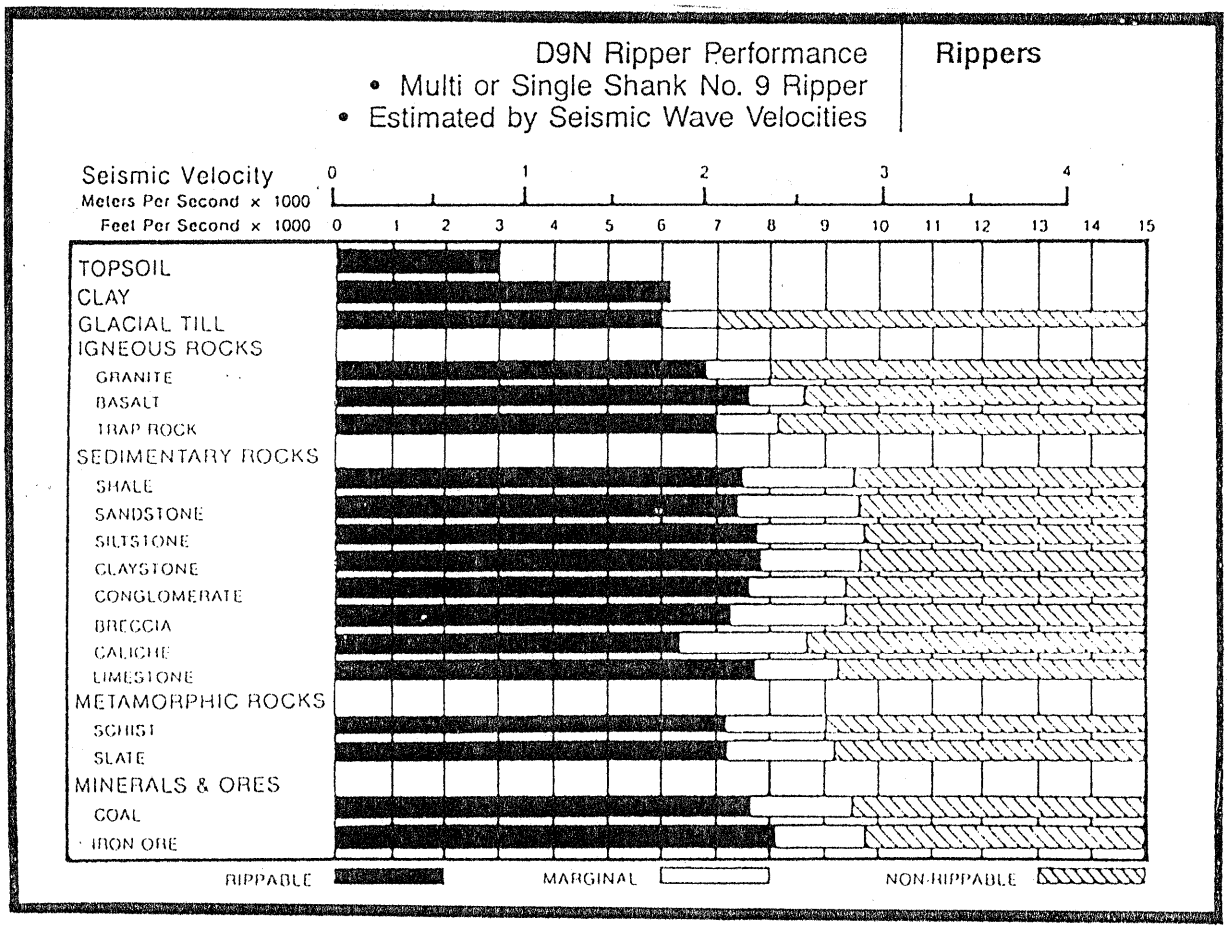


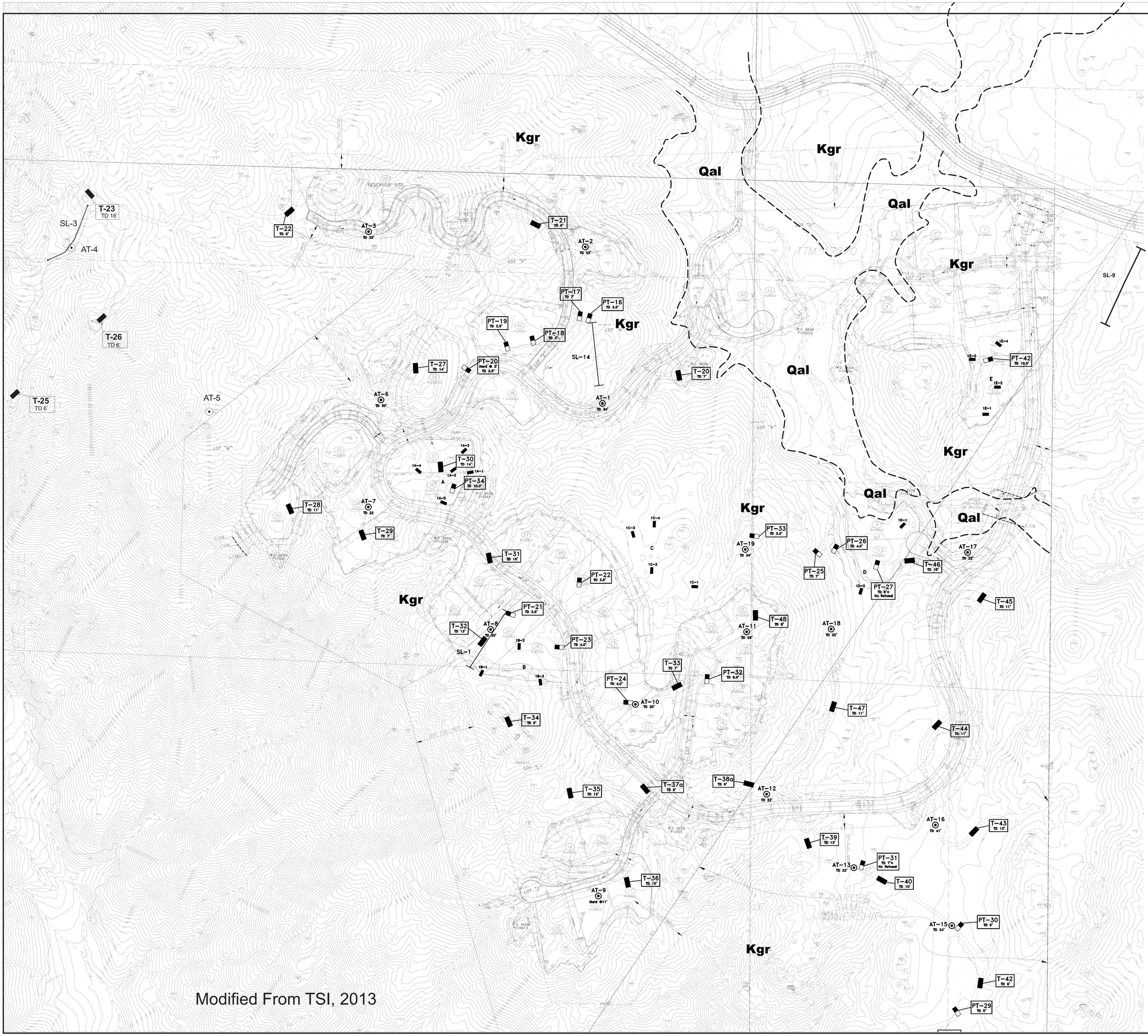
Figure 19. Caterpillar Rippability Chart

SubSurface Surveys and Associates professional personnel are trained and experienced and have completed thousands of projects since the company's inception in 1988. It is our policy to work diligently to bring this training and experience to bear to acquire quality data sets, which in turn, can provide clues useful in formulating our interpretations. Still, non-uniqueness of interpretations, methodological limitations, and non-target interferences are prevailing problems. SubSurface Surveys and Associates makes no guarantee either expressed or implied regarding the accuracy of the interpretations presented. And in no event will SubSurface Surveys and Associates be liable for any direct, indirect, special, incidental, or consequential damages resulting from interpretations presented herewith

Conclusions – Granitic rocks of the Peninsular Ranges batholith appear to underlie the site investigated. Velocities and layer thicknesses determined geophysically are consistent with these parameters found elsewhere on the batholith. The topmost two layers, soil-colluvium and weathered granite, are readily rippable by heavy equipment. The third layer, unweathered granite, is not rippable at the site. The nearest this unit comes to the surface is about 13 feet, but it is significantly deeper elsewhere, where sampled.

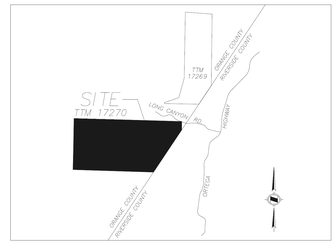
Gary W. Crosby

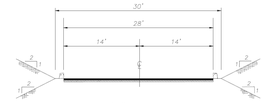
Gary W. Crosby, PhD, GP 960



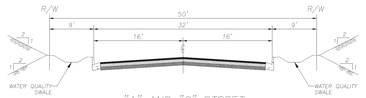
Modified From TSI, 2013

VICINITY MAP

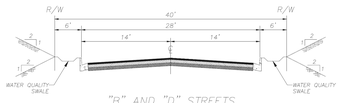




"E" STREET
(PRIVATE) PARKING ONE SIDE
NTS



"A" AND "C" STREET
(PRIVATE) PARKING ONE SIDE
NTS



"B" AND "D" STREETS
(PRIVATE) PARKING ONE SIDE
NTS

LEGEND

- AT-1 — APPROXIMATE LOCATION OF AIRTRACK BORING BY PSE., 2008
- T-48 — APPROXIMATE LOCATION OF BACKHOE TRENCH BY PSE., 2008
- PT-33 — APPROXIMATE LOCATION OF BACKHOE TRENCH THIS INVESTIGATION
- SL-14 — APPROXIMATE LOCATION OF SEISMIC LINE BY SUBSURFACE SURVEYS, 2008

EARTH MATERIALS

- **afu** UNDOCUMENTED ARTIFICIAL FILL
- **Qal** QUARTERNARY ALLUVIUM
- **Kgr** GRANITIC BEDROCK
- GEOLOGIC CONTACT

Plate 1

TERRESTRIAL SOLUTIONS INC.
Project No. 12054-01 Date August 2014

PREPARED FOR:
The Preserve
at San Juan, LLC
4000 Barranca Parkway
Suite 250
Irvine, CA 92604

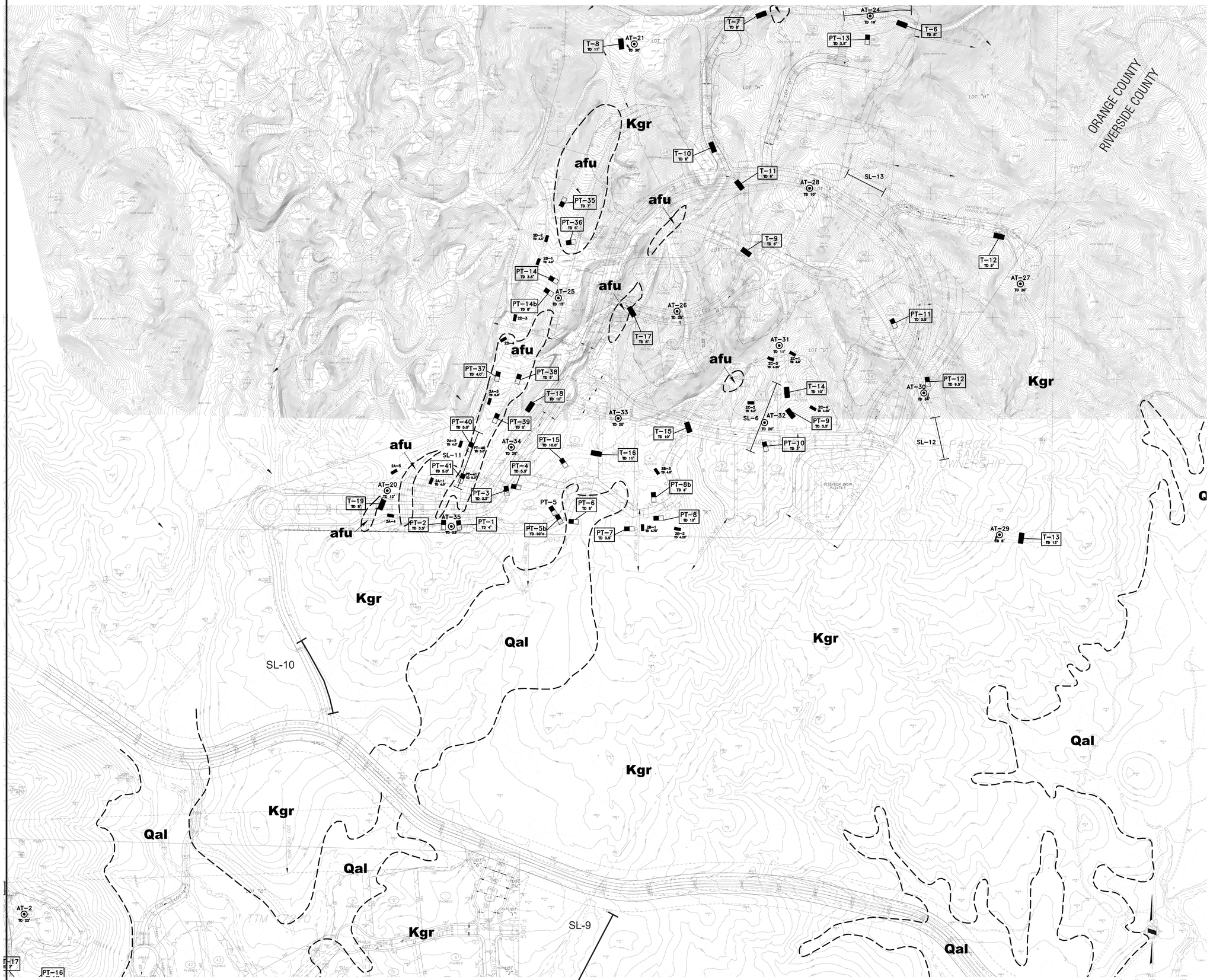
PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 PH: (949) 583-1010

VESTING TENTATIVE MAP NO. 17270

Plate 1

SHEET 2 OF 2

THE PRESERVE
VESTING TENTATIVE TRACT NO. 17269
ORANGE COUNTY, CALIFORNIA



NOTES

1. Assessor Parcel Numbers: 125-120-32 and 125-120-37
2. Existing Land Use: Vacant Land
3. Proposed Land Use: Single Family Residential
4. Existing General Plan Land Use Designation: Open Space and Cleveland National Forest
5. Proposed General Plan Land Use Designation: Rural Residential (1A)
6. Existing Zoning: General Agricultural (A1)
7. Proposed Zoning: Agricultural Residential (AR)
8. Water service provided by Elsinore Valley Municipal Water District (EVMWD)
9. Sewer service provided by Elsinore Valley Municipal Water District (EVMWD)
10. Gas service provided by Southern California Gas Company.
11. Electric service provided by Southern California Edison Company.
12. Telephone service provided by Verizon
13. Cable service provided by Verizon
14. The project site is located within Saddleback Valley Unified School District.
15. All grading and erosion control shall be consistent the requirements from Orange County Grading Manual and Orange County Grading and Excavation Code.
16. Street improvements shall be designed per the Orange County Highway Design Manual and Resource Development Management Division's Standard Plans.
17. Drainage improvements shall be designed per the Orange County Local Drainage Manual and Orange County Flood Control District Design Manual.
18. Multiple Final Tract Maps may be filed on Vesting Tentative Tract Map 17269.
19. Project site is located within Zone D, area in which flood hazards are undetermined, but possible, per firm map Community Panel Number 06059C0375H dated February 15, 2004.
20. Thomas Bros. Maps 2006: Page 864 A3
21. Approximate Earthwork Quantities:
    Cut: 313,980 CYS
    Fill: 313,800 CYS

EASEMENTS

A. Nonexclusive easement for pedestrian and vehicular ingress and egress and incidental purposes, in favor of The Preserve at San Juan, LLC, a California limited liability company, Recorded March 28, 2011 as Instrument No. 2011000158063 of Official Records.

B. A right of way for the construction, maintenance and full, free and quite use and enjoyment of a line to support private and/or public telephone, telegraph and other types of communication circuits traversing the above described premises, over a portion of the land.
This grant shall be effective so long as said easement be actually used for the purposes above specified, and all rights hereunder shall revert to the owner of the land a soon as the said use thereof shall be abandoned and discontinued for a period of five years or more, as conveyed to United States of America in Deed recorded November 1, 1939 in Book 1015, Page 412 of Official Records.

C. An easement for either or both pole lines, conduits and incidental purposes. In favor of Southern California Edison Company. Recorded July 24, 1963 as Book 6645, Page 335 of Official Records.

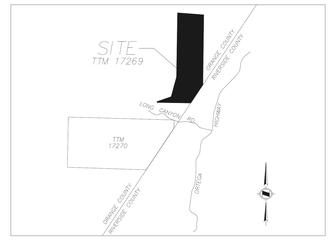
D. An easement for either or both pole lines, conduits and incidental purposes. In favor of California Water and Telephone Company. Recorded as Book 7539, Page 855 of Official Records.

E. An easement for utility purposes over a portion of the land as disclosed by Superior Court Case No. 0-16-73-11 and as shown on said Parcel Map.

F. An easement for either or both pole lines, conduits and incidental purposes. In favor of Southern California Edison Company, a Corporation. Recorded August 9, 1995 as Instrument No.95-342662 of Official Records.

G. An easement for ingress and egress utility and incidental purposes. In favor of Flora Adina Nilson, an unmarried woman. Recorded January 31, 2000 as Instrument No.00-52428 of Official Records.

VICINITY MAP



LEGAL DESCRIPTION

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 20, TOWNSHIP 6 SOUTH, RANGE 5 WEST, SBM.

STATEMENT OF OWNERSHIP

I HEREBY STATE THAT THIS MAP WAS PREPARED UNDER MY SUPERVISION AND THAT THE OWNER OF RECORD HAS KNOWLEDGE OF AND CONSENTS TO THE FILING OF THIS MAP.

DATE

DOUGLAS L. STALEY

LOT SUMMARY

1 – 29	RESIDENTIAL LOTS	21.19 ACRES
30	RESERVOIR SITE	2.6 ACRES
A – C	PRIVATE STREETS	6.7 ACRES
D & E	COMMON DRIVES	1.5 ACRES
F – L	OPEN SPACE	162.5 ACRES
	TOTAL	194.5 ACRES

LOT AREA TABLE

Residential Gross Area								
Lot No.	Gross S.F.	Net S.F.	Lot No.	Gross S.F.	Net S.F.	Lot No.	Gross S.F.	Net S.F.
1	27,222	19,633	10	15,488	14,458	19	43,575	28,820
2	42,796	37,177	11	14,072	13,695	20	49,107	34,618
3	28,051	24,055	12	18,594	18,594	21	23,395	17,089
4	29,836	26,088	13	26,573	19,239	22	27,630	18,530
5	20,369	19,843	14	22,204	21,603	23	45,476	25,026
6	21,952	19,650	15	28,978	24,656	24	35,224	23,869
7	21,652	18,883	16	31,470	24,656	25	45,175	29,296
8	38,782	26,273	17	33,460	28,223	26	40,854	19,571
9	28,252	23,814	18	30,902	28,304	27	39,933	28,419
						28	50,823	28,825
						29	41,320	23,462

Total Gross	
S.F.	923,165
Acres	21.19
Gross Average S.F.	31,833

Total Net	
S.F.	686,369
Acres	15.19
Net Average S.F.	23,667

LOT AREA TABLE

Lot No.	S.F.	Acres
A	201,031	4.62
B	27,034	0.62
C	62,255	1.43
D	14,205	0.33
E	52,492	1.21
F	44,303	1.02
G	206,448	4.74
H	794,948	18.25
I	405,304	9.30
J	330,101	7.58
K	203,076	4.66
L	5,097,400	117.00

Total S.F.	7,438,597
Total AC	170.76

MAP DATE IDENTIFIER
07/11/14 BY LP
07/25/14

NO.	DATE	REVISION	BY
	04/14/15	ADDED RESIDENTIAL LOTS	JS
---	12.2013	GRADE REVISIONS ON LOT "B" AND LOTS 9 & 10.	LP

SEE PLATE 1 FOR LEGEND Plate 2A

TERRESTRIAL SOLUTIONS INC.
Project No. 12054-01 Date August 2014

PREPARED FOR:
The Preserve
at San Juan, LLC
4000 Barranca Parkway
Suite 250
Irvine, CA 92604

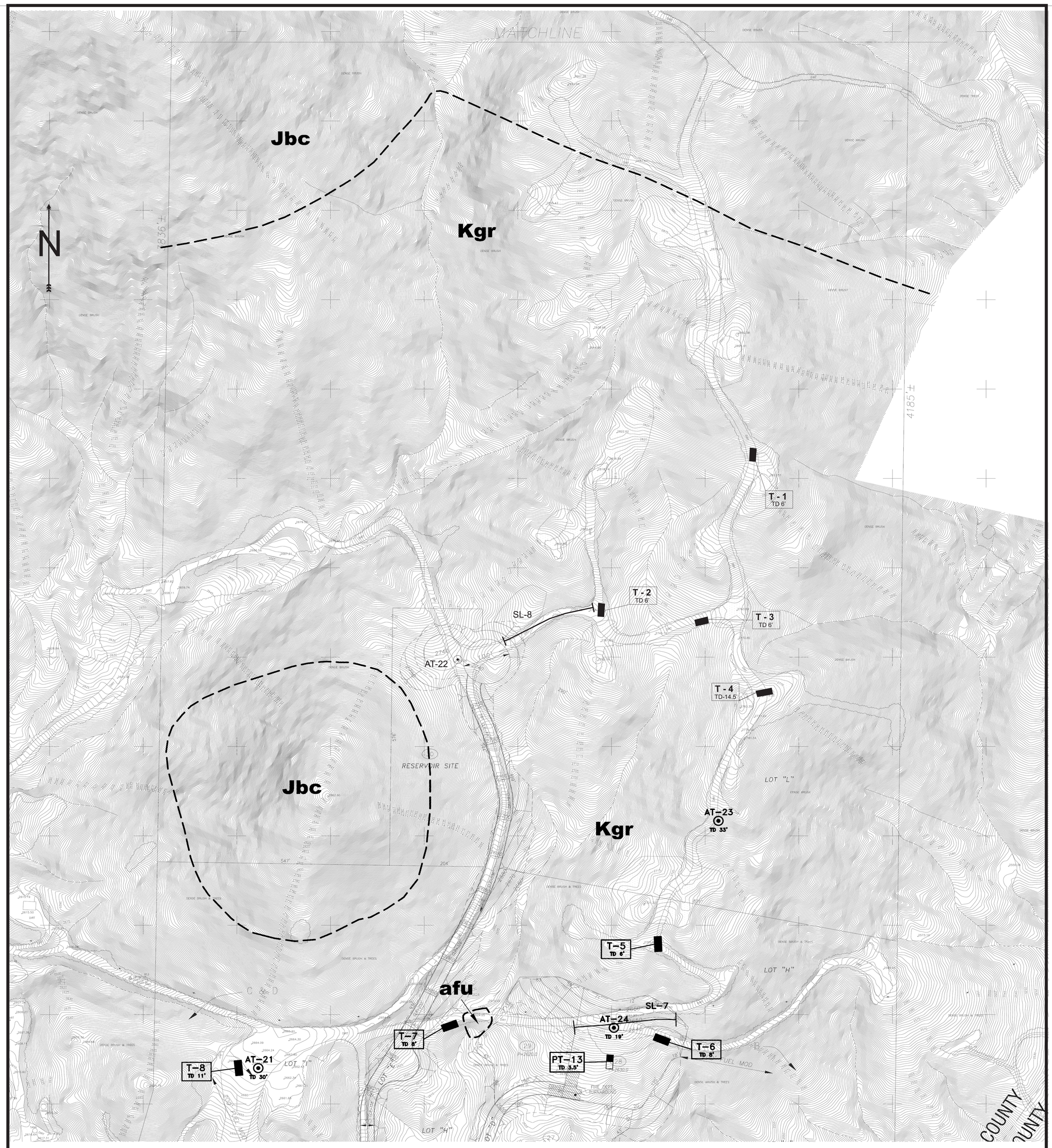
PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 PH: (949) 583-1010

VESTING TENTATIVE TRACT NO. 17269

Plate 2A

SHEET 1 OF 2

Modified From TSI, 2013



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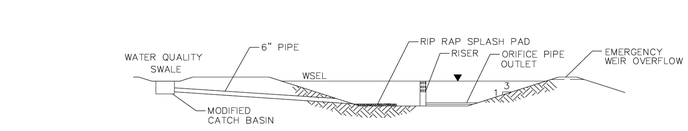
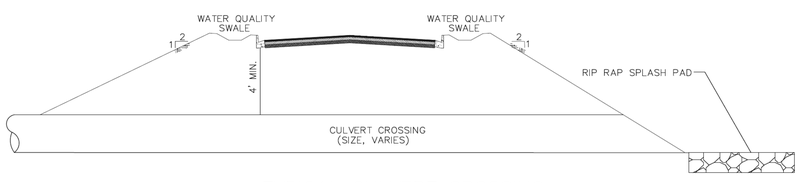


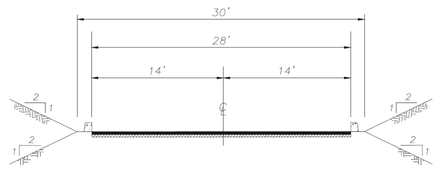
INFILTRATION BASIN DETAIL – INLET/OUTLET

NTS



TYPICAL CULVERT CROSSING

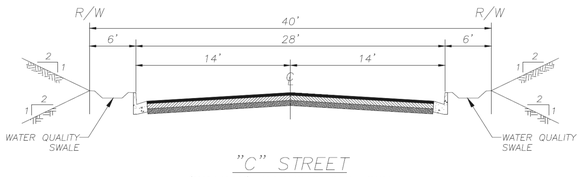
NTS



PRIVATE DRIVES

(PRIVATE) PARKING ONE SIDE

NTS



"C" STREET

(PRIVATE) PARKING ONE SIDE

NTS

Plate 2B