GEOTECHNICAL INVESTIGATION
SEWER LINE REPLACEMENT
TECOLOTE CANYON SEWER MAIN
SAN DIEGO, CALIFORNIA

Prepared for
PSOMAS
San Diego, California

Prepared by
TERRACOSTA CONSULTING GROUP, INC.
San Diego, California

Project No. 2945
February 7, 2019

TerraCosta
Consulting Group

Geotechnical Engineering
Coastal Engineering
Maritime Engineering

Project No. 2945
February 7, 2019

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Dear Mr. Magee:

In accordance with your request, TerraCosta Consulting Group, Inc. (TerraCosta) is pleased to present the accompanying geotechnical investigation report for the Tecolote Canyon Sewer Main Replacement Project in San Diego, California. This report provides a summary of our investigation, descriptions of the alignment site conditions, and our geotechnical recommendations for the design of the project.

We appreciate the opportunity to work with you on this project and trust this information meets your current needs. If you have any questions or require additional information, please give us a call.

Very truly yours,
TERRACOSTA CONSULTING GROUP, INC.

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1 INTRODUCTION AND PROJECT DESCRIPTION

This report presents the results of our geotechnical investigation, which includes the results of our field investigation and laboratory testing, our review of available literature, a description and discussion of geologic and geotechnical conditions along the pipeline alignment, and our geotechnical recommendations for the proposed sewer line replacement project.

The project is located within Tecolote Canyon Nature Park and Nature Center, and extends from the downstream end of the sewer main at Sewer Manhole 266 (Station 100+00) near the baseball fields in Tecolote Creek Park, and upstream to Manhole 275 (Station 360+42) located within Chateau Drive located approximately 520 feet from the intersection of Genesee Avenue and Chateau Drive (Figure 1). The project limits span the Morena, Linda Vista, Bay Park, and Clairemont neighborhoods in the City of San Diego, California.

The project consists of replacing and remediating portions of the sewer main. A limited length of the 21-inch-diameter PVC sewer main between Stations 132+60 and 144+65 will be left in-place and is not part of this project. From Stations 100+00 to 132+60, 144+65 to 289+35, and 346+48 to 353+68, the sewer main will be replaced; and from Stations 289+35 to 346+48 and 353+68 to 360+42, the sewer main will be rehabilitated. Lastly, we understand that ten (10) segments of the replaced sewer main are to be constructed using trenchless methods, with the remainder being constructed using cut and cover methods.

2 PURPOSE AND SCOPE OF WORK

The purpose of our geotechnical investigation is to provide an assessment of the geologic and geotechnical conditions that are likely to be encountered during the construction of the project sewer main and to provide geotechnical recommendations for the design of the project.

To this end, our scope of work included:

- Drilling, sampling, and logging 12 test borings at select locations along the alignment to obtain subsurface information for input into project design;

- Laboratory testing on select samples to determine soil index properties for input into geotechnical design. Limited chemical testing was also performed to determine corrosivity properties of the soil;

- Geotechnical engineering analyses to evaluate potential impacts along the proposed sewer main alignment, and development of geotechnical engineering input for design of the new sewer main; and

- Preparation of this geotechnical investigation report.

In addition to these tasks, we reviewed information available in our files relevant to the project alignment, including historic topographic maps, pertinent geologic and geotechnical maps, available geotechnical reports for other improvements within the project area, and historic aerial photographs along the project alignment. A list of references is provided at the end of this report.

Lastly, we prepared a desktop study report (TerraCosta, 2016), which summarized general geologic conditions along the project alignment.

3 FIELD INVESTIGATION, LABORATORY TESTING & OTHER STUDIES

3.1 Field Investigation

Our field investigation was conducted between October 15 and October 18, 2018, under the supervision and direction of a Certified Engineering Geologist from TerraCosta. Our investigation consisted of drilling 12 exploratory borings, the locations of which are shown on Figure 1.

The soil borings were drilled by Pacific Drilling using a Fraste MD/UX with hollow-stem augers. The borings were advanced to approximate depths of 9 to 27 feet. Bulk samples were collected at selected depths. In addition, drive samples were obtained from the test borings

using either a 2-inch O.D. Standard Penetration Test sampler or a 3-inch O.D. "California Sampler." The samplers were advanced by driving them into the soil at the bottom of the drill hole using a 140-pound hammer falling 30 inches. Samples obtained from the borings were sealed in the field to preserve in-situ moisture, and transported to the laboratory for additional inspection and testing. The drilling operations were observed, borings logged, and soils classified by a Registered Engineering Geologist from TerraCosta. Field logs of the materials encountered in the test borings were prepared based on visual examination of the materials, and on the action of the drilling and sampling equipment. Logs of test borings are presented in Appendix A.

3.2 Laboratory Testing

Laboratory testing for this project consisted of grain-size distribution, plasticity, moisture content, dry density, corrosion testing, chemical testing, and compaction. The results of the laboratory testing are presented in Appendix B.

3.3 Other Studies

We reviewed another study along the alignment of the sewer main which was conducted by Southland Geotechnical Consultants, Inc. (SGC). As part of that study, they drilled two borings designated Borings North and South. Copies of their logs of test borings and results of their laboratory testing are provided in Appendix C.

4 SITE, SOIL, AND GEOLOGIC CONDITIONS

The project site is located within the Tecolote Canyon Nature Park and Nature Center beginning approximately 3,600 feet east from the point of discharge of Tecolote Creek into Mission Bay. The project begins at Sewer Manhole No. 266 (Station 100+00) near the baseball fields in Tecolote Creek Park and extends approximately 26,000 feet (4.9 miles) up Tecolote Canyon to Manhole 275 (Station 360+42.37) on Chateau Drive located in the neighborhood of Clairemont in the City of San Diego. The general geologic and subsurface conditions anticipated to be encountered along the alignment are described in the following sections.

4.1 Geologic Setting

The project site is located within the Peninsular Ranges Geomorphic Province, which is generally characterized as a series of northwest-trending mountain ranges and valleys between Baja California and the Santa Monica Mountains. Geomorphic maps typically show that the Peninsular Ranges Province, which is bounded by the Transverse Ranges and the Colorado Desert Geomorphic provinces to the north and east, respectively, extends into the Baja California peninsula on the south, and is often mapped as extending as far west as the western edge of the offshore continental borderland. Within San Diego County, the Peninsular Range Province is oftentimes further subdivided into a coastal plain subzone (referred to as the San Diego Embayment), a central mountain subzone, and a desert subzone.

Within the Peninsular Ranges Province, the project site is further situated on the westerly margin of the coastal plain subzone, which is characterized by a series of uplifted coastal terraces (stepping down to the west) that have been modified and abraded by various sea-level high stands and incised by numerous drainages.

The coastal plain terraces are typically covered by a veneer of Quaternary-age nearshore marine, beach, and non-marine sediments, which are in turn underlain by Cretaceous- and Tertiary-age deposits that may or may not be exposed within the coastal bluff face. The incised drainages are generally filled by Quaternary-age alluvial sediments.

Geologically, the majority of the reach of Tecolote Canyon is incised into soils of the Scripps Formation, with the exception that portions of the upper reaches of Tecolote Canyon, generally easterly of Genesee Avenue, are incised into the soils of the Friars Formation. The soils on top of the mesa generally consist of nearshore and beach deposits of the Lindavista Formation, and soils within the canyon bottom generally consist of alluvium, slopewash, and colluvium. Two landslides were noted along the project alignment.

The regional geology in the project site vicinity is shown on Figures 2A and 2B. Local site geology is shown on Figures 3A, 3B, 4A, and 4B. Figure 4A illustrates an alternative description of geologic units that have been used to describe surface geology (Kennedy, 1975) developed prior to the publishing of the 30’x60’ Geologic Map developed by Kennedy and Tan (Kennedy and Tan, 2008; Figure 3A).

4.2 Surface Conditions

The majority of the pipeline is generally within the bottom or on the lower portions of the canyon slopes of Tecolote Canyon. The pipeline starts at Manhole 266 (Station 100+00) at approximate elevation 32 feet, then rises to its highest elevation of approximately 285 feet at Manhole 275 (Station 360+42.37).

Typical construction along the alignment is anticipated to be cut and cover, with segments constructed using trenchless methods that, as we understand, are to be determined by the contractor. The anticipated trenchless sections are shown on Figure 1. The majority of the alignment is within the Tecolote Nature Park and Nature Center, with environmentally sensitive areas on either side of the alignment and with access roads that help to channel traffic in order to limit impacts to those environmentally sensitive areas.

4.3 Subsurface Conditions

Soils likely to be encountered along the alignment include fill, alluvium, colluvium, slopewash (included in the description for alluvium and colluvium), and the Scripps Formation. A general description of these soils is provided below.

Artificial Fill Soils: Artificial fills will likely consist of locally derived soils placed during construction activities around the canyon rim. Fill soils encountered in Boring B-1 were comprised of clayey and silty sands with some gravel and debris. Based on a review of maps and aerial photographs, we anticipate that the deepest fills will be encountered at the upper reaches of Tecolote Canyon easterly of Genesee Avenue. These soils will likely consist of clayey sands to sandy clays derived from the Scripps and Friars Formations.

Alluvium and Colluvium: Alluvial and colluvial deposits are generally found on the canyon slopes and in the canyon bottom. These deposits are locally derived, and are anticipated to range in thickness from a few feet at the upper reaches of Tecolote Canyon, up to tens of feet at the lower reaches of Tecolote Canyon. In our Borings B-1 through B-9, B-11, and B-12, the thickness of these deposits ranged from 4 to 16 feet. In SGC's borings North and South, these deposits extended to the limits of the depths of their borings. In addition, these deposits are comprised of silty sands, clayey sands, sand, and silty clays. In some locations, gravels and cobbles were encountered. Standard penetration resistances (SPT) in blows per foot ranged from 5 to 87, with a median SPT of 10.

Scripps Formation: The Scripps Formation, as encountered in our borings, consisted of silty sands, clayey sand, sandy and clayey silts, and sandy and silty clays. In addition, we encountered gravels and cobbles, as well as cemented zones. The SPT blow counts of the formation ranged from 6 to in excess of 100 blows per foot, with a median SPT of 65. In addition, where cemented zones were encountered, the SPT blow count tended to exceed 100, with one blow count of 50 blows for 1 inch.

5 GEOLOGIC HAZARDS

5.1 City of San Diego Seismic Hazard Categories

The alignment of the proposed Tecolote sewer main project in relationship to the City of San Diego Seismic Hazards mapping is presented as Figure 1. As shown on Figure 1, the proposed sewer main follows the alignment of Tecolote Canyon and is located in Geologic Hazard Categories 32 (Liquefaction) and 53 (Other Terrain). Category 32 is described as "Liquefaction - low potential, fluctuating groundwater- minor drainages." Category 53 is described as "Level or sloping terrain, unfavorable geologic structure, low to moderate risk."

In addition, the downstream end of the project is located adjacent to a landslide (Category 21) and within Fault Zone (Category 12), which is described as "Potentially active, Inactive, Presumed Inactive, or Activity Unknown." Also, approximately 500 feet north of our Boring B-3, the sewer main crosses another fault zone (Category 12).

5.2 On-Site Faults

As noted in Section 5.1, the sewer main encounter City-designated Category 12 fault zones (Figure 1).

5.3 Regional Faulting and Seismicity

In order to assess the general regional faulting and seismicity, we utilized the computer software "EQFAULT" and "EQUAKE". For purposes of our search, we used the downstream terminus of the project sewer alignment for reference. The databases in these two programs identify known faults near the project site and summarize the historical earthquakes that may have impacted the site. The results of our searches for faults and events within 100 miles of the site are presented in Appendices D and E. Table 1

summarizes known faults within 50 miles of the site. In addition, the largest estimated peak ground acceleration experienced at the site occurred on July 27, 1862, and was a Magnitude 5.9 event located approximately 5.4 miles from the site. The peak ground acceleration estimated for this event was approximately 0.26g.

5.4 Liquefaction and Lateral Spreading

Portions of the project are located in City of San Diego Geologic Hazard Category 32, which corresponds to minor drainages with fluctuating groundwater. The potential for liquefaction and lateral spreading for soils located in this area is contingent upon the depth to groundwater and the characteristics of the soils. Loose to medium dense silty sands and sands are susceptible to liquefaction if saturated. Conditions within the project limits encountered in our borings indicate that groundwater is intermittent and heavily influenced by rainfall. As such, it is our opinion that the risk to liquefaction and lateral spreading within the project area is low, as suggested by the City of San Diego Seismic and Geologic Hazards Map.

5.5 Landslides

One ancient natural landslide has been mapped along the proposed alignment of the sewer main and is shown on the City of San Diego Seismic and Geologic Hazards Maps. This landslide is mapped to the south of the sewer main alignment. In addition, California Division of Mines and Geology (DMG) Open-File Report 95-03 identified three questionable landslide areas, which encroach near and into the project alignment (Figures 1, 3, and 4). The potential impacts associated with these questionable landslide areas were discussed with the project team. Given the project constraints and uncertainty of their existence, these areas were not investigated as part of this project.

5.6 Tsunamis and Seiches

The project site is not located within a tsunami inundation zone, nor is the site located next to the bay. As such, the risk associated with tsunamis and seiches is considered low to negligible.

5.7 Expansive Soils

Clayey soils are, by nature, generally expansive. Clayey soils are found within the alluvial and colluvial deposits, as well as some segments of the Scripps Formation. As such, the use of these clayey soils as backfill materials or around the pipe is not recommended in order to limit the impacts to the proposed improvements associated with expansive soils.

5.8 Corrosive Soils

Selected soils samples have been tested for their compatibility with construction materials. The results of these tests are summarized in Table 2. The risks to the proposed project are a function of construction materials used and the characteristics of the soils surrounding improvement. We recommend that an expert in soil corrosion and material compatibility evaluate these test results.

5.9 Contaminated Soils

An investigation of contaminated soils was not included in our scope of work for this project. In addition, we are unaware of any other studies or investigations conducted for this project concerning contaminated soils. However, we reviewed the http:/geotracker.waterboards.ca.gov database for the Tecolote Canyon and found one hazardous material incident report filed for the Tecolote Golf Course on September 4, 1986. The reported contaminant was gasoline, which was reported as discovered and stopped on September 4, 1986. No remedial actions were entered. The case was closed on December 12, 1994. No other reports were noted within Tecolote Canyon. As such, it is our opinion that the risk associated with contaminated soils for this project is low. This opinion should not be construed as a guarantee that contaminated soils are not located within the project site.

6 DISCUSSION

6.1 Characteristics of Proposed Sewer Main

As described above, the proposed sewer main improvements follow the alignment of Tecolote Canyon and are located within the Tecolote Canyon Nature Park and Nature Center. Beginning at the downstream end at Manhole 266 (Station 100+00), the sewer main travels up Tecolote Canyon to the upstream Manhole 275 (Station 360+42). The sewer main will

traverse portions of Snead Avenue from approximate Station 214+40 to approximate Station 225+73, cross Mt. Acadia between approximate Stations 225+72 and 226+97, cross Balboa Avenue between approximate Stations 284+00 and 285+75, and cross Genesee Avenue between approximate Stations 354+40 and 355+50.

The proposed sewer main replaces portions of the existing sewer main from Station 100+00 to approximate Station 184+00, where the sewer line follows a new alignment from approximate Station 180+00 to approximate Station 288+35, except for a limited segment where the sewer main replaces existing pipe between approximate Station 195+48 to approximate Station 200+46. From approximate Station 289+95 to approximate Station 360+42, the existing sewer main will be retrofitted, except for approximately 720 feet from approximate Station 346+69 to approximate Station 353+69, where a new section of main will be constructed.

We understand that there are 10 sections of the sewer main where the new pipe will be installed using trenchless methods. The lengths of the trenchless sections range from approximately 100 to 2,100 feet. The trenchless portions of the project primarily cross beneath creeks and roadways.

The depth of the proposed sewer main ranges from approximately 7 to 40 feet. The sewer main will be constructed within alluvial and colluvial deposits and within the Scripps Formation (see Section 6.2). In addition, groundwater can be expected to be encountered along the alignment. However, the depth and location of groundwater varies (see Section 6.3.4).

Lastly, both buried and overhead utilities will be encountered along the alignment and will cross the alignment at various locations (see project plans for details). One particular utility of interest is a fuel line that parallels the proposed sewer line. Special coordination with the agency in charge of this utility will be required.

6.2 General Soil Characteristics Along Pipeline Alignment

Based on our study and the shallow nature of the construction, we anticipate that excavations for the proposed pipeline will encounter fill soils, remnants of natural surficial soils, Quaternary-age alluvial and colluvial deposits, and the Tertiary–age Scripps Formation. The soils generated from these excavations are anticipated to consist primarily of silty to clayey

sands and sandy lean to fat clays, with varying amounts of gravels and cobbles. In addition, hard cemented zones are anticipated generally within the Scripps Formation. Tables 2 through 4 summarize the anticipated materials and their excavation characteristics along the pipeline alignment.

Table 3 presents a summary of general material types encountered in the borings, whereas Table 4 presents a summary of our assessment of the materials likely to be encountered at the invert of the pipeline, and which materials are likely to be encountered by the excavations. Table 5 summarizes our assessment of the materials likely to be encountered at the various trenchless sections.

6.3 **Sewer Main Construction**

6.3.1 *Introduction*

The proposed project includes approximately 24,600 feet of sewer main, which excludes approximately 1,200 feet of existing sewer main between Manholes 184 and 166 where no improvements will be made. We anticipate that the project will involve three main types of construction. These are cut and cover construction to replace and place new pipe, trenchless methods to install new pipe along alignments that generally pass near or beneath creek crossings or roadways, and rehabilitating existing pipe without excavation or replacement. We estimate that the cut and cover operations will encompass approximately 12,700 feet, approximately 5,600 feet will be installed using trenchless methods, and approximately 6,500 feet will be rehabilitated.

We have provided general discussions concerning the anticipated cut and cover and trenchless segments below. In addition, we have provided a discussion on general dewatering concerns.

6.3.2 *Cut and Cover Segments*

In general, cut and cover construction will begin at the downstream end of the project and extend to Balboa Avenue. We anticipate that the depths of the excavations for the cut and cover operations will range from 7 to 24 feet. Given the limited construction right-of-way, these excavations will likely require shoring. In addition, the excavations will likely encounter various amounts of groundwater that will require controlling and may require

dewatering. The excavations will be made into fill, alluvial and colluvial deposits, and the Scripps Formation.

In general, SPT blow counts are an indicator of the relative excavatability of a given deposit. SPT values for the fill, alluvium, and colluvium encountered in our borings ranged from 5 to 87 blows per foot, with a median SPT of 10 blows per foot. However, it must be noted that the locations of our borings were restricted due to environmental reasons and, as such, may not be representative of the fill and alluvial, and colluvial deposits. In addition, construction debris, gravels, and cobbles were encountered in the fill and alluvial, and colluvial deposits. Within the Scripps Formation, we encountered gravels and cobbles, as well as cemented zones. The SPT blow counts of the formation ranged from 6 to in excess of 100 blows per foot, with a median SPT value of 65. In addition, where cemented zones were encountered, the SPT blow count tended to exceed 100, with one blow count of 50 blows for 1 inch.

Based on the above data, we anticipate that the excavation in the fill and alluvial and colluvial deposits will be easier than in the Scripps Formation, and that special equipment, such as rock breakers, may be required when excavating the cemented zones of the Scripps Formation.

Lastly, we anticipate that in general, excavation upstation of approximate Station 150+50 will encounter Scripps Formation at varying depths below the ground surface, and at the ground surface as the alignment of the sewer main moves upwards on the canyon sides from the canyon bottom.

6.3.3 *Trenchless Segments*

As stated above, approximately 5,600 feet of sewer main will be installed using trenchless methods. There are 10 segments of the alignment where trenchless methods are likely, and these range in length from approximately 100 to 2,100 feet.

The likely trenchless segments begin near Station 162+50 where the sewer main passes beneath a creek crossing near the SDGE Facility. The thickness of cover over the sewer main is approximately 5 to 6 feet, according to project plans.

The longest trenchless segment of the sewer main begins near Station 264+59, and ends near Station 285+76 after it passes beneath Balboa Avenue.

As we understand, a given trenchless method of construction has not yet been selected for this project and the contractor will be given the choice of method. NCHRP Synthesis 242 (TRB, 1997) provides a summary of trenchless methods that have been used on highway projects. There are many different methods that can be employed, in general. Descriptions of methods described in the NCHRP Synthesis 242 are presented in Table 6. In addition, Table 7 provides a summary of the various characteristics of trenchless construction. Lastly, Table 8 summarizes the general applicability of a given trenchless technique for various soil conditions.

The selection of a trenchless method depends on the materials anticipated to be encountered. Mixed face conditions, as well as groundwater, complicate the selection process.

From our review of project plans, the use of trenchless methods tends to correspond to creek crossings, being near creeks and drains, and beneath roadways. For the most part, the trenchless methods will be performed within the Scripps Formation or near the contact of the Scripps Formation. As such, we anticipate that the face conditions for the chosen method will either be within Scripps Formation, mixed conditions comprised of alluvial and colluvial deposits and Scripps Formation, or alluvial and colluvial deposits. As discussed above, the Scripps Formation is a fairly competent material that has cemented zones that can be as competent as concrete. In addition, cemented and uncemented cobble and gravel zones were encountered in our borings and should be anticipated. Lastly, as some of the trenchless method areas are near and beneath water courses, groundwater and saturated soil conditions should be anticipated. As such, face stability issues associated with groundwater and saturated conditions should be anticipated.

6.3.4 *Dewatering*

Groundwater was encountered in six of our borings and in one boring that was advanced as part of a 2013 study by SGC. Typically, groundwater was encountered within 9 to 12 feet of the ground surface and generally within the alluvial and colluvial deposits. However, groundwater was encountered in one boring (Boring B-12) within the Scripps Formation where we did not encounter alluvial or colluvial deposits. In addition, in some areas, the groundwater appeared to be perched on top of the Scripps Formation. However, it is our opinion that groundwater could be encountered within the Scripps Formation as well.

Given the high likelihood that groundwater will be encountered within the depths of work along the sewer main alignment, dewatering will be needed to maintain dry working conditions, to maintain the stability of the excavations, and to maintain the stability of face conditions for the trenchless portions of the project, depending upon the method selected.

6.4 Trench Stability

Excavation for the pipeline will generally encounter fill soils, alluvial and colluvial deposits, and the Scripps Formation. Descriptions of these materials are presented in Section 4.3 of this report.

Trenching operations, as well as shaft excavations for trenchless methods for the project, will need to comply with OSHA and Cal/OSHA requirements. Given the limited width of the construction right-of-way, excavations will generally need to be shored and likely dewatered. Trench shields may be used in lieu of shoring of the excavations, provided Cal/OSHA and OSHA regulations are followed and subsurface conditions permit.

6.5 Pavement Repair

Limited sections of the proposed sewer main will be located within City streets. Depending on the width of the existing pavement removed for the sewer main trench, City of San Diego standards may require construction of a replacement asphalt/concrete pavement section. The effectiveness of the restored pavement section is a function of the components of the structural pavement section, as well as the underlying subgrade soils.

To assess the potential subgrade conditions of the backfilled sewer main trenches, we reviewed the nature of the material composition of the potential excavated soils. Our review of available data indicates that the potential subgrade soils may be comprised of mixtures of sands and clays. The support characteristics of the potential subgrade soils are directly related to the amount of the finer fraction (clays and silts) of soils in the mixture. As such, the replacement pavement may vary depending upon subgrade conditions

7 RECOMMENDATIONS

7.1 General Site Preparation and Earthwork Operations

All grading and site preparation should be performed under the observation of the geotechnical engineer and in accordance with the 2018 Edition of the Standard Specifications for Public Works Construction ("Whitebook") and the latest edition of the City of San Diego Standard Drawings for Public Works Construction.

In general, all vegetation, debris, and other deleterious material should be removed from areas to receive fill prior to site regrading. All structural fill soils, including trench backfill, should be compacted to a minimum 90 percent of the maximum dry density, as determined by ASTM Test Method D1557. Moisture content in the fill should be maintained between the optimum moisture content and 3 percent over optimum.

In areas receiving pavement or foundations, we recommend that the upper 1 foot of subgrade soils be compacted to 95 percent of the maximum dry density, as determined by ASTM D1557.

As noted in the Whitebook, soft, spongy, or other unstable soils should be removed from the trench bottom before placement of the bedding material and pipe. It is expected that trench bottoms in formational materials will be firm and competent. Unsuitable soils are most likely to be encountered in those portions of the alignment located within alluvial or colluvial deposits. When encountered at trench grade, the unsuitable material should be excavated and replaced with properly compacted fill.

The geotechnical engineer should review the project plans to evaluate whether the intent of the recommendations presented herein has been properly interpreted and incorporated into the contract documents.

We recommend that all trenching operations for the proposed sewer main comply with OSHA and Cal/OSHA requirements. As such, given the limitations of the construction right-of-way, trench excavations for the pipeline will generally need to be shored and likely dewatered. The extent of dewatering is expected to vary and will depend upon the depth of the excavation and the local site conditions. As such, the contractor may wish to pot hole in advance of their operations to assess the varying dewatering conditions. Trench shields may

be used, provided site conditions permit and provided Cal/OSHA and OSHA regulations are followed.

Excavations will be made into fill materials, alluvial and colluvial deposits, and Scripps Formation. As such, excavation equipment is expected to vary depending upon the materials to be excavated. The alluvial and colluvial deposits contain gravels and cobbles, as does the Scripps Formation. In addition, the Scripps Formation contains cemented zones that can be very strong and concrete-like in nature.

We recommend that excavation conditions be verified in the field, and that modifications be made to any trench or access shaft excavation support systems, as needed, based upon the actual exposed conditions in the field. We recommend that the designated "competent person" determine the need and method for trench stabilization, as stated in the OSHA and Cal/OSHA requirements.

7.2 Sewer Main Design

7.2.1 *Sewer Main and Anchorage and Sliding*

We recommend an allowable passive earth pressure of 350 pcf for thrust block design. For test conditions, we recommend that this value be increased by one-third. The allowable passive earth pressure includes a factor of safety of 2.

We recommend an allowable bearing pressure of 1,200 psf for anchor blocks for no embedment of the anchor block, and an allowable bearing pressure of 2,800 psf for 1 foot of embedment. We recommend a minimum bearing area for the anchor block of 1 foot by 1 foot square.

For frictional resistance of anchor blocks and thrust blocks, we recommend an ultimate coefficient of friction of 0.70 and an allowable coefficient of friction of 0.35. For thrust block design, both the passive pressure and friction coefficient can be combined. However, if the passive pressure and friction coefficient are combined, we recommend reducing the passive pressure and friction coefficient by 25 percent.

For frictional resistance of buried pipes, where the sewer main anchorage is obtained by soil-pipe friction, we recommend an alternate coefficient of friction of 0.30. This

value assumes a formed steel-soil or plastic interface. We recommend reducing this value by 75 percent if a bituminous coating is used around the pipe.

7.2.2 *Sewer Main Design*

For design of the loads acting on the buried conduit, we recommend using a total unit weight of soil of 130 pcf and a buoyant soil weight of 70 pounds pcf. The total unit weight of soil includes the effects of moisture, and reflects compactive efforts. It is intended to reflect the likely in-situ unit weight of the compacted backfill soil. Typically, silty sands have a laboratory maximum (ASTM D1557) dry density between 120 and 127 pcf, with an optimum moisture content ranging from 10 to 12 percent. Assuming a minimum relative compaction of 90 percent, and allowing for moisture contents between 10 and 14 percent, the likely range of total in-situ compaction unit weight is 123 to 130 pcf. The buoyant soil weight can be used for resisting uplift forces.

7.2.3 *Sewer Main Trench, Bedding, and Backfill Criteria*

We recommend that the proposed sewer main trench width, sewer main bedding, and sewer main backfill criteria comply with San Diego Regional Standard Drawing No. SDS-110, as adopted in the City of San Diego Standard Drawings. In addition, we recommend that modifications to minimum trench width requirements dictated by construction methods and requirements be approved by the Engineer-of-Record. Additionally, we recommend that if a clean crushed rock is used for the pipe zone and pipe bedding areas, a layer of filter fabric be placed at the interface between the pipe backfill zone and pipe zone in order to mitigate migration of fines into the pipe zone rock.

We recommend that, where unsuitable soils are encountered at the pipe subgrade, the materials be overexcavated and replaced as properly compacted fill where practical or replaced with 1/2-inch maximum size crushed rock.

In addition, we recommend that open trench operations, pipe installation, and backfill material be in conformance with the Whitebook requirements, except that jetting of backfill and bedding materials will not be permitted.

7.3 Manhole Design

We recommend using a total lateral earth and hydrostatic pressure, expressed as an equivalent fluid pressure, of 94 pounds per square foot. This pressure is to be distributed radially around the manhole. This lateral pressure is based on the soil having a total unit weight of 125 psf. We have assumed that the area outside of the manhole could become inundated. As such, we used a buoyant weight of 63 psf. We have considered the manhole as a non-yielding structure and, as such, used a lateral at-rest earth pressure coefficient of 0.5.

7.4 Trenchless Methods

For preliminary design purposes, we recommend the following geotechnical parameters to assist in the design of trenchless operations:

- For assessing face stability of the excavated annulus, we recommend modeling the hydraulic fill soils as having an angle of friction equal to 30 degrees, a total unit weight of soil of 130 pcf, and a buoyant unit weight of soil equal to 66 pcf.

- For estimating the likely ground deformation resulting from the proposed trenchless operations, we recommend using the following equation:

$$d_{max} = \frac{2.5i}{V_s}$$

where: $\mathbf{d_{max}}$ is the maximum ground settlement;
i is equal to K times the depth to the center of the pipe; and
$\mathbf{V_s}$ is the volume loss due to the excavation per foot of pipe.

For this equation, we recommend using a K ranging from 0.25 to 0.5 and a V_s equal to 5 percent of the excavated face.

In order to estimate the shape of ground settlement manifested at the surface, we recommend using the following equation:

$$d = d_{max} \exp\left(\frac{-x^2}{2i^2}\right)$$

where: **x** is the distance from the centerline of the pipe in feet;
i is defined as Kz, where z is the depth to the center of the pipe;
d is the ground displacement at **x**; and
$\mathbf{d_{max}}$ is the maximum ground displacement as calculated above.

- For estimating the jacking force required to push the pipe casing, we recommend using a coefficient of friction equal to 0.55 for steel casing against soil and a coefficient of friction of 0.88 for concrete against soil. Furthermore, we recommend using a total unit weight of 130 pcf for calculating the normal pressure acting on the pipeline that is being jacked.

- For designing the reaction wall for jacking, we recommend using an allowable passive pressure, expressed as an equivalent fluid pressure, of 350 psf.

- For design of shoring for the jacking and receiving pits, we recommend the following:

    1. For active lateral earth pressures above the water table, we recommend an equivalent fluid pressure of 38 pcf.

    2. For active lateral earth pressures below the water table, we recommend an equivalent fluid pressure of 20 pcf.

    3. For passive lateral earth pressures above the water table, we recommend an equivalent fluid pressure of 380 pcf.

    4. For passive lateral earth pressures below the water table, we recommend an equivalent fluid pressure of 190 pcf.

    5. We recommend assuming a unit weight of water equal to 64 pcf.

    6. For adjacent surface surcharge loads, we recommend applying a uniform lateral pressure equal to 0.333 times the magnitude of the vertical surface pressure.

    7. Finally, we recommend placing 1 foot of gravel along the base of the shaft in order to provide a working surface.

7.5 **Temporary Shoring Design**

We recommend that all trenches and excavations be designed and constructed in accordance with OSHA and Cal/OSHA regulations. For preliminary planning purposes, we recommend using an OSHA soil classification of Type C for all excavations. In all instances, soil and trench conditions should be assessed by a competent person, in accordance with 29CRF Part 1926, Occupational Safety Health Standards - Excavations.

In addition, only limited test borings were drilled to investigate soil conditions within the areas of the proposed excavations. Perched water and, depending upon depth, groundwater may be encountered. As such, one should anticipate that portions of the proposed excavations could become saturated, extremely weak, and subject to caving.

Zones of clean pervious sands can be expected to be encountered, which will be prone to caving.

For the design of temporary shoring in areas that have been dewatered so that seepage effects and water pressure loads are not applicable, we recommend the following:

- For cantilevered shoring systems, we recommend using an active lateral earth pressure expressed as an equivalent fluid pressure of 40 pcf and an ultimate passive lateral earth pressure expressed as an equivalent fluid pressure of 350 pcf. We recommend that the upper foot of the soils providing passive resistance be ignored.

- For braced shoring systems, we recommend using a trapezoidal loading diagram that begins at zero at the ground surface and linearly increases to 50H psf at a depth of 0.25H, and then remains constant to a depth of 0.75H where it linearly decreases to 0 at the bottom of the excavation. H is the overall depth of the excavation. Where the braced system includes passive resistance for embedded structural elements of the shoring system, we recommend an ultimate passive lateral earth pressure expressed as an equivalent fluid pressure of 350 pcf. We recommend that the upper foot of the soils providing passive resistance be ignored.

- We recommend including a uniform lateral pressure distribution of 120 psf to account for light traffic and surcharge loading. However, if materials are stockpiled near the excavation and where heavy equipment is operating adjacent to the excavation, we

recommend that the shoring designer include surcharge loadings that represent the actual surcharge loads.

We recommend that the contractor retain a civil engineer experienced in shoring design to design his shoring systems. In addition, we recommend that the shoring designs for the excavations be submitted for review by the owner's engineer.

7.6 **Dewatering**

A limited number of test borings were drilled to investigate soil conditions within the areas of the proposed excavations. Groundwater was encountered in most of the borings at depths on the order of 8 to 11 feet. Some of this water is perched water and some is attributed to the regional groundwater table in the area. Given the depths of the proposed sewer main, groundwater is anticipated to be encountered. As such, one should anticipate that portions of the proposed excavations could become saturated, extremely weak, and subject to caving. As such, excavations for this project will need to be dewatered.

In addition, many of the trenchless sections cross near and beneath creeks and drainages. In some cases, the depth below the drainage or creek invert is on the order of only a few feet. As such, the contractor should anticipate that along the alignments of trenchless sections, groundwater and seepage will be encountered.

We recommend that the contractor retain a dewatering subcontractor and a civil engineer experienced with construction dewatering. We recommend that the civil engineer prepare a dewatering plan to be submitted for review by the owner's engineer. When designing the dewatering system, the dewatering engineer will need to assess the potential impacts to the shoring designs anticipated by the shoring engineer. As such, we recommend that the dewatering engineer review the proposed shoring plans, as well as the proposed trenchless methods, and give their concurrence on the applicability of the interaction of the proposed dewatering system, the proposed shoring system, and the proposed trenchless construction method.

Dewatering of construction excavations often requires modifications and adjustments in order to maintain dry and workable conditions.

7.7 Seismic Design Parameters

Recommended seismic design parameters for the proposed sewer main are presented below. We have treated the site as a non-liquefiable site having Site Class D.

We used an approximate site location of 32.7776 degrees latitude and -117.1853 degrees longitude. The corresponding CBC seismic design parameters are listed below.

CBC Seismic Design Parameters	
F_S	1.005
F_V	1.522
S_S	1.237g
S_1	0.478g
S_{MS}	1.243g
S_{M1}	0.728g
S_{DS}	0.829g
S_{D1}	0.485g

7.8 Pavement Repair

For preliminary design purposes, we have assumed that pavement sections may require repairs for streets disturbed by cut and cover operations. We have estimated pavement design using procedures outlined by the State of California, Department of Transportation (Caltrans). For preliminary design purposes, we have assumed that Traffic Indices (TI) for various traffic areas may range from 4.5 to 7.0 throughout the project site. The design criteria listed in the following table reflect a gravel equivalent safety factor of 0.20 feet applied to the asphalt concrete pavement section for all pavement sections provided herein. The preliminary design pavement sections listed below are based on an R-value of 20.

Pavement Design Sections

Design Traffic Index	AC (in.)	Class II Aggregate Base (in.)
4.5	2.5	7
5.0	3	8
5.5	3	9
6.0	3.5	10
7.0	4	12

The upper 12 inches of subgrade should be compacted to 95 percent of the maximum laboratory density as determined by ASTM Test Method D 1557. We recommend that, once the subgrade has been prepared, pavement design be validated by performing R-value tests on the subgrade soils prior to placement of pavement. The Class II aggregate base should be in conformance with Section 26 of the Caltrans Specifications and compacted to 95 percent of the maximum laboratory density calculated using the above ASTM standard.

Asphalt concrete should be placed in accordance with Section 39 of the Caltrans Standard Specifications. The mix design for asphalt concrete should be prepared by an engineering company specializing in this type of work; paving operations should be monitored by a qualified testing laboratory. Pavement sections designed and built to Caltrans specifications have a design life of approximately 20 years. The pavement design also assumes that normal maintenance, such as periodic application of sealer coating, shall be performed to reduce infiltration of water and maintain asphalt pavement surfaces.

7.9 Construction Material Compatibility and Corrosion Protection

We recommend that a corrosion and construction materials compatibility expert review the construction materials and corrosion systems selected for the project, and make recommendations, as needed, regarding the modification of materials or systems as deemed appropriate based on a review of the collected data. In addition, we recommend that all construction materials comply with the appropriate sections of the CBC, as it relates to the selection of materials and their environment of use.

8 LIMITATIONS

The data and conclusions provided in this report are based on a review of published reports and the results of our test explorations. The conclusions and information presented in this report are intended to assist PSOMAS in the completion of their pipeline design studies. Use of this information for any other intended purpose is not recommended.

It should be understood that California, including San Diego County, is an area of high seismic risk. It is generally considered economically unfeasible to build totally earthquake-resistant structures. Therefore, it is possible that a large or nearby earthquake could cause damage at the site. Additionally, we have not investigated or addressed the stability of

previously identified questionable landslide areas (DMG, 1995) within the area of the project site alignment.

This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations, and we cannot be responsible for the safety of other than our own personnel on the site. Therefore, the safety of others is the responsibility of the contractor. The contractor should notify the owner if he considers any of the recommended actions presented herein to be unsafe.

REFERENCES

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3. City of San Diego, Public Works Department, 2012, Standard Drawings for Public Works Construction.

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9. Southland Geotechnical Consultants, December 17, 2013, "Geotechnical Investigation, Proposed Replacement Support Bridge for Sewer Main Crossing Tecolote Creek, Tecolote Canyon Natural Park, San Diego, California,".

10. Thomson, James, 1993, Pipejacking and Microtunneling, Blackie Academic & Professional, an Imprint of Chapman and Hall.

11. Transportation Research Board, 1997, NCHRP Synthesis 242, Trenchless Installation of Conduits Beneath Roadways, A Synthesis of Highway Practice, National Cooperative Highway Research Program.

TABLE 1
SUMMARY OF FAULTS WITHIN 100 MILES OF THE SITE

Name	Magnitude (Mw)	Distance miles	PGA, g
Rose Canyon	6.9	0.5	0.580
Coronado Banks	7.4	13.7	0.254
Newport –Inglewood (Offshore)	6.9	29.7	0.109
Elsinore-Julian	7.1	39.1	0.098
Elsinore-Temecula	6.8	42.6	0.078
Earthquake Valley	6.5	44.8	0.064
Elsinore-Coyote Mountain	6.8	49.5	0.070

TABLE 2
CORROSIVE TEST RESULTS

Boring No.	Description	Depth (ft)	Min. Resistivity (Ohm-cm)	pH	Cl (ppm)	SO_4 (ppm)
2	Silty Sand	0 to 8	1,094	7.08	78	554
2	Clay	50 to 62	135	7.38	3.276	1,149
3	Sandy Silt	5 to 10	630	7.63	222	397
5	Silty Sand	0 to 5	1,113	7.46	117	167
7	Silty Gravel	5 to 10	1,338	8.01	92	289
9	Silty Sand	0 to 6	892	6.99	159	317
10	Silt with Sand	0 to 5	650	7.04	365	173
11	Silty Sand	0 to 7	463	7.97	324	656

Notes:
1. Soil Resistivity - CTM 643
2. pH - CTM 643
3. Cl - CTM 422
4 SO_4 - CTM 417

TABLE 3
SUMMARY OF TEST BORINGS
WITH ENCOUNTERED SUBSURFACE MATERIALS

Geotechnical Company	Boring Number	Approx. Station	Lateral Offset (feet)	Total Depth (feet)	Ground Surface Elevation (feet)	Depth to GW (feet)	Depth Range Qaf/Qal/ Qcol (feet)	Depth to Tsc (feet)
TerraCosta	B-1	161+90	90-W	27	80	13	0 to 25	25
	B-2	191+80	10-E	20.9	100	10	0 to 15	15
	B-3	206+75	15-E	20.8	113		0 to 4	4
	B-4	226+85		21.5	143		0 to 5	5
	B-5	245+90	70-W	21.5	155	10	0 to 15	15
	B-6	253+40		21.3	165		0 to 14	14
	B-7	262+10	15-W	21	174		0 to 13	13
	B-8	270+85	10-E	20	180		0 to 4	4
	B-9	276+95	10-W	21.2	184	8.5	0 to 13	13
	B-10	286+00		9.2	204		0	0
	B-11	346+60	20-N	18	251	10	0 to 13	13
	B-12	352+50	10-N	20.8	264	15.5	0 to 4	4
SGC	North	127+50	165-N	19	51		0 to 19	Refusal
	South	126+10	25-N	26.5	51	11	0 to 26.5	

TABLE 4
ANTICIPATED SUBSURFACE CONDITIONS AT INVERT OF SEWER MAIN*

Sewer Main Stations	Range of Manhole Depths (feet)	Anticipated Subsurface Materials at Invert
Sta. 100+00 to 158+00	10 to 16	Qaf/Qal/Qcol
Sta. 158+00 to 163+00	10 to 13	Qaf/Qal/Qcol/Tsc
Sta. 163+00 to 176+00	8 to 13	Tsc
Sta. 176+00 to 181+00	4 to 10	Qaf/Qal/Qcol/Tsc
Sta. 181+00 to 186+00	11 to 17	Tsc
Sta. 186+00 to 211+00	8 to 17	Qaf/Qal/Qcol/Tsc
Sta. 211+00 to 243+00	8 to 23	Tsc
Sta. 243+00 to 246+00	13 to 18	Qaf/Qal/Qcol/Tsc
Sta. 246+00 to 252+00	12 to 19	Tsc
Sta. 252+00 to 260+00	12 to 17	Qaf/Qal/Qcol/Tsc
Sta. 260+00 to 286+00	17 to 30	Tsc
Sta. 345+00 to 347+00	8 to 14	Qaf/Qal/Qcol/Tsc
Sta. 347+00 to 353+00	8 to 14	Tsc

* Locations are approximate; actual limits and depths may vary.

TABLE 5
SUMMARY OF TRENCHLESS SECTIONS

Stations	Estimated Depth to Invert (feet)	Minimum Cover from surface (feet)	Anticipated Tunnel Face Conditions	Surface Features	Nearby Borings
162+50 to 163+50	8 to 12	6 to 7	Qaf/Qal/Qcol/Tsc	Beneath creek	B-1
175+00 to 178+00	7 to 9	3 to 4	Qaf/Qal/Qcol/Tsc	Adjacent to creek	
181+00 to 184+00	8 to 13	4 to 5	Tsc	Adjacent to creek	
188+50 to 193+00	5 to 12	2 to 3	Qaf/Qal/Qcol/Tsc	Beneath or within potential landslide and beneath creek	B-2
206+10 to 207+91	7 to 15	4	Qaf/Qal/Qcol/Tsc	Beneath creek	B-3
225+71 to 226+97	12 to 23	10	Tsc	Beneath Mt. Acadia	B-4
244+46 to 249+22	7 to 16	4 to 5	Qaf/Qal/Qcol/Tsc	Beneath creek	B-5
253+54 to 262+27	13 to 17	10	Qaf/Qal/Qcol/Tsc	Adjacent to creek	B-6 and B-7
264+59 to 285+76	7 to 30	4 to 5	Tsc except beneath creek then Qaf/Qal/Qcol/Tsc	Adjacent to and beneath creek and beneath existing sewer	B-8, B-9, and B-10
346+49 to 353+69	5 to 40	2 to 3	Tsc except beneath creek then Qaf/Qal/Qcol/Tsc	Beneath creek and through hillside	B-11 and B-12

Notes:

1. Stations are approximate.
2. The depths to the invert of the trenchless sections and minimum cover are estimated from project plans.
3. Borings by others are indicated by the acronym of the company that performed the investigation. TerraCosta borings are indicated by boring number only.
4. Groundwater is anticipated in areas near creeks and drainages and beneath creeks and drainages. However, seepage should in general be expected.

TABLE 6
SUMMARY OF TRENCHLESS CONSTRUCTION TECHNIQUES

Technique	Man Entry	Description
Auger Boring (AB)	No	A technique that forms a bore hole from a drive shaft to a reception shaft by means of a rotation-cutting head. Spoil is transported back to the drive shaft by helical-wound auger flights rotating inside a steel casing that is being jacked in place simultaneously. AB may provide limited tracking and steering capability. It does not provide continuous support to the excavation face. AB is typically a 2-stage process (i.e., casing installation and product pipe installation).
Slurry Boring (SB)	No	A technique that forms a bore hole from a drive shaft to a reception shaft by means of a drill bit and frill tubing (stem). A drilling fluid (i.e. bentonite slurry, water, or air pressure) is used to facilitate the drilling process by keeping the drill bit clean and aiding with spoil removal. It is a 2-stage process. Typically, an unsupported horizontal hole is produced in the first stage. The pipe is installed in the second stage.
Micro-Tunneling (MT)	No	A remotely controlled, guided pipe-jacking process that provides continuous support to the excavation face. The guidance system usually consists of a laser mounted in the drive shaft communicating a reference line to a target mounted inside the MT machine's articulated steering head. The MT process provides ability to control excavation face stability by applying mechanical or fluid pressure to counterbalance the earth and hydrostatic pressures.
Horizontal Directional Drilling (HDD)	No	A 2-stage process that consists of drilling a small diameter pilot directional hole along a predetermined path and then developing the pilot hole into a suitable bore hole that will accommodate the desired utility and then pulling the utility into place. The HDD process provides the ability to track the location of the drill bit and steer it during the drilling process. The vertical profile of the bore hole is typically in the shape of an arc entrapping drilling fluid to form a slurry pathway rather than an open hole. This entrapped slurry provides continuous support to the borehole.
Pipe Ramming (PR)	No	A technique for installing steel casings from a drive shaft to a reception shaft utilizing the dynamic energy from a percussion hammer attached to the end of the pipe. A continuous casing support is provided and overexcavation or water is not required. This is a 2-stage process.
Soil Compaction (SC)	No	This method consists of several techniques for forming a borehole by in-situ soil displacement using a compacting device. The compacting device is forced through the soil, typically from a drive shaft to a reception shaft, by applying static thrust force, rotary force and/or dynamic impact energy. The soil along the alignment is simply displaced rather than being removed. This is a 2-stage process.
Pipe Jacking (PJ)	Yes	A pipe is jacked horizontally through the ground from the drive shaft to the reception shaft. People are required inside the pipe to perform the excavation and/or spoil removal. The excavation can be accomplished manually or mechanically.
Utility Tunneling (UT)	Yes	A 2-stage process in which a temporary ground support system is constructed to permit the installation of a product pipe. The temporary tunnel liner is installed as the tunnel is constructed. The temporary ground support system can be steel or concrete tunnel liner plates, steel ribs with lagging, or all wood box culverts. People are required inside the tunnel to perform the excavation and/or spoil removal. The excavation can be accomplished manually or mechanically.

Note: Descriptions taken from Table 4 of NCHRP Synthesis 242 (TRB, 1997)

TABLE 7
SUMMARY OF CHARACTERISTICS OF TRENCHLESS CONSTRUCTION

Trenchless Method	Pipe/Casing Installation Mode	Suitable Pipe/ Casing	Soil Excavation Mode	Soil Removal Mode	Diameter Range	Typical Lengths of Bore	Ground Movement	Recommended Soil Conditions
Auger Boring (AB)	Jacking	Steel	Mechanical	Auger	4 to 60 in. with most 8 to 36 in.	100 to 300 ft	Difficult to control	Wide range; difficult in flowing sands
Slurry Boring (SB)	Pulling/ Pushing	All Types	Mechanical and Hydraulic	Hydraulic, Mechanical Reaming and Compaction	2 to 12 in.; has been used up to 48 in.	50 ft	Can be difficult to control	Firm, stable, cohesive soils
Micro-Tunneling (MT)	Jacking	Steel, RCP, GFRP, PCP, VCP, DIP	Mechanical	Augering or Hydraulic (Slurry)	10 to 136 in.; most commonly 24 to 48 in.	500 to 1000 ft. for slurry MT; 200 ft to 400 ft. for auger MT	Typically less than 1 inch	Wide range from wet sand, clay, to boulders
Horizontal Directional Drilling (HDD)	Pulling	Steel, PVC, HDPE	Mechanical and Hydraulic	Hydraulic, Mechanical Reaming and Compaction	2 to 48 in.	600 to 5000 ft.	Difficult to control	Clay
Pipe Ramming (PR)	Hammering/ Driving	Steel	Mechanical	Augering, Hydraulic, Compressed Air, or Compaction	4 to 60 in. for open face; 4 to 8 in. for closed face	50 to 200 ft.	Must be evaluated based on soil type; surface heaving potentially a problem	Wide range
Soil Compaction (SC)	Pulling	Steel, PVC, HDPE	Pushing	Displacement (in-situ)	Up to 12 in.	40 to 80 ft.	Difficult to control	Soft clays and silts
Pipe Jacking (PJ)	Jacking	Steel, RCP, GFRP	Manual or Mechanical	Augers, Conveyors, Manual Carts, Power Carts, or Hydraulic	42 in. to 12 ft.; most commonly 48 to 72 in.	500 to 1000 ft.	Typically less than 1 inch; must control face stability	Typically sandy clay, however, other soils with proper selection of equipment
Utility Tunneling (UT)	Lining	Steel or Concrete Liner Plates w/Wood lagging, wood box	Manual or Mechanical	Augers, Conveyors, Manual Carts, Power Carts, or Hydraulic	Flexible; same as tunneling in general	Flexible; same as tunneling in general	Same as tunneling in general	Same as tunneling in general

TABLE 8
APPLICABILITY OF TRENCHLESS TECHNIQUES IN VARIOUS SOIL CONDITIONS

Soil and Groundwater Applications	Soil Type N Value (Standard Penetration Value as per ASTM D 1452)	Cohesive Soils (Clay) N < 5 (Soft)	 N = 5-15 (Firm)	 N > 15 (Stiff-Hard)	Cohesionless Soils (Sand/Silt) N < 10-30 (Loose)	 N = 10-30 (Medium)	 N > 30 (Dense)	 High Ground Water	Boulders	Full-Face Rock
	Auger Boring (AB)	°	•	•	°	•	•	χ	# 33% φ[1]	# 12 ksi
	Microtunneling (MT)	•	•	•	•	•	•	•	# 33% φ[1]	# 30 ksi
	Maxi/Midi-Horizontal Directional Drilling (HDD)	°	•	•	°	•	•	°	°	# 15 ksi
	Mini-Horizontal Directional Drilling (Mini-HDD)	°	•	•	°	•	•	°	χ	χ
	Impact Moling/Soil Displacement	°	•	•	χ	•	°	χ	χ	χ
	Pipe Ramming	•	•	•	•	°	°	°	# 90% φ	χ
	Pipe Jacking (PJ)									
	w/TBM	°	•	•	°	•	•	°	°	# 30 ksi
	w/Hand Mining (HM)	χ	•	•	°	•	•	χ	# 95% φ	°
	Utility Tunneling (UT)[2]									
	w/TBM	°	•	•	°	•	•	°	°	# 30 ksi
	w/Hand Mining (HM)	°	•	•	°	•	•	°	# 95% φ	•

•: Recommended °: Possible χ: Unsuitable N/A: Not Applicable
(This table is based on the assumption that work is performed by experienced operators using proper equipment)

[1] Size of largest boulder versus minimum casing diameter (φ)

[2] Ground conditions may require either a closed face, earth pressure balance, or slurry shield

SCALE: 1"=1,500'

B-1 (32)
B-2 (53)
B-3 (32)
B-4 (32)
B-5 (32)
B-6 (32/53)
B-7 (32)
B-8 (32)
B-9 (32)
B-10 (32/53)
B-11 (53)
B-12 (53)

Rose Canyon Fault Zone

LEGEND:

B-1 — APPROXIMATE LOCATION OF TERRACOSTA BORING

TECOLOTE CANYON SEWER ALIGNMENT
GREEN INDICATES LIKELY TRENCHLESS SEGMENT

EXISTING PIPE TO BE REHABILITATED

QUESTIONABLE LANDSLIDE DESIGNATED AS 4-1 PER DMG OPEN FILE REPORT 95-03

FAULT ZONES

11 Active, Alquist-Priolo Earthquake Fault Zone

12 Potentially Active, Inactive, Presumed Inactive, or Activity Unknown

LIQUEFACTION

32 Low Potential -- fluctuating groundwater minor drainages

OTHER TERRAIN

53 Level or sloping terrain, unfavorable geologic structure, Low to moderate risk

FAULTS

Fault

Inferred Fault

Concealed Fault

Shear Zone

BASE MAP SOURCE:
Adapted from a portion of "City of San Diego Seismic Safety Study, Geologic Hazards & Faults, Grids 20, 21, 25, 26 & 30," dated 4-3-2008.

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FIGURE NUMBER 1

PROJECT NAME: TECOLOTE CANYON SEWER

PROJECT NUMBER 2945

VICINITY MAP AND SAN DIEGO SEISMIC AND GEOLOGIC HAZARDS

118°00'
33°00'
117°00'
33°00'

PROJECT LOCATION

PACIFIC OCEAN

SAN DIEGO TROUGH

SAN DIEGO TROUGH FAULT

SAN CLEMENTE FAULT ZONE

PALOS VERDES HILLS

CORONADO BANK

CORONADO ESCARPMENT

CORONADO BANK FAULT ZONE

LOMA CANYON

LA JOLLA CANYON

NEWPORT - INGLEWOOD - ROSE CANYON FAULT ZONE

FISHERMANS BANK

FINESTERRE BANK

GEOLOGIC MAP OF THE SAN DIEGO 30' x 60' QUADRANGLE, CALIFORNIA

By

Michael P. Kennedy[1] and Siang S. Tan[1]

2008

SCALE 1:100,000

2 0 2 4 6 Miles

2 0 2 4 6 Kilometers

Contour Interval: 50 meters (approximately 164 feet)
Bathymetric Contour Interval: 50 meters (approximately 164 feet)

32°30'
118°00'

BASE MAP SOURCE:

"Geologic Map of the San Diego 30'x60' Quadrangle, California," compiled by Michael P. Kennedy and Siang S. Tan, 2008. California Geological Survey, Regional Geologic Map No. 3.

SEE LEGEND ON FIGURE 2B

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FIGURE NUMBER
2A

PROJECT NAME
TECOLOTE CANYON SEWER

PROJECT NUMBER
2945

REGIONAL GEOLOGY

ABBREVIATED EXPLANATION

Approximate stratigraphic relationships only;
see pamphlet and CMU (Plate 2) for more detailed information

MODERN SURFICIAL DEPOSITS

- af — Artificial fill (late Holocene)
- Qw — Wash deposits (late Holocene)
- Qls — Landslide deposits, undivided (Holocene and Pleistocene)
- Qmb — Marine beach deposits (late Holocene)
- Qpe — Paralic estuarine deposits (late Holocene)
- Qmo — Undivided marine deposits in offshore region (late Holocene)
- Qcf — Canyon fill deposits in offshore region (late Holocene)

YOUNG SURFICIAL DEPOSITS

- Qya — Young alluvial flood-plain deposits (Holocene and late Pleistocene)
- Qyc — Young colluvial deposits (Holocene and late Pleistocene)
- Qct — Undivided canyon terrace deposits in offshore region (Holocene and Pleistocene)

OLD SURFICIAL DEPOSITS

- Qoa — Old alluvial flood-plain deposits, undivided (late to middle Pleistocene)
- Qop — Old paralic deposits, undivided (late to middle Pleistocene)
  - Qop_7 — Unit 7
  - Qop_6 — Unit 6
  - Qop_{2-4} — Units 2-4, undivided

VERY OLD SURFICIAL UNITS

- Qvoa — Very old alluvial flood-plain deposits, undivided (middle to early Pleistocene)
- Qvop — Very old paralic deposits, undivided (middle to early Pleistocene)
  - $Qvop_7$ — Unit 7
  - $Qvop_6$ — Unit 6
  - $Qvop_5$ — Unit 5
  - $Qvop_4$ — Unit 4
  - $Qvop_3$ — Unit 3
  - $Qvop_2$ — Unit 2
  - $Qvop_1$ — Unit 1
  - $Qvop_{13}$ — Unit 13
  - $Qvop_{12}$ — Unit 12
  - $Qvop_{11}$ — Unit 11
  - $Qvop_{10}$ — Unit 10
  - $Qvop_9$ — Unit 9
  - $Qvop_8$ — Unit 8
  - $Qvop_{11a}$ — Unit 11a
  - $Qvop_{10a}$ — Unit 10a
  - $Qvop_{9a}$ — Unit 9a
  - $Qvop_{8a}$ — Unit 8a

SEDIMENTARY AND VOLCANIC BEDROCK UNITS

- QTu — Undivided sediments and sedimentary rocks in offshore region (Holocene, Pleistocene, Pliocene and Miocene)
- Tsd — San Diego Formation (early Pleistocene and late Pliocene)
  - Tsd - undivided
  - Tsdcg - transitional marine and nonmarine pebble and cobble conglomerate
  - Tsdss - marine sandstone
- Tba — Basaltic-andesite dike (Miocene)
- Tmo — Undivided sedimentary rocks in offshore region (Miocene)
- Tmvo — Undivided volcanic rocks in offshore region (Miocene)
- Tvsso — Undivided volcanic and sedimentary rocks in offshore region (Miocene)
- To — Otay Formation (late Oligocene)
- Tp — Pomerado Conglomerate (middle Eocene)
  - Tpm - Miramar Sandstone Member
- Tmv — Mission Valley Formation (middle Eocene)
- Tst — Stadium Conglomerate (middle Eocene)
- Tf — Friars Formation (middle Eocene)
- Tsc — Scripps Formation (middle Eocene)
  - Tscu - upper unit
- Ta — Ardath Shale (middle Eocene)
- Tt — Torrey Sandstone (middle Eocene)
- Td — Delmar Formation (middle Eocene)
- Tdmv — Delmar Formation and Friars Formation, undivided (middle Eocene)
- Tms — Mount Soledad Formation (middle Eocene)
  - Tmss - sandstone
  - Tmsc - cobble conglomerate
- Teu — Undivided Eocene rocks in offshore region (Eocene)
- Kcs — Cabrillo Formation (Upper Cretaceous)
  - Kcs - sandstone
  - Kccg - cobble conglomerate
- Kp — Point Loma Formation (Upper Cretaceous)
- Kl — Lusardi Formation (Upper Cretaceous)
- Kuu — Undivided rocks of the Rosario Group in the offshore area (Upper Cretaceous)

UNNAMED CRETACEOUS ROCKS OF THE PENINSULAR RANGES BATHOLITH

- Kgu — Granodiorite and tonalite, undivided (mid-Cretaceous)
- Kgd — Granodiorite, undivided (mid-Cretaceous)
- Kt — Tonalite, undivided (mid-Cretaceous)
- Kd — Diorite, undivided (mid-Cretaceous)
- Kph — Hypabyssal rocks, undivided (mid-Cretaceous)

JURASSIC AND CRETACEOUS METAMORPHOSED AND UNMETAMORPHOSED VOLCANIC AND SEDIMENTARY ROCKS

- Mzu — Metamorphosed and unmetamorphosed volcanic and sedimentary rocks, undivided (Mesozoic)
- MzT — Undivided metamorphic rocks in offshore region (Mesozoic)

ONSHORE MAP SYMBOLS

- Contact - Contact between geologic units; dotted where concealed.
- Fault - Solid where accurately located; dashed where approximately located; dotted where concealed. U = upthrown block, D = downthrown block. Arrow and number indicate direction and angle of dip of fault plane.
- Anticline - Solid where accurately located; dashed where approximately located; dotted where concealed. Arrow indicates direction of axial plunge.
- Syncline - Solid where accurately located; dotted where concealed. Arrow indicates direction of axial plunge.
- Landslide - Arrows indicate principal direction of movement. Queried where existence is questionable.
- Strike and dip of beds
- Inclined
- Strike and dip of igneous joints
- Inclined
- Vertical
- Strike and dip of metamorphic foliation
- Inclined

OFFSHORE MAP SYMBOLS

Contacts

- Contact - All contacts are extrapolated from a combination of seismic reflection data, seafloor samples and bathymetry, and are approximate in location.

Faults

- Fault - Solid where well defined; dashed where approximately located; short dash where inferred; dotted where concealed; queried where uncertain. Where fault offsets sea floor, age symbol is shown on bar on downthrown side. Where age was determined, age symbol is shown astride fault and relative offset, if known, is shown by "D" and "U" on downthrown and upthrown sides. Ages of faults are indicated as follows:
  - ⊠ cuts strata of Holocene age
  - ■ cuts strata of late Quaternary age
  - ◧ cuts strata of Quaternary age
  - △ cuts Miocene or older strata

- Fault zone - Area of extensively sheared rock within a zone defined by multiple faults.

Folds

- Anticline - Solid where well defined, short dash where inferred.
- Syncline - Solid where well defined, short dash where inferred.

Channels

- Active - Dash-dot line marks axis, arrow indicates direction of sediment transport.

Levees

- Levees - Dashed where inferred.

Landslides

- Creep - Dashed where inferred.
- Creep (noted on single survey line) - Arrow indicates apparent direction of sediment movement.
- Slump - Dashed where inferred, queried where uncertain. Arrows indicate direction of movement.

ABBREVIATED INDEX TO GEOLOGIC SOURCE DATA

(Primary compilaton sources shown in bold type)
See pamphlet for complete citation

Del Mar Quadrangle
Kennedy, 1975; Kern, 1996a,b; Tan and Giffen, 1995.

Imperial Beach Quadrangle
Kennedy and others, 1975; **Kennedy and Tan, 1977**; Kern, 1996a,b; Tan, 1995.

La Jolla Quadrangle
Kennedy, 1975; Kennedy and others, 1975; Kern, 1996a,b; Tan, 1995.

La Mesa Quadrangle
Kennedy and Peterson, 1975; Kennedy and others 1975; Kern, 1996a,b; Tan, 1995

National City Quadrangle
Kennedy and others, 1975; **Kennedy and Tan, 1977**; Kern, 1996a,b; Tan, 1995.

Point Loma Quadrangle
Kennedy, 1975; **Kennedy and Clarke, 1999a,b**; Kennedy and others, 1975; Kern, 1996a,b; Tan, 1995.

Poway Quadrangle
Kennedy and Peterson, 1975; Kern, 1996a,b; Tan and Giffen, 1995.

Offshore Region 1
Clarke and others, 1987; Ryan and others, (in press)

Offshore Region 2
Clarke and others, 1987; **Kennedy and others, 1980b; Ryan and others (in press)**

Offshore Region 3
Clarke and others, 1987; **Kennedy and others, 1980a; Ryan and others (in press)**

Offshore Region 4
Kennedy and Welday, 1980

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FIGURE NUMBER
2B

PROJECT NAME
TECOLOTE CANYON SEWER

PROJECT NUMBER
2945

REGIONAL GEOLOGY LEGEND

B-1 (32)
B-2 (53)
B-3 (32)
B-4 (32)
B-5 (32)
B-6 (32/53)
B-7 (32)
B-8 (32)
B-9 (32)
B-10 (32/53)
B-11 (53)
B-12 (53)

SCALE: 1"=1,500'

BASE MAP SOURCE:
Adapted from a portion of "Geologic Map of the San Diego 30'x60' Quadrangle, California," compiled by Michael P. Kennedy and Siang S. Tan, 2008. California Geological Survey, Regional Geologic Map No. 3.

SEE LEGEND ON FIGURE 3B

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FIGURE NUMBER
3A

PROJECT NAME
TECOLOTE CANYON SEWER

PROJECT NUMBER
2945

LOCAL GEOLOGY MAP
TAN AND KENNEDY

GEOLOGIC UNITS

Qls — Landslide deposits, undivided (Holocene and Pleistocene) - Highly fragmented to largely coherent landslide deposits. Unconsolidated to moderately well consolidated. Most mapped landslides contain scarp area as well as slide deposit. Many Pleistocene age landslides were reactivated in part or entirely during late Holocene.

Qya — Young alluvial flood-plain deposits (Holocene and late Pleistocene) - Poorly consolidated, poorly sorted, permeable flood-plain deposits of sandy, silty or clay-bearing alluvium.

Qyc — Young colluvial deposits (Holocene and late Pleistocene) - Poorly consolidated and poorly sorted sand and silt slope wash deposits.

Qya/Qyc — Undifferentiated alluvial flood-plain and colluvial deposits (Holocene and Pleistocene)

Tsc
Tscu — Scripps Formation (middle Eocene) - The Scripps Formation (Tsc) is mostly pale-yellowish-brown, medium-grained sandstone containing occasional cobble- conglomerate interbeds. It contains a middle Eocene Molluscan fauna (Givens and Kennedy, 1979). The Scripps Formation is 56 m thick at its type section, which is 1 km north of Scripps Pier, on the north side of the mouth of Blacks Canyon (Kennedy and Moore, 1971). Both the basal contact with the Ardath Shale and the upper contact with the Friars Formation are conformable.

NOTE: Areas of graded (artificial) fill are not shown on the Geologic Map.

See Text for Additional Explanation

QUESTIONABLE LANDSLIDE DESIGNATED AS 4-1 PER DMG OPEN FILE REPORT 95-03

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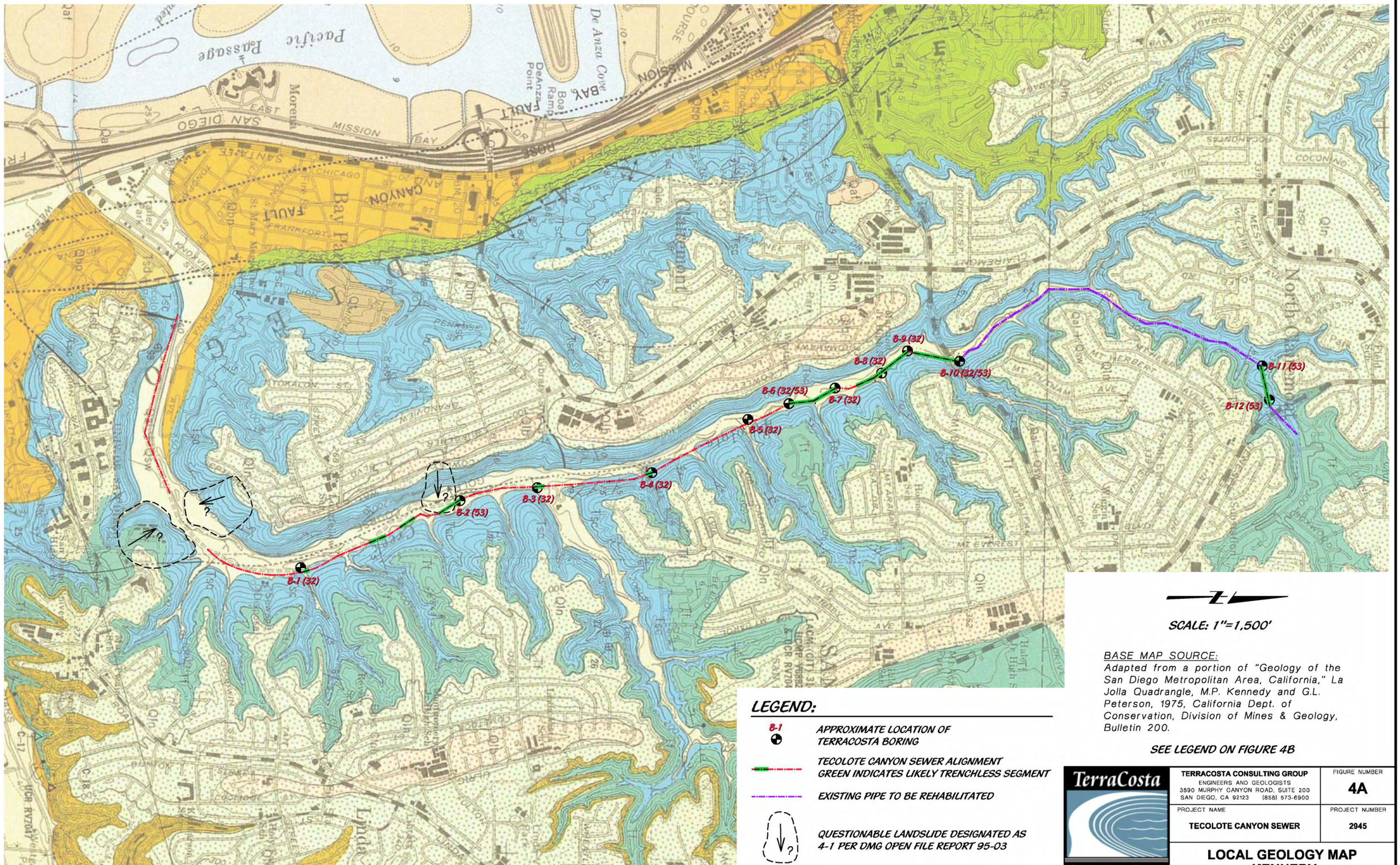
FIGURE NUMBER
3B

PROJECT NAME
TECOLOTE CANYON SEWER

PROJECT NUMBER
2945

LOCAL GEOLOGY MAP
TAN AND KENNEDY - LEGEND



LEGEND:

- **B-1** — APPROXIMATE LOCATION OF TERRACOSTA BORING
- TECOLOTE CANYON SEWER ALIGNMENT GREEN INDICATES LIKELY TRENCHLESS SEGMENT
- EXISTING PIPE TO BE REHABILITATED
- QUESTIONABLE LANDSLIDE DESIGNATED AS 4-1 PER DMG OPEN FILE REPORT 95-03

SCALE: 1"=1,500'

BASE MAP SOURCE:
Adapted from a portion of "Geology of the San Diego Metropolitan Area, California," La Jolla Quadrangle, M.P. Kennedy and G.L. Peterson, 1975, California Dept. of Conservation, Division of Mines & Geology, Bulletin 200.

SEE LEGEND ON FIGURE 4B

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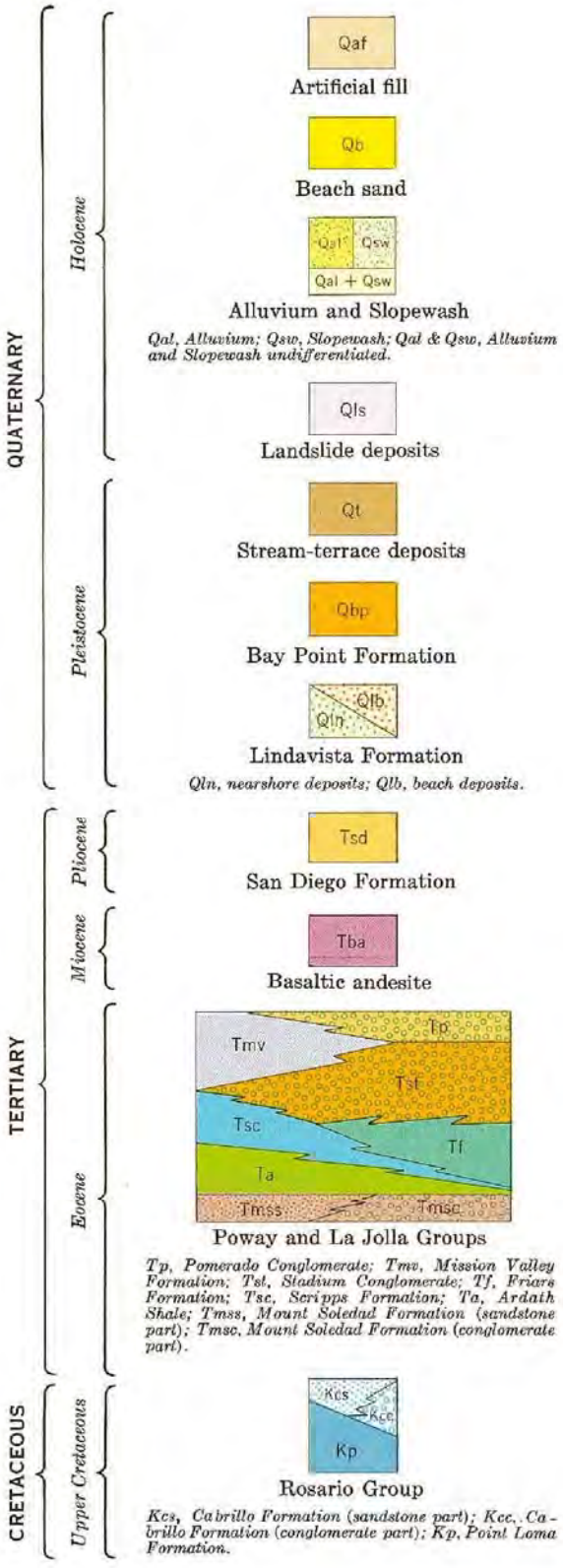
FIGURE NUMBER 4A

PROJECT NAME: TECOLOTE CANYON SEWER

PROJECT NUMBER: 2945

LOCAL GEOLOGY MAP KENNEDY

GEOLOGIC UNITS



SOURCE:
"Geology of the San Diego Metropolitan Area, California," La Jolla Quadrangle, M.P. Kennedy and G.L. Peterson, 1975, California Dept. of Conservation, Division of Mines & Geology, Bulletin 200.

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TERRACOSTA CONSULTING GROUP ENGINEERS AND GEOLOGISTS 3890 MURPHY CANYON ROAD, SUITE 200 SAN DIEGO, CA 92123 (858) 573-6900	FIGURE NUMBER **4B**
PROJECT NAME **TECOLOTE CANYON SEWER**	PROJECT NUMBER **2945**

LOCAL GEOLOGY MAP
KENNEDY - LEGEND

APPENDIX A

TERRACOSTA LOGS OF TEST BORINGS

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Consulting Group

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** **LEGEND**
SITE LOCATION San Diego, CA	**START** 10/15/2018	**FINISH** 10/18/2018	**SHEET NO.** 1 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 40	**GROUND ELEV (ft)**
SAMPLING METHOD SPT	**NOTES**		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG
5		S	1					
10		B	2					
15								

KEY TO EXCAVATION LOGS

WATER TABLE MEASURED AT TIME OF DRILLING

OTHER TESTS

CC	Confined Compression	ppm	parts per million of VOCs*
CL	Chloride Content	R	Resistivity
CS	Consolidation	RV	R-Value
DS	Direct Shear	SA	Sieve Analysis
EI	Expansion Index	SE	Sand Equivalent
GS	Grain Size Analysis	SF	Sulfate
LC	Laboratory Compaction	SG	Specific Gravity
pH	Hydrogen Ion	SW	Swell
PI	Plasticity Index		

PENETRATION RESISTANCE (BLOWS/ft)

Number of blows required to advance the sampler 1 foot.

California Sampler blow counts can be converted to equivalent SPT blow counts by using an end-area conversion factor of 0.67 when using a 140-pound hammer and a 30-inch drop.

SAMPLE TYPE

S ("SPT") - a.k.a. Standard Penetration Test, an 18-inch-long, 2-inch O.D., 1-3/8-inch I.D. drive sampler.

B ("Bulk") - a.k.a. Bulk Sack Sample, a disturbed, but representative sample obtained from a specific depth interval placed in a large plastic bag.

(CONTINUED)

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-1 a

LOG OF TEST BORING

PROJECT NAME: Tecolote Canyon Sewer Main	PROJECT NUMBER: 2945	BORING: **LEGEND**	
SITE LOCATION: San Diego, CA	START: 10/15/2018	FINISH: 10/18/2018	SHEET NO.: 2 of 2
DRILLING COMPANY: Pacific Drilling	DRILLING METHOD: Hollow Stem Auger	LOGGED BY: G. Spaulding	CHECKED BY:
DRILLING EQUIPMENT: Fraste MD/XU	BORING DIA. (in): 6"	TOTAL DEPTH (ft): 40	GROUND ELEV (ft):
SAMPLING METHOD: SPT	NOTES:	DEPTH/*ELEV.* GROUND WATER (ft): ▼ n/a	

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION

25

30

35

KEY TO EXCAVATION LOGS

(CONTINUED)

NOTES ON FIELD INVESTIGATION

Borings were advanced using a track-mounted drill rig with a 6-inch hollow-stem auger.

Standard Penetration Tests (SPT) were used to obtain soil samples. The SPT were driven into the soil at the bottom of the borings with a 140-pound hammer falling 30 inches. When the samplers were withdrawn from the boring, the samples were removed, visually classified, sealed in plastic containers, and taken to the laboratory for detailed inspection.

Free groundwater was encountered in the borings at the time of drilling as noted on the boring logs.

Classifications are based upon the Unified Soil Classification System and include color, moisture, and consistency. Field descriptions have been modified to reflect results of laboratory inspection where deemed appropriate. At the completion of drilling, all borings were sealed per state and local standards.

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FIGURE A-1 b

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Tecolote Canyon Sewer Main	2945	**B-1**

SITE LOCATION	START	FINISH	SHEET NO.
San Diego, CA	10/17/2018	10/17/2018	1 of 2

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Hollow Stem Auger	G. Spaulding	

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Fraste MD/XU	6"	27	80	▼ 13.0 / *67.0*

SAMPLING METHOD	NOTES
SPT	Approximate Station 162 + 25

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
									FILL **SILTY TO CLAYEY FINE SAND (SM/SC)**, damp, loose, brown w/ occasional gravel
5	75	S	1	5			GS		- Gravels, rebar, concrete
		B	2						- Sack sample 5' - 10'
10	70	S	3	11		16.4	GS		COLLUVIUM **CLAYEY FINE SAND (SM)**, damp to moist, stiff, brown
15	65	S	4	5					Becomes ALLUVIUM **SILTY TO CLAYEY FINE SAND (SM/SC)** wet, loose to medium dense, interbedded brown, w/ gravels

TCG_METRIC_LOG(3) 2945.GPJ GDCLOGMT.GDT 1/30/19

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FIGURE A-2 a

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Tecolote Canyon Sewer Main	2945	**B-1**

SITE LOCATION	START	FINISH	SHEET NO.
San Diego, CA	10/17/2018	10/17/2018	2 of 2

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Hollow Stem Auger	G. Spaulding	

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Fraste MD/XU	6"	27	80	▼ 13.0 / *67.0*

SAMPLING METHOD	NOTES
SPT	Approximate Station 162 + 25

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			5	11					- With gravel
25	55								SCRIPPS FORMATION **SILTY TO FINE SANDY CLAY AND SILT (ML/CL)**, dry, very dense, light gray-brown, cemented with CaCO3 - Hard drilling
			6	50/1"					No recovery. Refusal bottom of hole @ 27 feet. Free groundwater encountered at 13 feet. Hole sealed with bentonite grout.
30	50								
35	45								

TCG_METRIC_LOG(3) 2945.GPJ GDCLOGMT.GDT 1/30/19

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FIGURE A-2 b

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Tecolote Canyon Sewer Main	2945	**B-2**

SITE LOCATION	START	FINISH	SHEET NO.
San Diego, CA	10/15/2018	10/15/2018	1 of 2

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Hollow Stem Auger	G. Spaulding	

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Fraste MD/XU	6"	20.91	100	▼ 10.0 / *90.0*

SAMPLING METHOD	NOTES
SPT	Approximate Station 192 + 80

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		B	1			8.3	pH / R CL / SF GS / LC		COLLUVIUM **SILTY FINE SAND (SM)**, damp to moist, loose, brown - Sack sample 0-8'
5	95	S	2	8					
10	90	S	3	26					ALLUVIUM **SILTY TO CLAYEY SAND (SM/SC)**, wet, medium dense, gray-brown
15	85	S	4	61/11"					SCRIPPS FORMATION **SILTY FINE SAND (SM)**, moist, very dense, gray - Hard drilling - No recovery

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FIGURE A-3 a

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-2
SITE LOCATION San Diego, CA	**START** 10/15/2018	**FINISH** 10/15/2018	**SHEET NO.** 2 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 20.91	**GROUND ELEV (ft)** 100
SAMPLING METHOD SPT	**NOTES** Approximate Station 192 + 80		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ 10.0 / *90.0*

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		S	5	81/11"					Bottom of hole @ 20 feet 11 inches. Groundwater perched at ±10 feet.
25	75								
30	70								
35	65								

TCG_METRIC_LOG(3) 2945.GPJ GDCLOGMT.GDT 1/30/19

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FIGURE A-3 b

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-3
SITE LOCATION San Diego, CA	**START** 10/15/2018	**FINISH** 10/15/2018	**SHEET NO.** 1 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 20.83	**GROUND ELEV (ft)** 113	**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a
SAMPLING METHOD SPT	**NOTES** Approximate Station 191 + 88		

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
0	110								ALLUVIUM **SILTY FINE SAND, GRAVEL, COBBLE (SM-GM)**, dry, medium dense to dense, red to light brown
5	105	S	1	33					SCRIPPS FORMATION **SILTY TO CLAYEY FINE SAND (SM-SC)**, damp, dense to very dense, mottled orange/yellow/gray
		B	2			14.5	pH / R CL / SF GS / LC		- Sack sample 5 feet to 10 feet
10	100	S	3	31					- Becomes cemented zones
15	95	S	4	82/10"					- Becomes moist, very dense, mottled olive-gray/gray - Becomes gray in color

TCG_METRIC_LOG(3) 2945.GPJ GDCLOGMT.GDT 1/30/19

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-4 a

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-3
SITE LOCATION San Diego, CA	**START** 10/15/2018	**FINISH** 10/15/2018	**SHEET NO.** 2 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 20.83	**GROUND ELEV (ft)** 113
SAMPLING METHOD SPT	**NOTES** Approximate Station 191 + 88		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		S	5	77/10"					Bottom of hole @ 20 feet 10 inches. No groundwater encountered at time of drilling.
	90								
25									
	85								
30									
	80								
35									
	75								

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FIGURE A-4 b

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-4
SITE LOCATION San Diego, CA	**START** 10/15/2018	**FINISH** 10/15/2018	**SHEET NO.** 1 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 20.58	**GROUND ELEV (ft)** 143	**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a
SAMPLING METHOD SPT	**NOTES** Approximate Station 227 + 05		

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
									FILL **SILTY TO CLAYEY SAND (SM/SC)**, damp, medium dense, light gray w/ gravel 10%
	140	B	1						ALLUVIUM **SILTY FINE SAND (SM)**, damp, loose to medium dense, brown w/ occasional gravel and cobble - Bulk sample 2' - 6'
5		S	2	58					SCRIPPS FORMATION **SILTY TO FINE SANDY CLAY (CL)**, damp, very dense, mottled red/yellow/gray
	135								
10		S	3	66		18.7	PI / GS		
	130								
15		S	4	32					
	125								

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FIGURE A-5 a

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-4
SITE LOCATION San Diego, CA	**START** 10/15/2018	**FINISH** 10/15/2018	**SHEET NO.** 2 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 20.58	**GROUND ELEV (ft)** 143	**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a
SAMPLING METHOD SPT	**NOTES** Approximate Station 227 + 05		

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			5	49					Bottom of hole @ 20 feet 7 inches. Refusal on concretion. No groundwater encountered at time of drilling.
	120								
25									
	115								
30									
	110								
35									
	105								

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FIGURE A-5 b

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-5
SITE LOCATION San Diego, CA	**START** 10/16/2018	**FINISH** 10/16/2018	**SHEET NO.** 1 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 21.5	**GROUND ELEV (ft)** 155
SAMPLING METHOD SPT	**NOTES** Approximate Station 245 + 80		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ 10.0 / *145.0*

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		B	1			9.9	pH / R CL / SF GS		COLLUVIUM **SILTY TO FINE SANDY CLAY (CL)**, damp, medium stiff, light brown - Bulk sample 0' - 5' - Becomes gray-brown in color
5	150	S	2	7					- Becomes moist
10	145	S	3	7					ALLUVIUM **CLAYEY SAND TO SANDY CLAY (SC/CL)**, wet, loose, gray-brown to red-brown - Becomes wet and sandier
15	140	S	4	6		22.5	PI / GS		- Gravels and cobbles SCRIPPS FORMATION **FINE SANDY CLAY (CL)**, moist, medium stiff, mottled red/red-brown/gray

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FIGURE A-6 a

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-5
SITE LOCATION San Diego, CA	**START** 10/16/2018	**FINISH** 10/16/2018	**SHEET NO.** 2 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 21.5	**GROUND ELEV (ft)** 155
SAMPLING METHOD SPT	**NOTES** Approximate Station 245 + 80		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ 10.0 / *145.0*

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		S	5	62					- Becomes less weathered
									Bottom of hole @ 21.5 feet. Free groundwater encountered at 10 feet.
25	130								
30	125								
35	120								

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FIGURE A-6 b

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-6
SITE LOCATION San Diego, CA	**START** 10/16/2018	**FINISH** 10/16/2018	**SHEET NO.** 1 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 21.33	**GROUND ELEV (ft)** 165	**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a
SAMPLING METHOD SPT	**NOTES** Approximate Station 253 + 66		

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
									COLLUVIUM/ALLUVIUM **FINE SANDY CLAY (CL)**, interbedded, damp, medium stiff, light brown to gray-brown
5	160	S	1	14		10.7	PI / GS		- Becomes stiff, mottled red/red-brown/brown
10	155	S	2	63					- Rock in tip of sampler - Gravels and cobbles
									SCRIPPS FORMATION **CLAYEY FINE SAND (SC)**, w/ iron oxide staining, damp, dense, gray to olive-gray
15	150	S	3	41					

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FIGURE A-7 a

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-6
SITE LOCATION San Diego, CA	**START** 10/16/2018	**FINISH** 10/16/2018	**SHEET NO.** 2 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 21.33	**GROUND ELEV (ft)** 165
SAMPLING METHOD SPT	**NOTES** Approximate Station 253 + 66		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		S	4	72/10"					Bottom of hole @ 21 feet 4 inches. No groundwater encountered at time of drilling.
25	140								
30	135								
35	130								

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FIGURE A-7 b

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-7
SITE LOCATION San Diego, CA	**START** 10/16/2018	**FINISH** 10/16/2018	**SHEET NO.** 1 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 21	**GROUND ELEV (ft)** 174
SAMPLING METHOD SPT	**NOTES** Approximate Station 262 + 24		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
									COLLUVIUM/ALLUVIUM
									CLAYEY SAND (CL), interbedded, damp, loose to medium dense, brown
									- Becomes red to red-brown in color
	170								
5									**SILTY SAND (SM)**, damp , red-brown, interbedded, with gravel
		S	1	87					- Gravels
									- Hard drilling
		B	2			4.3	pH / R CL / SF LC / GS		- Bulk sample 5' - 10'
	165								
10									- Sampler on rock. No recovery.
		S	3	20/5"					
									- Occasional rock, becomes olive-gray in color
									- Gravels and cobbles
	160								SCRIPPS FORMATION
15									**SILTY FINE SAND (SM)**, damp to moist, very dense, mottled gray/olive-gray
		S	4	69					
	155								

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FIGURE A-8 a

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-7
SITE LOCATION San Diego, CA	**START** 10/16/2018	**FINISH** 10/16/2018	**SHEET NO.** 2 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 21	**GROUND ELEV (ft)** 174
SAMPLING METHOD SPT	**NOTES** Approximate Station 262 + 24		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		S	5	63					
									Bottom of hole @ 21 feet. No groundwater encountered at time of drilling.
	150								
25									
	145								
30									
	140								
35									
	135								

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FIGURE A-8 b

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-8
SITE LOCATION San Diego, CA	**START** 10/16/2018	**FINISH** 10/16/2018	**SHEET NO.** 1 of 1
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 20	**GROUND ELEV (ft)** 180
SAMPLING METHOD SPT	**NOTES** Approximate Station 270 + 60		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
									COLLUVIUM **SILTY TO FINE SANDY CLAY (CL)**, damp, medium stiff, light brown to gray-brown
									SCRIPPS FORMATION **SILTY TO CLAYEY FINE SAND (SM/SC)**, damp, dense to very dense, mottled gray/red-brown
5	175	S	1	60					
10	170	S	2	47					
15	165	S	3	54					
									Bottom of hole @ 20 feet. No groundwater encountered at time of drilling.

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FIGURE A-9

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-9
SITE LOCATION San Diego, CA	**START** 10/17/2018	**FINISH** 10/17/2018	**SHEET NO.** 1 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 21.25	**GROUND ELEV (ft)** 184	**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ 8.5 / *175.5*
SAMPLING METHOD SPT	**NOTES** Approximate Station 277 + 00			

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
									COLLUVIUM/ALLUVIUM
									SILTY FINE SAND (SM), damp, very loose to loose, light brown to brown
		B	1			6.4	pH / R CL / SF LC / GS		- Bulk sample 0' - 6'
	180								
5		S	2	4					**SANDY CLAY (CL)**, moist, soft to medium stiff, brown
	175								
10		S	3	3					- Becomes wet, soft, mottled gray-brown/brown/red
	170								SCRIPPS FORMATION
									FINE SANDY CLAY (CL), moist to wet, stiff, mottled gray-brown/brown
15		S	4	19					
	165								

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FIGURE A-10 a

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-9
SITE LOCATION San Diego, CA	**START** 10/17/2018	**FINISH** 10/17/2018	**SHEET NO.** 2 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 21.25	**GROUND ELEV (ft)** 184
SAMPLING METHOD SPT	**NOTES** Approximate Station 277 + 00		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ 8.5 / *175.5*

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
		S	5	94/9"					Bottom of hole @ 21 feet 3 inches. Perched groundwater encountered from 8.5 feet to 13 feet.
	160								
25									
	155								
30									
	150								
35									
	145								

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FIGURE A-10 b

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-10
SITE LOCATION San Diego, CA	**START** 10/17/2018	**FINISH** 10/17/2018	**SHEET NO.** 1 of 1
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 9.17	**GROUND ELEV (ft)** 204	**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ n/a
SAMPLING METHOD SPT	**NOTES** Approximate Station 286 + 00		

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
0									SCRIPPS FORMATION
		B	1			12.3	pH / R CL / SF LC / GS		**FINE SANDY SILT (ML)**, damp, hard, mottled olive-gray/red-brown/yellow, w/ CaCO3
	200								- Bulk sample 0' - 5'
5		S	2	71/10"					- Cemented zone
									- Very hard drilling
	195	S	3	50/2"					
10									Bottom of hole @ 9 feet 2 inches. No groundwater encountered at time of drilling.
	190								
15									
	185								

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FIGURE A-11

LOG OF TEST BORING

PROJECT NAME	PROJECT NUMBER	BORING
Tecolote Canyon Sewer Main	2945	**B-11**

SITE LOCATION	START	FINISH	SHEET NO.
San Diego, CA	10/18/2018	10/18/2018	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Hollow Stem Auger	G. Spaulding	

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Fraste MD/XU	6"	18	251	▼ 10.0 / *241.0*

SAMPLING METHOD: SPT

NOTES: Approximate Station 346 + 80

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
0	250								COLLUVIUM **SILTY FINE SAND (SM)**, damp, soft, brown
		B	1				pH / R CL / SF LC / GS		
5									- Becomes moist
	245	S	2	4					
									ALLUVIUM **SILTY TO CLAYEY SAND (SM/SC)**, wet, medium dense, brown to red-brown, w/ occasional gravel
10									- Occasional gravel and cobble
	240	S	3	24					
									SCRIPPS FORMATION **SILTY FINE SAND (SM)**, moist, very dense, mottled gray/red/yellow, w/ CaCO3 cemented zones
15									
	235	S	4	65					
									- Very hard drilling
		S	5	50/6"					
									Bottom of hole @ 18 feet. Perched groundwater at 10 feet.

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FIGURE A-12

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-12
SITE LOCATION San Diego, CA	**START** 10/18/2018	**FINISH** 10/18/2018	**SHEET NO.** 1 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 20.75	**GROUND ELEV (ft)** 264
SAMPLING METHOD SPT	**NOTES** Approximate Station 352 + 90		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ 15.5 / *248.5*

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
									COLLUVIUM **SILTY FINE SAND (SM)**, damp, loose, light brown, w/ gravel and cobble
									- Becomes brown in color - Gravel and cobble
	260								SCRIPPS FORMATION
5		S	1	46					**SILTY FINE SAND (SM)**, damp, dense, mottled gray/olive-gray/yellow, interbedded - No recovery. Rock in tip. - Hard drilling - Cemented zone
	255								
10		S	2	37					
	250								
15		S	3	81/9"					▼ - Becomes very dense
	245								

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FIGURE A-13 a

LOG OF TEST BORING

PROJECT NAME Tecolote Canyon Sewer Main		**PROJECT NUMBER** 2945	**BORING** B-12
SITE LOCATION San Diego, CA	**START** 10/18/2018	**FINISH** 10/18/2018	**SHEET NO.** 2 of 2
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Hollow Stem Auger	**LOGGED BY** G. Spaulding	**CHECKED BY**
DRILLING EQUIPMENT Fraste MD/XU	**BORING DIA. (in)** 6"	**TOTAL DEPTH (ft)** 20.75	**GROUND ELEV (ft)** 264
SAMPLING METHOD SPT	**NOTES** Approximate Station 352 + 90		**DEPTH/*ELEV.* GROUND WATER (ft)** ▼ 15.5 / *248.5*

DEPTH (ft)	ELEVATION (ft)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS/ft)	DRY DENSITY (pcf)	MOISTURE (%)	OTHER TESTS	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			4	83/9"					Bottom of hole @ 20 feet 9 inches. Groundwater encountered at 15.5 feet.
	240								
25									
	235								
30									
	230								
35									
	225								

TCG_METRIC_LOG(3) 2945.GPJ GDCLOGMT.GDT 1/30/19

TerraCosta Consulting Group, Inc.
3890 Murphy Canyon Road, Suite 200
San Diego, California 92123

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-13 b

APPENDIX B

LABORATORY TEST RESULTS

TerraCosta
Consulting Group

wood.

PHYSICAL PROPERTIES OF SOILS

PROJECT: #2945 Tecolote Canyon Sewer	LAB NO.: 31969-31980	PROJECT NO.: 5015-150030-36
CLIENT: TerraCosta Consulting Group	SAMPLED BY: G. Spaulding	DATE: 10/17/18
	AUTHORIZED BY: M. Eckert	DATE: 11/05/18
	REVIEWED BY: L. Collins	REPORT DATE: 11/30/18

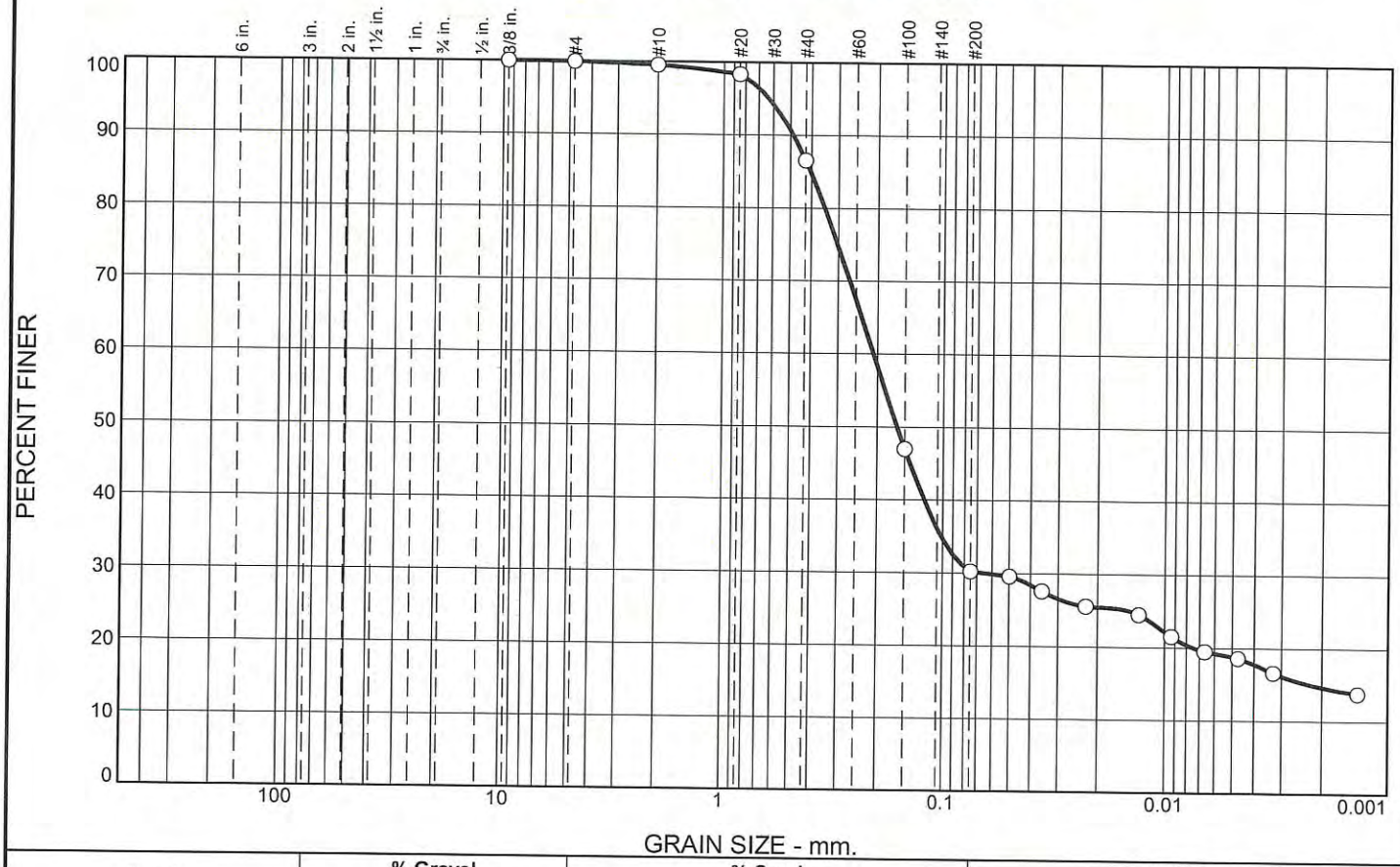
Boring No. (Sample I.D.)	Depth (ft.)	Maximum Density/ Optimum Moisture ASTM D1557	Corrosivity CTM 643/422/417 R(ohm-cm)/ pH/Cl/SO_4(ppm)	Atterberg Limits ASTM D4318 LL/PL/PI	Percent Passing #200 Sieve ASTM D 1140	Dry Density (pcf) ASTM D2937	Moisture Content (%), as received ASTM D 2216
B1-1 (#31969)	5'	*	*	*	30.2	*	*
B1-3 (#31970)	10'	*	*	*	43.6	*	16.4
B10-1 (#31971)	0'-5'	119.4 / 12.3	650/7.04/365/173	*	74.4	*	12.3
B2-1 (#31972)	0'-8'	130.9 / 7.9	1,094/7.08/78/554	*	31.4	*	8.3
B3-2 (#31973)	5'-10'	122.3 / 9.7	630/7.63/222/397	*	57.8	*	14.5
B4-3 (#31974)	10'	*	*	32.3/15.8/16.5	60.4	*	18.7
B5-1 (#31975)	0'-5'	123.3 / 10.3	1,113/7.46/117/167	*	46.7	*	9.9
B5-4 (#31976)	15'	*	*	38.2/16.6/21.6	50.1	*	22.5
B6-1 (#31977)	5'	*	*	27.6/16.4/11.2	60.1	*	10.7
B9-1 (#31978)	0'-6'	123.7 / 10.1	892/6.99/159/317	*	39.5	*	6.4
B11-1 (#31979)	0'-7'	123.3 / 9.7	463/7.97/324/656	*	45.9	*	14.8
B7-2 (#31980)	5'-10'	138.7 / 6.6	1,338/8.01/92/289	*	31.6	*	4.3

*Indicates test not assigned

Reviewed by: _____

David C. Wilson, CE #54734

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.4	13.0	56.3	15.6	14.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375"	100.0		
#4	99.9		
#10	99.5		
#20	98.3		
#40	86.5		
#100	47.0		
#200	30.2		

* (no specification provided)

Material Description

Silty Sand (#31969)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4861 D_{85}= 0.4039 D_{60}= 0.2087
D_{50}= 0.1625 D_{30}= 0.0661 D_{15}= 0.0023
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B1-1 **Depth:** 5'

Date: 11/13/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31969

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 5' **Sample Number:** B1-1
Material Description: Silty Sand (#31969)
Date: 11/13/18
USCS Classification: SM
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
0.375"	100.0
#4	99.9
#10	99.5
#20	98.3
#40	86.5
#100	47.0
#200	30.2

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 99.5
Weight of hydrometer sample =50.49
Hygroscopic moisture correction:
Moist weight and tare = 123.15
Dry weight and tare = 122.63
Tare weight = 75.84
Hygroscopic moisture = 1.1%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	19.9	18.0	14.8	0.0137	18.0	13.3	0.0499	29.6
2.00	19.9	17.0	13.8	0.0137	17.0	13.5	0.0355	27.6
5.00	19.9	16.0	12.8	0.0137	16.0	13.7	0.0226	25.6
15.00	19.8	15.5	12.3	0.0137	15.5	13.8	0.0131	24.5
30.00	19.8	14.0	10.8	0.0137	14.0	14.0	0.0093	21.5
60.00	19.8	13.0	9.8	0.0137	13.0	14.2	0.0066	19.5
120.00	19.9	12.5	9.3	0.0137	12.5	14.2	0.0047	18.6
250.00	19.9	11.5	8.3	0.0137	11.5	14.4	0.0033	16.6
1440.00	20.1	10.0	6.9	0.0136	10.0	14.7	0.0014	13.8

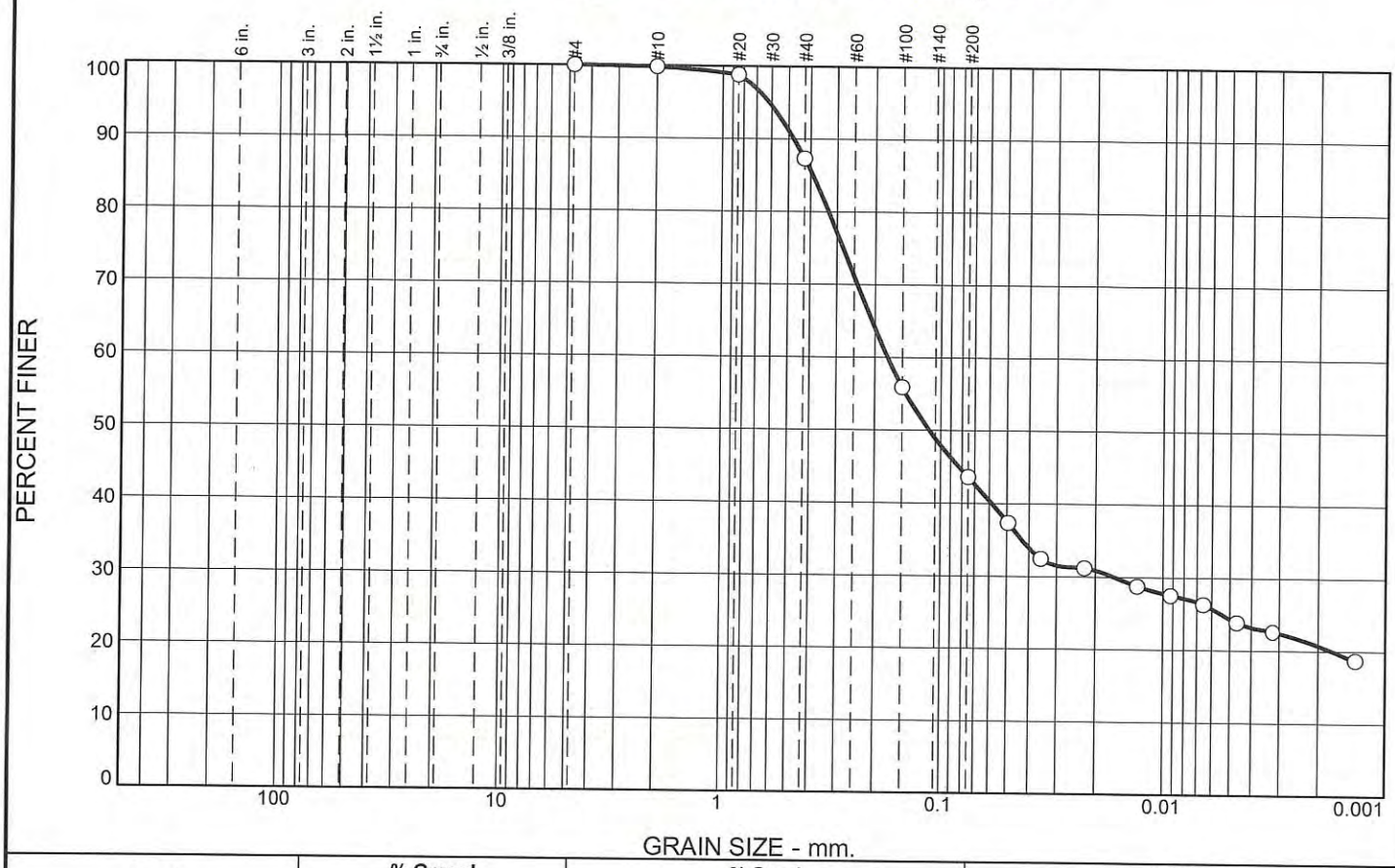
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	0.4	13.0	56.3	69.7	15.6	14.6	30.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0023	0.0075	0.0661	0.1220	0.1625	0.2087	0.3470	0.4039	0.4861	0.6304

Fineness Modulus
0.86

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	12.5	43.7	22.9	20.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.8		
#20	98.8		
#40	87.3		
#100	55.9		
#200	43.6		

* (no specification provided)

Material Description

Silty Sand (#31970)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4750 D_{85}= 0.3902 D_{60}= 0.1749
D_{50}= 0.1133 D_{30}= 0.0165 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B1-3 **Depth:** 10'

Date: 11/20/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31970

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 10'
Sample Number: B1-3
Material Description: Silty Sand (#31970)
Date: 11/20/18
USCS Classification: SM
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera
Checked by: L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
#4	100.0
#10	99.8
#20	98.8
#40	87.3
#100	55.9
#200	43.6

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 99.8
Weight of hydrometer sample =41.80
Hygroscopic moisture correction:
Moist weight and tare = 17.74
Dry weight and tare = 17.65
Tare weight = 14.44
Hygroscopic moisture = 2.8%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.8	18.0	15.2	0.0135	18.0	13.3	0.0494	37.3
2.00	20.8	16.0	13.2	0.0135	16.0	13.7	0.0353	32.4
5.00	20.8	15.5	12.7	0.0135	15.5	13.8	0.0224	31.2
15.00	20.8	14.5	11.7	0.0135	14.5	13.9	0.0130	28.7
30.00	20.8	14.0	11.2	0.0135	14.0	14.0	0.0092	27.5
60.00	20.8	13.5	10.7	0.0135	13.5	14.1	0.0065	26.3
120.00	20.8	12.5	9.7	0.0135	12.5	14.2	0.0047	23.8
250.00	20.8	12.0	9.2	0.0135	12.0	14.3	0.0032	22.6
1440.00	20.6	10.5	7.6	0.0135	10.5	14.6	0.0014	18.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	12.5	43.7	56.4	22.9	20.7	43.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0017	0.0165	0.0585	0.1133	0.1749	0.3295	0.3902	0.4750	0.6152

Fineness Modulus
0.73

COMPACTION TEST REPORT

Curve No.: #31971

Project No.: 5015150030.36 **Date:** 11/7/18
Project: #2945 Tecolote Canyon Sewer
Client: TerraCosta Consulting Group
Sample Number: B10-1 **Depth:** 0-5'

Remarks:

MATERIAL DESCRIPTION

Description: Silt w/ Sand, ML (#31971)

Classifications - **USCS:** ML **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = **Plasticity Index =**
% < No.200 = 74.4 %

TEST RESULTS
Maximum dry density = 119.4 pcf
Optimum moisture = 12.3 %

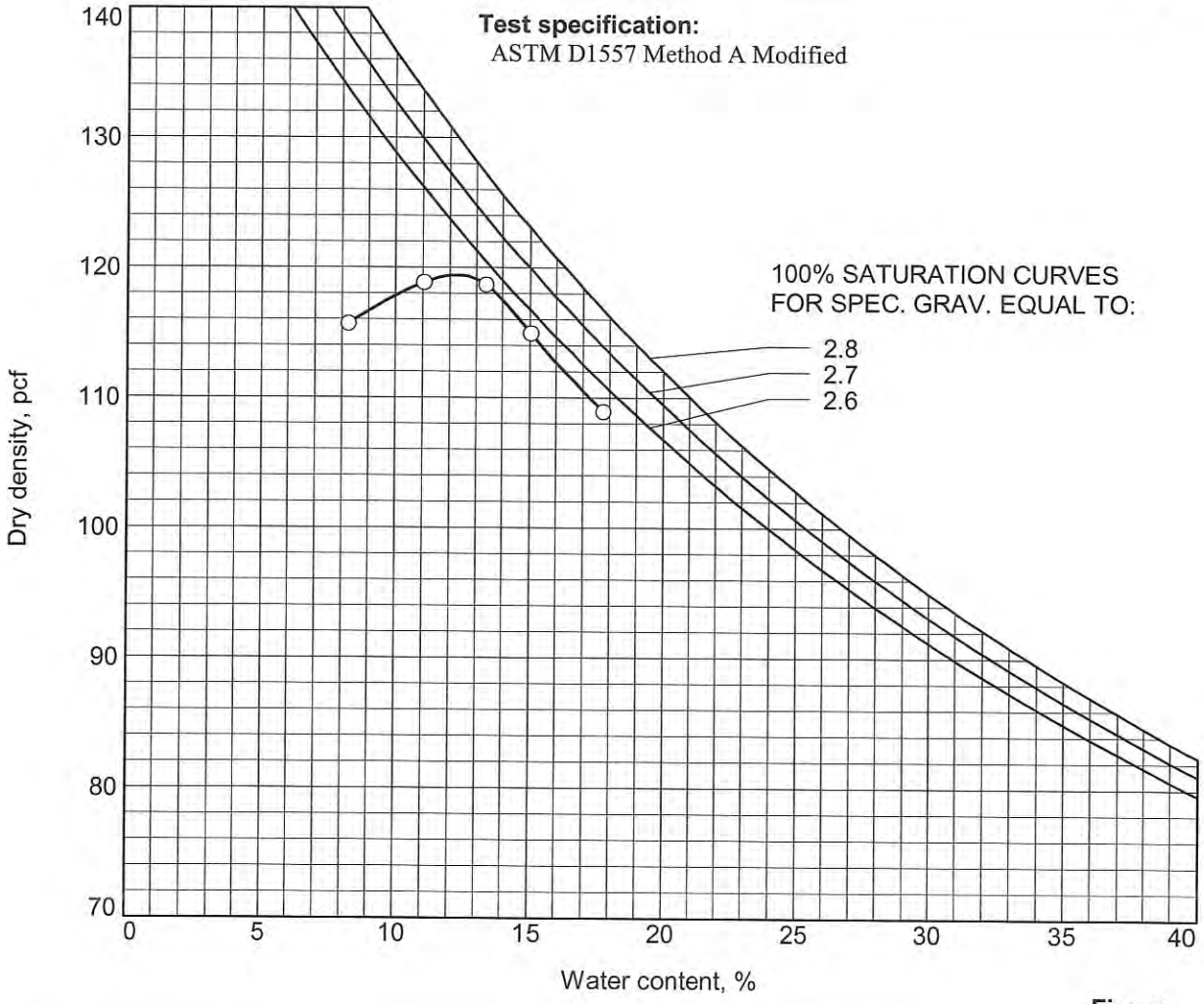


Figure #31971

AMEC

Tested By: B. Brown **Checked By:** L. Collins

MOISTURE DENSITY TEST DATA

12/10/2018

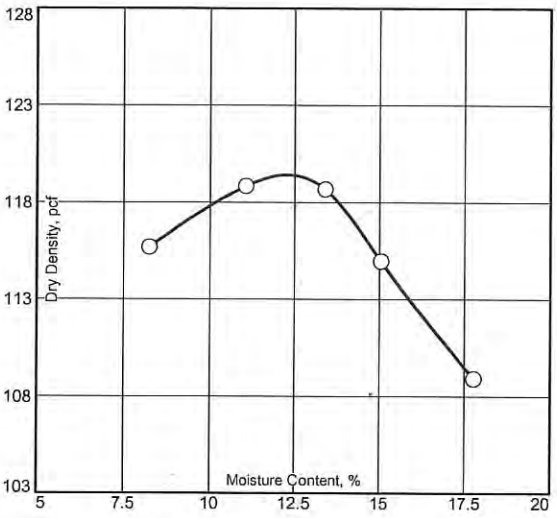
Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-5' **Sample Number:** B10-1
Description: Silt w/ Sand, ML (#31971)
Date: 11/7/18 **USCS Classification:** ML
Tested by: B. Brown **Checked by:** L. Collins
Percent passing #4 sieve: 99.2

Test Data and Results For Curve #31971

Test Specification:

Type of Test: ASTM D1557 Method A Modified

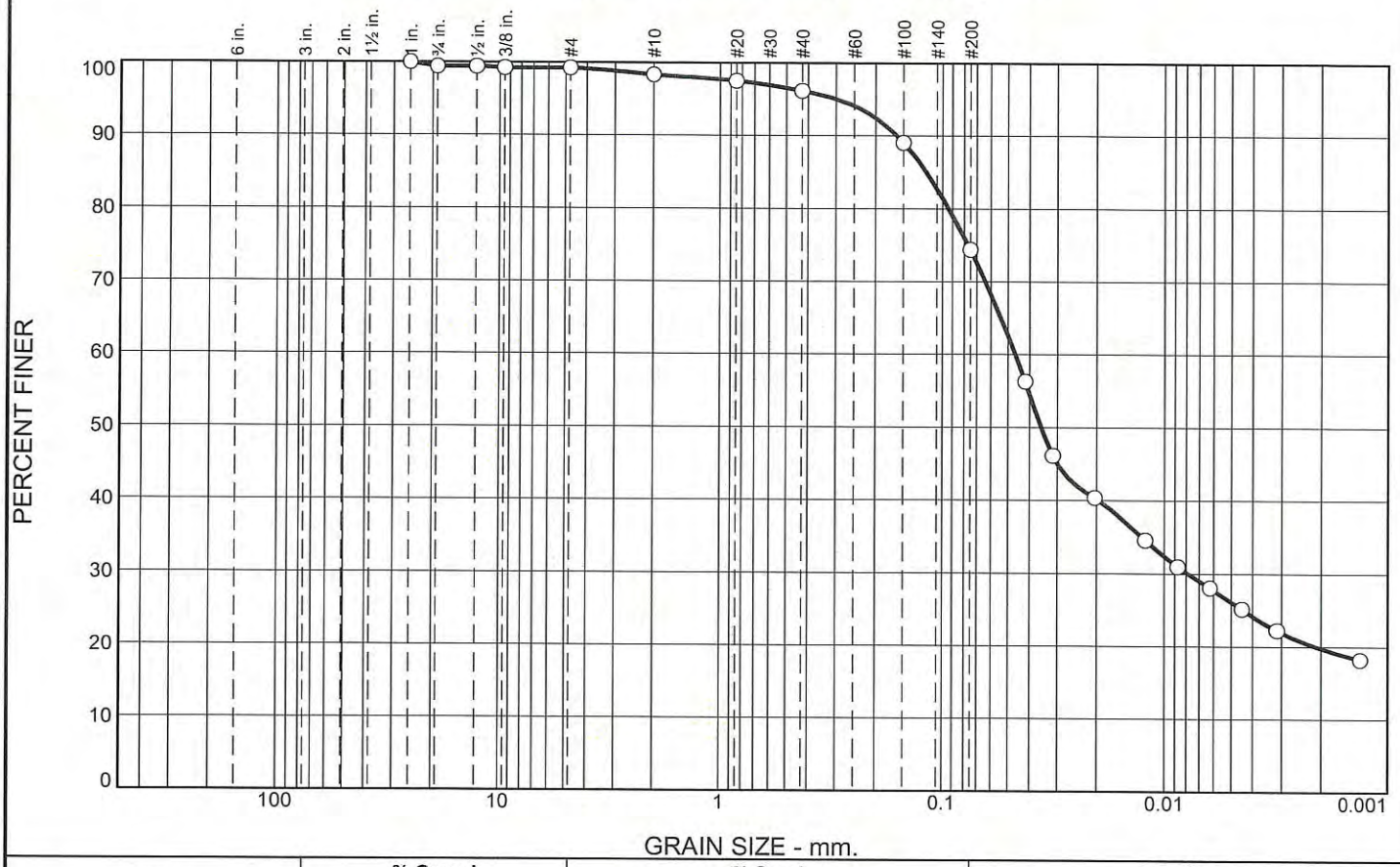
Mold Dia: 4.00 **Hammer Wt.:** 10 **Drop:** 18 **Layers:** five **Blows per Layer:** 25



Point No.	1	2	3	4	5
Wt. M+S	3989.9	3929.9	4025.0	3985.9	3883.6
Wt. M	1986.6	1986.6	1986.6	1986.6	1986.6
Wt. W+T	1284.8	1346.7	1318.5	1339.4	1418.7
Wt. D+T	1145.8	1177.8	1189.4	1228.9	1327.9
Tare	222.1	227.7	224.8	229.3	228.6
Moist.	15.0	17.8	13.4	11.1	8.3
Dry Den.	114.9	108.9	118.7	118.8	115.7

Test Results: **Max. Dry Den.=** 119.4 pcf **Opt. Moist.=** 12.3%

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.6	0.2	0.9	2.2	21.7	54.6	19.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
0.75"	99.4		
0.5"	99.4		
0.375"	99.2		
#4	99.2		
#10	98.3		
#20	97.5		
#40	96.1		
#100	89.0		
#200	74.4		

* (no specification provided)

Material Description

Silt w/ Sand (#31971)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1612 D_{85}= 0.1187 D_{60}= 0.0464
D_{50}= 0.0354 D_{30}= 0.0079 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B10-1 **Depth:** 0-5'

Date: 11/15/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31971

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-5' **Sample Number:** B10-1
Material Description: Silt w/ Sand (#31971)
Date: 11/15/18
USCS Classification: ML
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
1"	100.0
0.75"	99.4
0.5"	99.4
0.375"	99.2
#4	99.2
#10	98.3
#20	97.5
#40	96.1
#100	89.0
#200	74.4

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 98.3
Weight of hydrometer sample =68.75
Hygroscopic moisture correction:
Moist weight and tare = 113.58
Dry weight and tare = 113.18
Tare weight = 80.81
Hygroscopic moisture = 1.2%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.0	42.0	38.9	0.0136	42.0	9.4	0.0419	56.3
2.00	20.0	35.0	31.9	0.0136	35.0	10.6	0.0313	46.1
5.00	20.0	31.0	27.9	0.0136	31.0	11.2	0.0204	40.3
15.00	20.0	27.0	23.9	0.0136	27.0	11.9	0.0121	34.6
30.00	20.0	24.5	21.4	0.0136	24.5	12.3	0.0087	30.9
60.00	20.0	22.5	19.4	0.0136	22.5	12.6	0.0063	28.0
120.00	20.0	20.5	17.4	0.0136	20.5	12.9	0.0045	25.2
250.00	20.0	18.5	15.4	0.0136	18.5	13.3	0.0031	22.3
1440.00	20.5	15.5	12.6	0.0136	15.5	13.8	0.0013	18.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.6	0.2	0.8	0.9	2.2	21.7	24.8	54.6	19.8	74.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0021	0.0079	0.0197	0.0354	0.0464	0.0940	0.1187	0.1612	0.3008

Fineness Modulus
0.25

COMPACTION TEST REPORT

Curve No.: #31972

Project No.: 5015150030.36 **Date:** 11/6/18
Project: #2945 Tecolote Canyon Sewer
Client: TerraCosta Consulting Group
Sample Number: B2-1 **Depth:** 0-8'

Remarks:

MATERIAL DESCRIPTION

Description: Silty Sand (#31972)

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = **Plasticity Index =**
% < No.200 = 31.4 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 130.9 pcf	130.4 pcf
Optimum moisture = 7.9 %	8.0 %

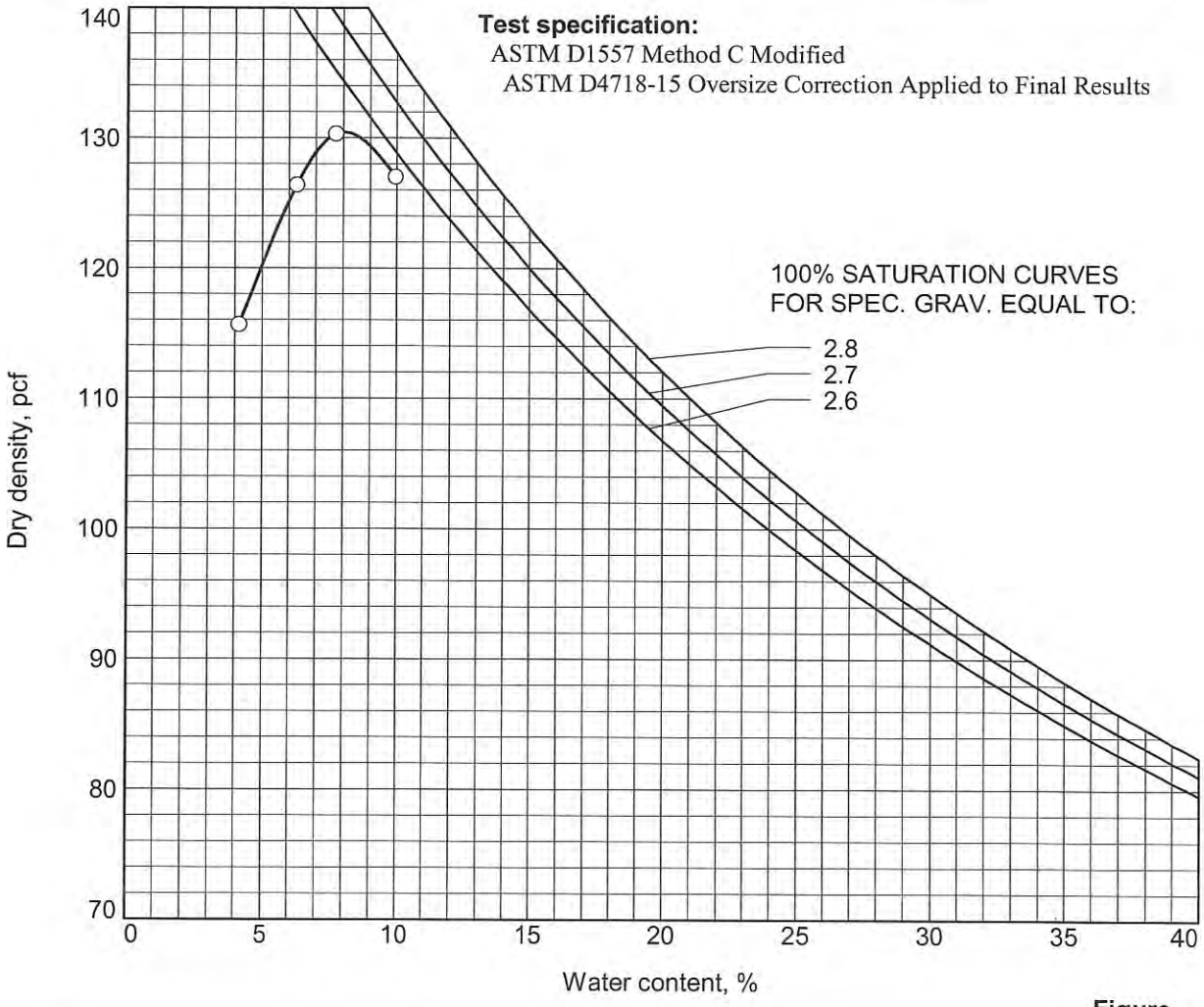


Figure #31972

AMEC

Tested By: B. Brown **Checked By:** L. Collins

MOISTURE DENSITY TEST DATA

12/10/2018

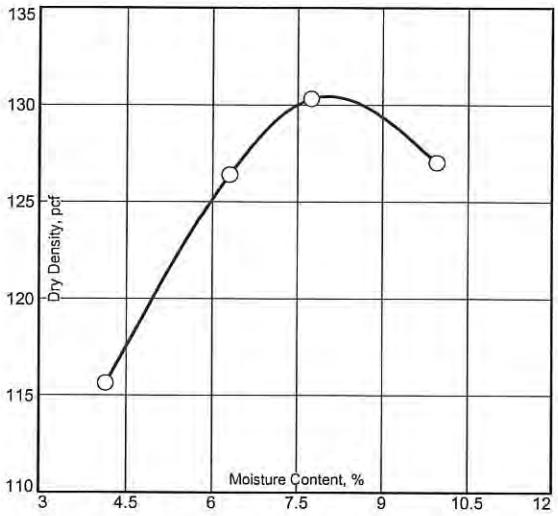
Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-8' **Sample Number:** B2-1
Description: Silty Sand (#31972)
Date: 11/6/18 **USCS Classification:** SM
Tested by: B. Brown **Checked by:** L. Collins

Test Data and Results For Curve #31972

Test Specification:

Type of Test: ASTM D1557 Method C Modified

Mold Dia: 6.00 **Hammer Wt.:** 10 **Drop:** 18 **Layers:** five **Blows per Layer:** 56



Point No.	1	2	3	4
Wt. M+S	6939.6	7412.2	7617.8	7593.2
Wt. M	2847.8	2847.8	2847.8	2847.8
Wt. W+T	1777.0	2533.8	1216.5	1931.6
Wt. D+T	1715.3	2396.9	1145.3	1776.9
Tare	227.9	221.3	224.5	223.6
Moist.	4.1	6.3	7.7	10.0
Dry Den.	115.6	126.4	130.3	127.0

Rock Corrected Results: **Max. Dry Den.=** 130.9 pcf **Opt. Moist.=** 7.9%
Uncorrected Results: **Max. Dry Den.=** 130.4 pcf **Opt. Moist.=** 8.0%

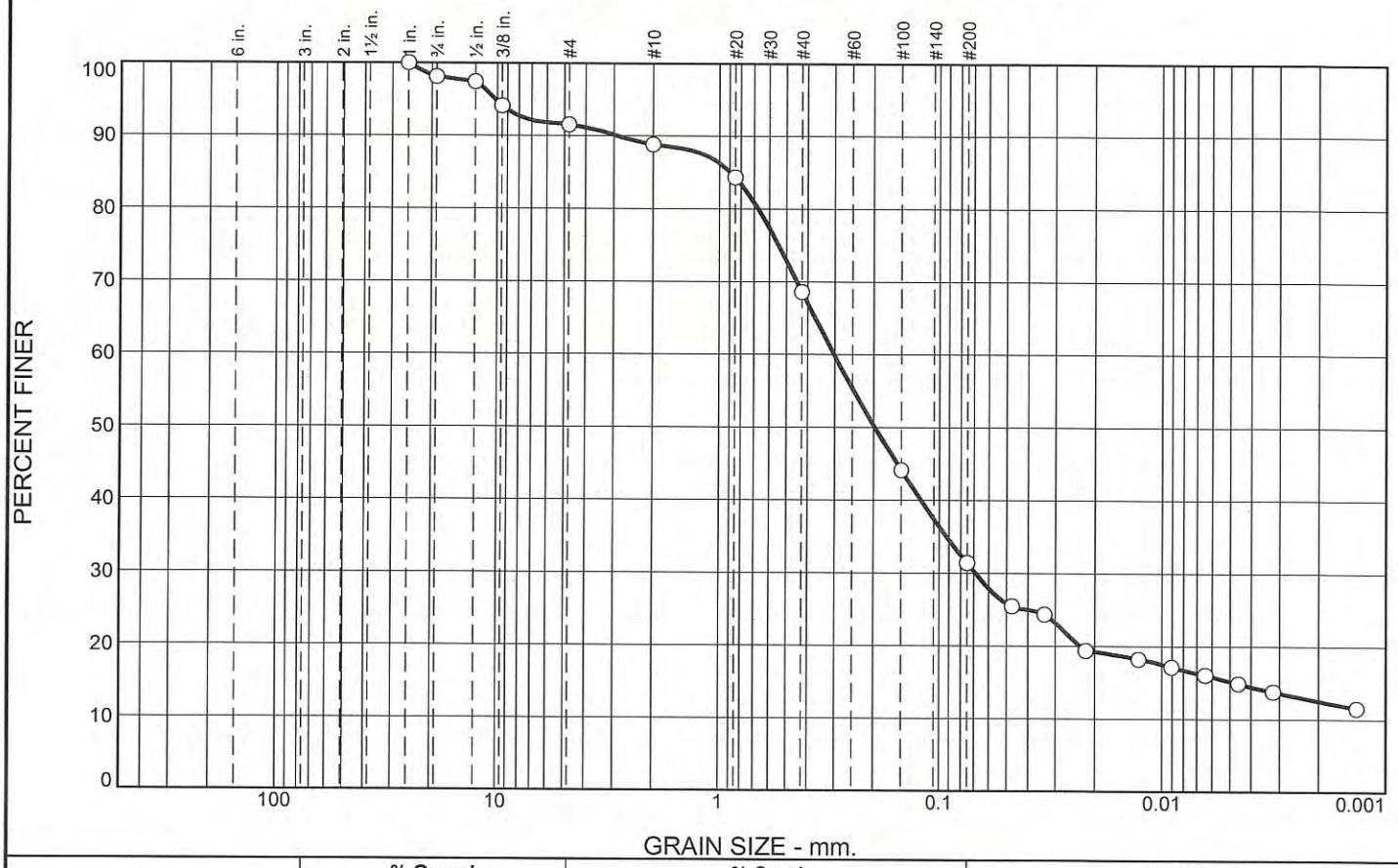
Rock Correction Data **Correction Method:** ASTM D4718-15

Percentage of Oversize Material (%> 3/4 in.): 1.9 **Bulk Specific Gravity of Oversize Material:** 2.569

Oversize Material Moisture Content: 2.5

Note: the rock correction was applied to the calculated max. density and opt. moisture values.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.9	6.6	2.7	20.2	37.2	18.9	12.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.0"	100.0		
0.75"	98.1		
0.5"	97.4		
0.375"	94.1		
#4	91.5		
#10	88.8		
#20	84.3		
#40	68.6		
#100	44.1		
#200	31.4		

* (no specification provided)

Material Description

Silty Sand (#31972)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.9136 D_{85}= 0.8946 D_{60}= 0.3028
D_{50}= 0.1978 D_{30}= 0.0690 D_{15}= 0.0048
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B2-1 **Depth:** 0-8'

Date: 11/15/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31972

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-8' **Sample Number:** B2-1
Material Description: Silty Sand (#31972)
Date: 11/15/18
USCS Classification: SM
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
1.0"	100.0
0.75"	98.1
0.5"	97.4
0.375"	94.1
#4	91.5
#10	88.8
#20	84.3
#40	68.6
#100	44.1
#200	31.4

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 88.8
Weight of hydrometer sample =80.85
Hygroscopic moisture correction:
Moist weight and tare = 113.99
Dry weight and tare = 113.70
Tare weight = 82.38
Hygroscopic moisture = 0.9%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.2	26.0	23.0	0.0136	26.0	12.0	0.0472	25.4
2.00	20.2	25.0	22.0	0.0136	25.0	12.2	0.0336	24.3
5.00	20.2	20.5	17.5	0.0136	20.5	12.9	0.0219	19.4
15.00	20.1	19.5	16.4	0.0136	19.5	13.1	0.0127	18.2
30.00	20.2	18.5	15.5	0.0136	18.5	13.3	0.0090	17.1
60.00	20.2	17.5	14.5	0.0136	17.5	13.4	0.0064	16.0
120.00	20.1	16.5	13.4	0.0136	16.5	13.6	0.0046	14.9
250.00	20.1	15.5	12.4	0.0136	15.5	13.8	0.0032	13.8
1440.00	20.0	13.5	10.4	0.0136	13.5	14.1	0.0013	11.5

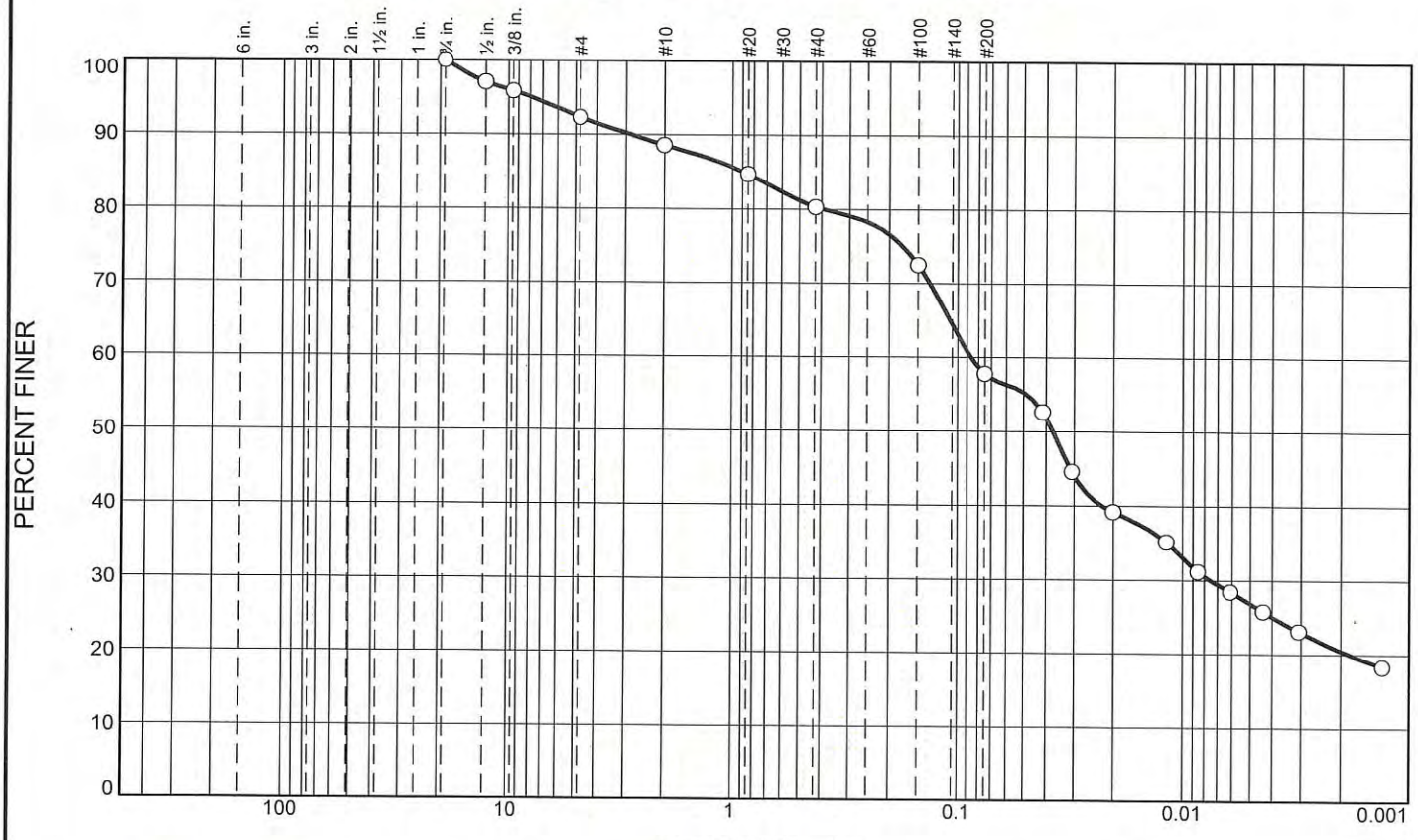
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	1.9	6.6	8.5	2.7	20.2	37.2	60.1	18.9	12.5	31.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0048	0.0233	0.0690	0.1217	0.1978	0.3028	0.6726	0.8946	2.9136	10.2670

Fineness Modulus
1.58

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	7.7	3.7	8.3	22.5	37.4	20.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75"	100.0		
0.5"	97.0		
0.375"	95.8		
#4	92.3		
#10	88.6		
#20	84.7		
#40	80.3		
#100	72.5		
#200	57.8		

* (no specification provided)

Material Description

Sandy Silt (#31973)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 2.8597 D_{85}= 0.8930 D_{60}= 0.0865
D_{50}= 0.0374 D_{30}= 0.0076 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B3-2 **Depth:** 5'-10'

Date: 11/13/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31973

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 5'-10' **Sample Number:** B3-2
Material Description: Sandy Silt (#31973)
Date: 11/13/18
USCS Classification: ML
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
0.75"	100.0
0.5"	97.0
0.375"	95.8
#4	92.3
#10	88.6
#20	84.7
#40	80.3
#100	72.5
#200	57.8

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 88.6
Weight of hydrometer sample =67.53
Hygroscopic moisture correction:
Moist weight and tare = 100.67
Dry weight and tare = 100.24
Tare weight = 81.17
Hygroscopic moisture = 2.3%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.8	42.0	39.2	0.0135	42.0	9.4	0.0414	52.6
2.00	20.8	36.0	33.2	0.0135	36.0	10.4	0.0308	44.6
5.00	20.8	32.0	29.2	0.0135	32.0	11.0	0.0201	39.2
15.00	20.8	29.0	26.2	0.0135	29.0	11.5	0.0118	35.2
30.00	20.8	26.0	23.2	0.0135	26.0	12.0	0.0086	31.1
60.00	20.8	24.0	21.2	0.0135	24.0	12.4	0.0061	28.5
120.00	20.8	22.0	19.2	0.0135	22.0	12.7	0.0044	25.8
250.00	20.8	20.0	17.2	0.0135	20.0	13.0	0.0031	23.1
1440.00	20.6	16.5	13.6	0.0135	16.5	13.6	0.0013	18.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	7.7	7.7	3.7	8.3	22.5	34.5	37.4	20.4	57.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0018	0.0076	0.0226	0.0374	0.0865	0.3953	0.8930	2.8597	7.9581

Fineness Modulus
1.02

COMPACTION TEST REPORT

Curve No.: 31973

Project No.: 5015150030.36 **Date:** 11/13/18
Project: #2945 Tecolote Canyon Sewer
Client: TerraCosta Consulting Group
Sample Number: B3-2 **Depth:** 5'-10'

Remarks:

MATERIAL DESCRIPTION

Description: Sandy Silt (#31973)

Classifications - **USCS:** ML **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = **Plasticity Index =**
% < No.200 = 57.8 %

TEST RESULTS
Maximum dry density = 122.3 pcf
Optimum moisture = 9.7 %

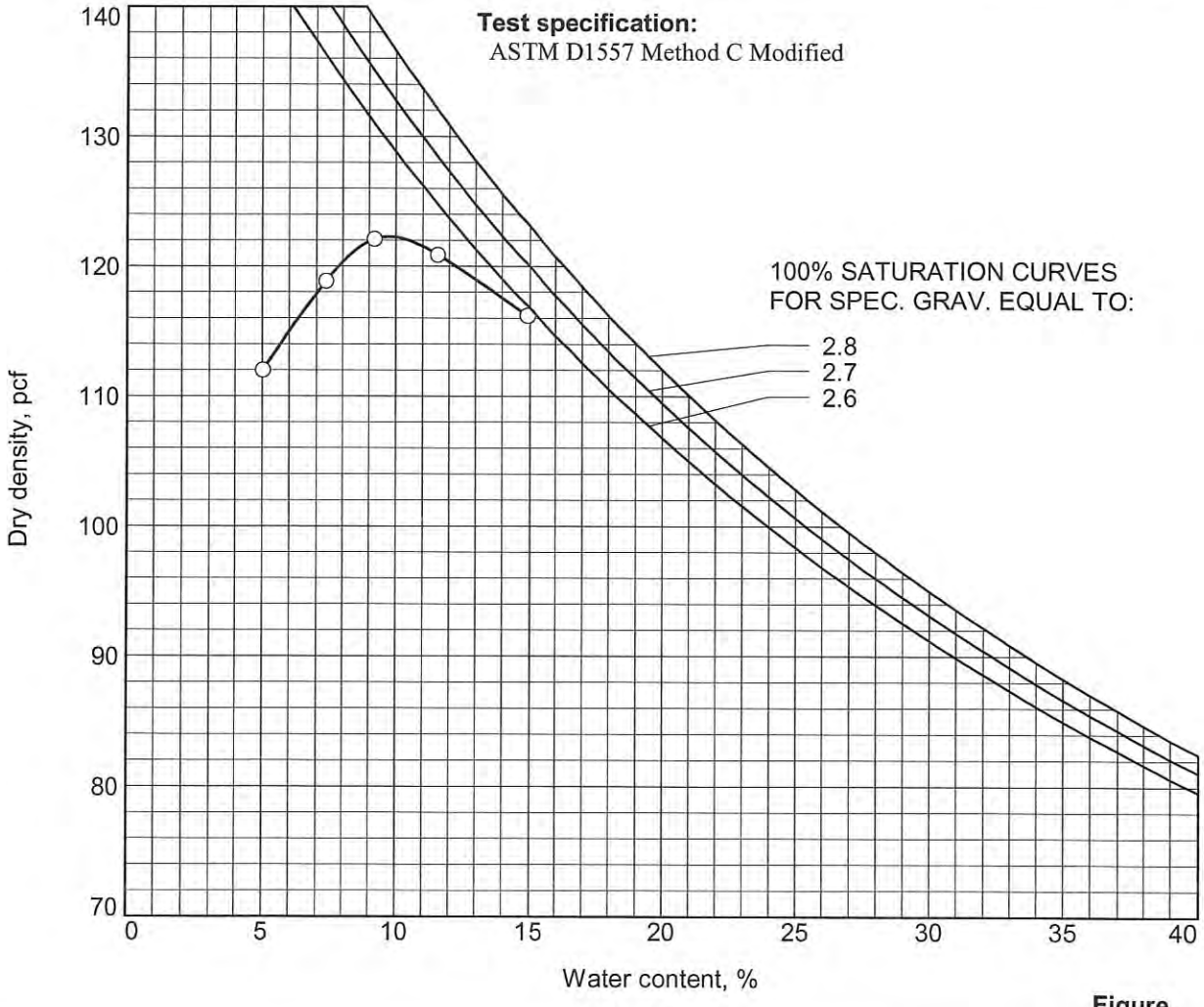


Figure #31973

AMEC

Tested By: B. Brown **Checked By:** L. Collins

MOISTURE DENSITY TEST DATA

12/10/2018

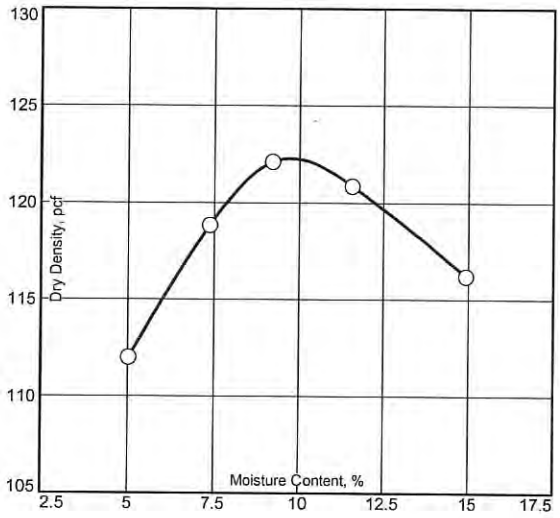
Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 5'-10'
Sample Number: B3-2
Description: Sandy Silt (#31973)
Date: 11/13/18
USCS Classification: ML
Tested by: B. Brown
Checked by: L. Collins
Percent passing 3/4 in. sieve: 100.0

Test Data and Results For Curve 31973

Test Specification:

Type of Test: ASTM D1557 Method C Modified

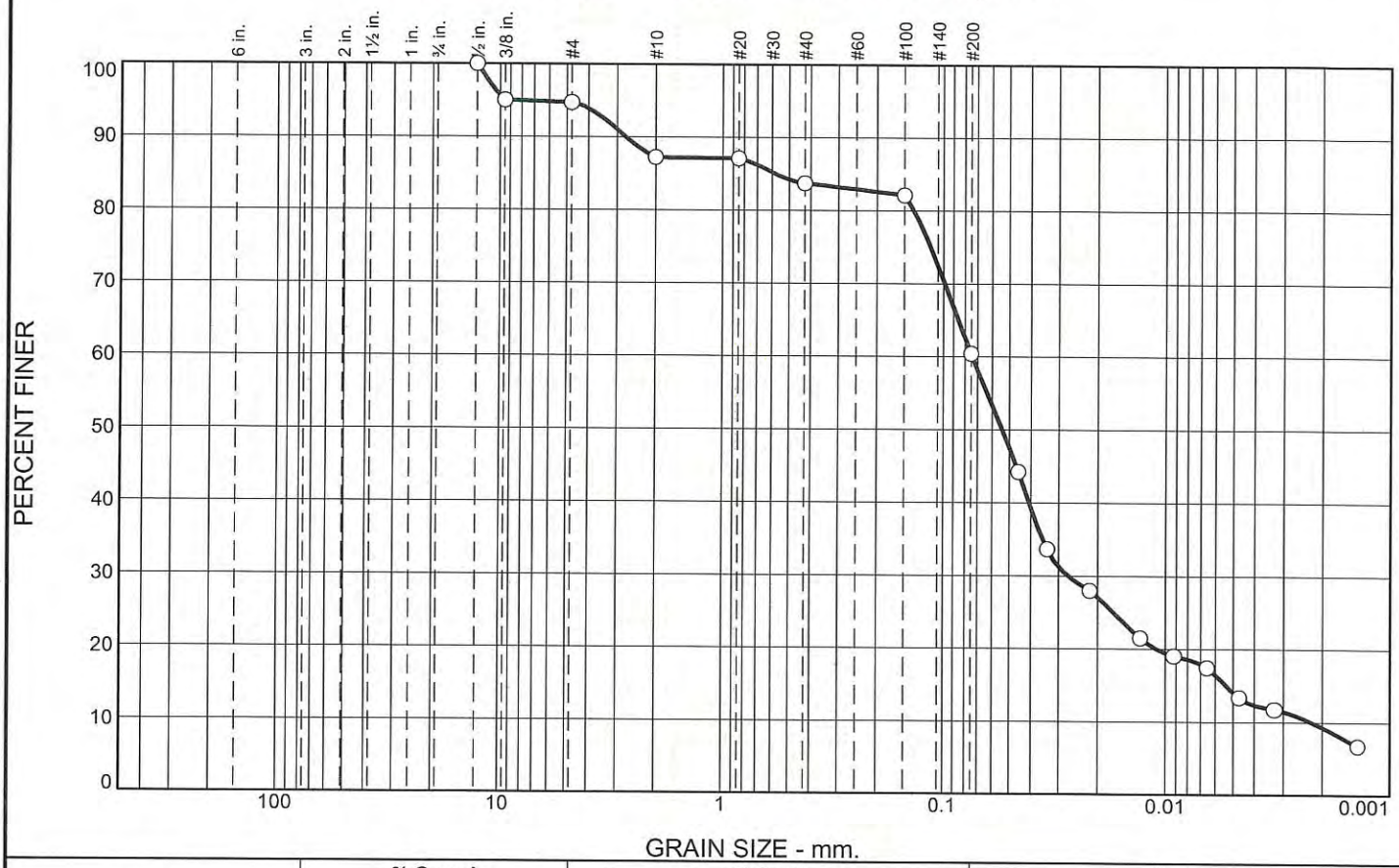
Mold Dia: 6.00 **Hammer Wt.:** 10 **Drop:** 18 **Layers:** five **Blows per Layer:** 56



Point No.	1	2	3	4	5
Wt. M+S	6848.7	7187.7	7383.8	7434.7	7390.0
Wt. M	2847.3	2847.3	2847.3	2847.3	2847.3
Wt. W+T	1895.6	2123.9	2424.4	1371.7	2616.3
Wt. D+T	1815.9	1993.8	2239.1	1253.1	2366.3
Tare	228.7	228.9	228.0	228.4	691.6
Moist.	5.0	7.4	9.2	11.6	14.9
Dry Den.	112.0	118.8	122.1	120.9	116.2

Test Results: **Max. Dry Den.=** 122.3 pcf **Opt. Moist.=** 9.7%

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.3	7.5	3.5	23.3	51.1	9.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.5"	100.0		
0.375"	95.0		
#4	94.7		
#10	87.2		
#20	87.1		
#40	83.7		
#100	82.1		
#200	60.4		

* (no specification provided)

Material Description

Lean Clay (#31974)

Atterberg Limits

PL= 15.8 LL= 32.3 PI= 16.5

Coefficients

D_{90}= 2.7379 D_{85}= 0.5802 D_{60}= 0.0741
D_{50}= 0.0540 D_{30}= 0.0274 D_{15}= 0.0054
D_{10}= 0.0022 C_u= 33.03 C_c= 4.50

Classification

USCS= CL AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B4-3 **Depth:** 10'

Date: 11/20/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31974

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 10' **Sample Number:** B4-3
Material Description: Lean Clay (#31974)
Date: 11/20/18 **PL:** 15.8 **LL:** 32.3 **PI:** 16.5
USCS Classification: CL
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
0.5"	100.0
0.375"	95.0
#4	94.7
#10	87.2
#20	87.1
#40	83.7
#100	82.1
#200	60.4

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 87.2
Weight of hydrometer sample =54.77
Hygroscopic moisture correction:
Moist weight and tare = 80.43
Dry weight and tare = 80.36
Tare weight = 77.00
Hygroscopic moisture = 2.1%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.8	30.0	27.2	0.0135	30.0	11.4	0.0456	44.2
2.00	20.8	23.5	20.7	0.0135	23.5	12.4	0.0337	33.7
5.00	20.8	20.0	17.2	0.0135	20.0	13.0	0.0218	28.0
15.00	20.8	16.0	13.2	0.0135	16.0	13.7	0.0129	21.5
30.00	20.8	14.5	11.7	0.0135	14.5	13.9	0.0092	19.0
60.00	20.8	13.5	10.7	0.0135	13.5	14.1	0.0065	17.4
120.00	20.8	11.0	8.2	0.0135	11.0	14.5	0.0047	13.3
250.00	20.8	10.0	7.2	0.0135	10.0	14.7	0.0033	11.7
1440.00	20.6	7.0	4.1	0.0135	7.0	15.1	0.0014	6.7

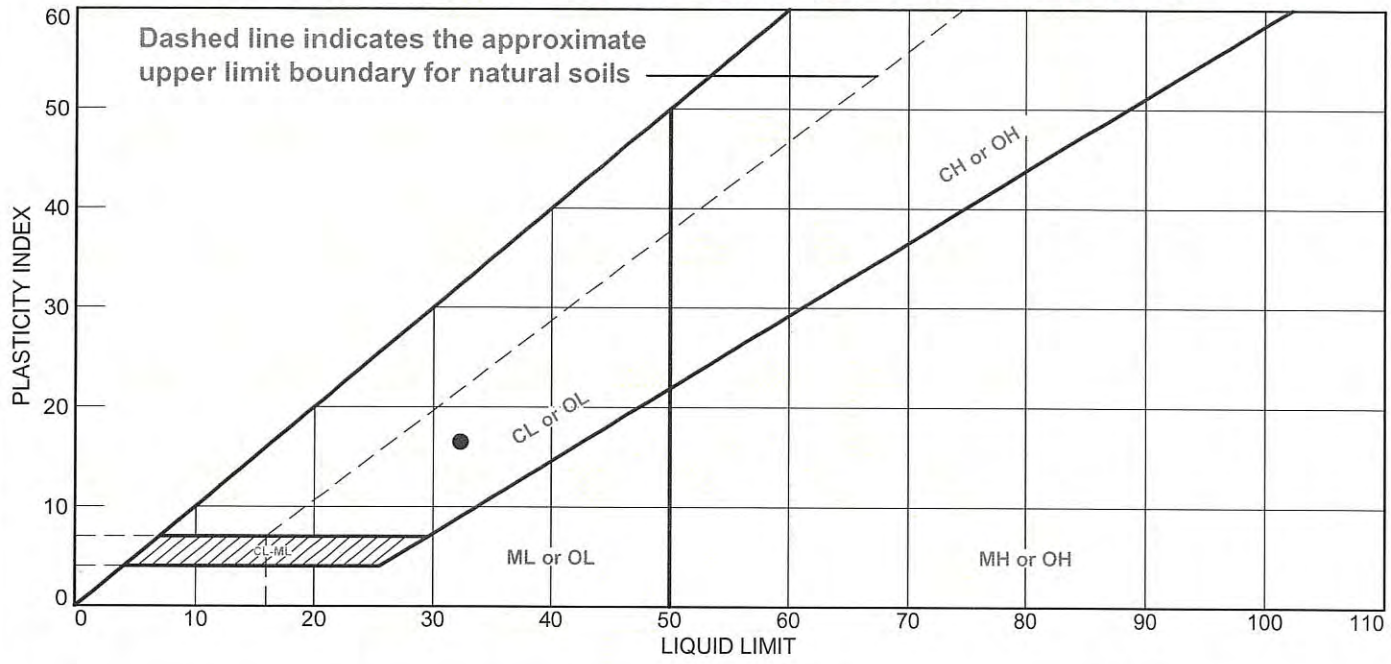
Fractional Components

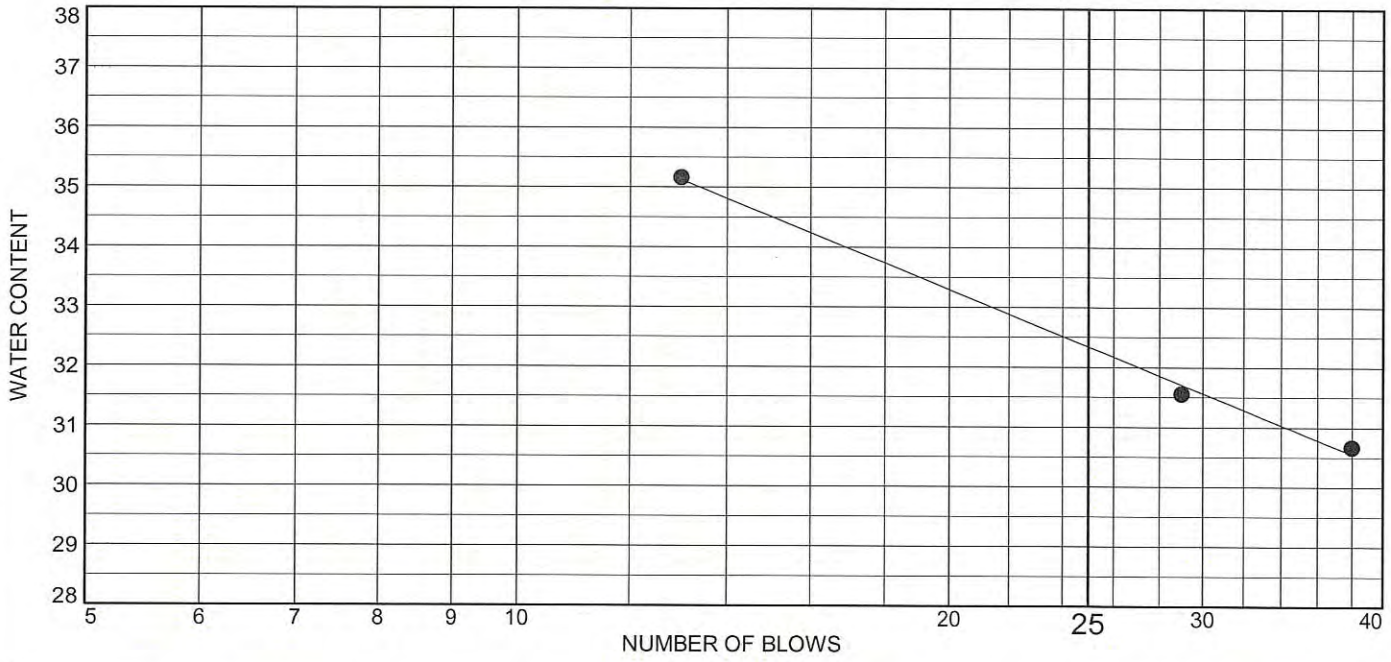
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	5.3	5.3	7.5	3.5	23.3	34.3	51.1	9.3	60.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0022	0.0054	0.0110	0.0274	0.0407	0.0540	0.0741	0.1363	0.5802	2.7379	9.5250

Fineness Modulus	C_u	C_c
0.84	33.03	4.50

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay (#31974)	32.3	15.8	16.5	83.7	60.4	CL

Project No. 5015150030.36 **Client:** TerraCosta Consulting Group

Project: #2945 Tecolote Canyon Sewer

Sample Number: B4-3 **Depth:** 10'

Remarks:

amec

Figure #31974

Tested By: L. Collins **Checked By:** L. Collins

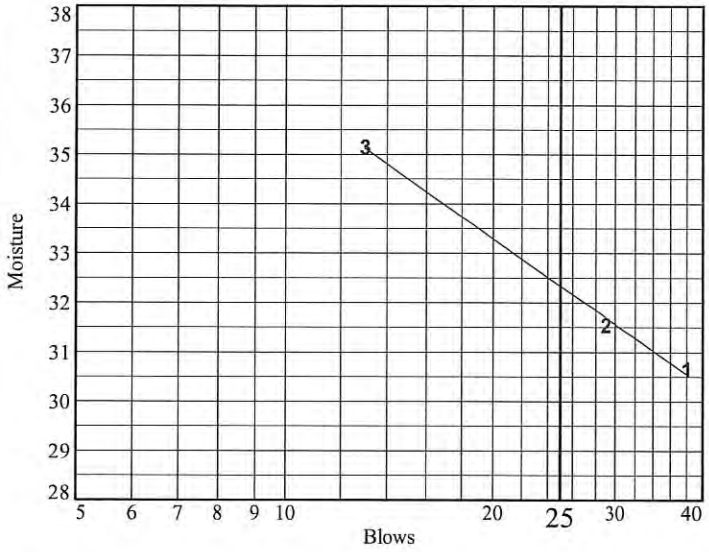
LIQUID AND PLASTIC LIMIT TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 10'
Sample Number: B4-3
Material Description: Lean Clay (#31974)
%<#40: 83.7
%<#200: 60.4
USCS: CL
Tested by: L. Collins
Checked by: L. Collins

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	18.64	19.14	23.52			
Dry+Tare	16.84	17.19	21.15			
Tare	10.97	11.01	14.41			
# Blows	38	29	13			
Moisture	30.7	31.6	35.2			



Liquid Limit= 32.3
Plastic Limit= 15.8
Plasticity Index= 16.5

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	16.85	16.15			
Dry+Tare	16.61	16.00			
Tare	15.12	15.03			
Moisture	16.1	15.5			

COMPACTION TEST REPORT

Curve No.: #31975

Project No.: 5015150030.36 **Date:** 11/6/18
Project: #2945 Tecolote Canyon Sewer
Client: TerraCosta Consulting Group
Sample Number: B5-1 **Depth:** 0-5'

Remarks:

MATERIAL DESCRIPTION

Description: Silty Sand (#31975)

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = **Plasticity Index =**
% < No.200 = 46.7 %

TEST RESULTS
Maximum dry density = 123.3 pcf
Optimum moisture = 10.3 %

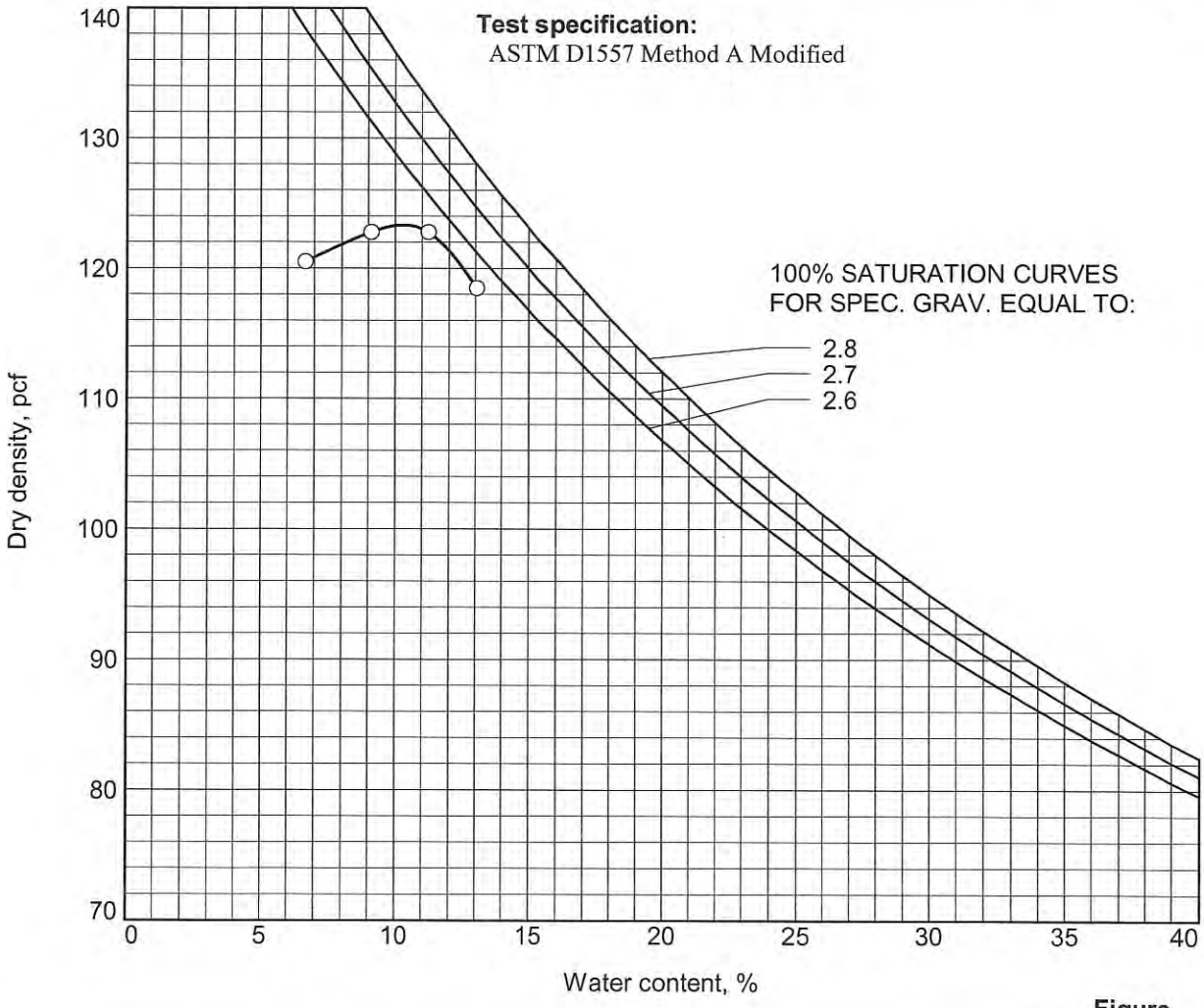


Figure #31975

AMEC

Tested By: B. Brown **Checked By:** L. Collins

MOISTURE DENSITY TEST DATA

12/10/2018

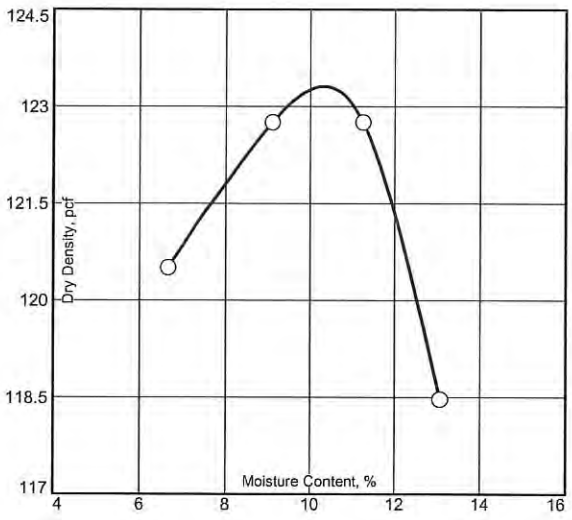
Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-5' **Sample Number:** B5-1
Description: Silty Sand (#31975)
Date: 11/6/18 **USCS Classification:** SM
Tested by: B. Brown **Checked by:** L. Collins
Percent passing #4 sieve: 98.8

Test Data and Results For Curve #31975

Test Specification:

Type of Test: ASTM D1557 Method A Modified

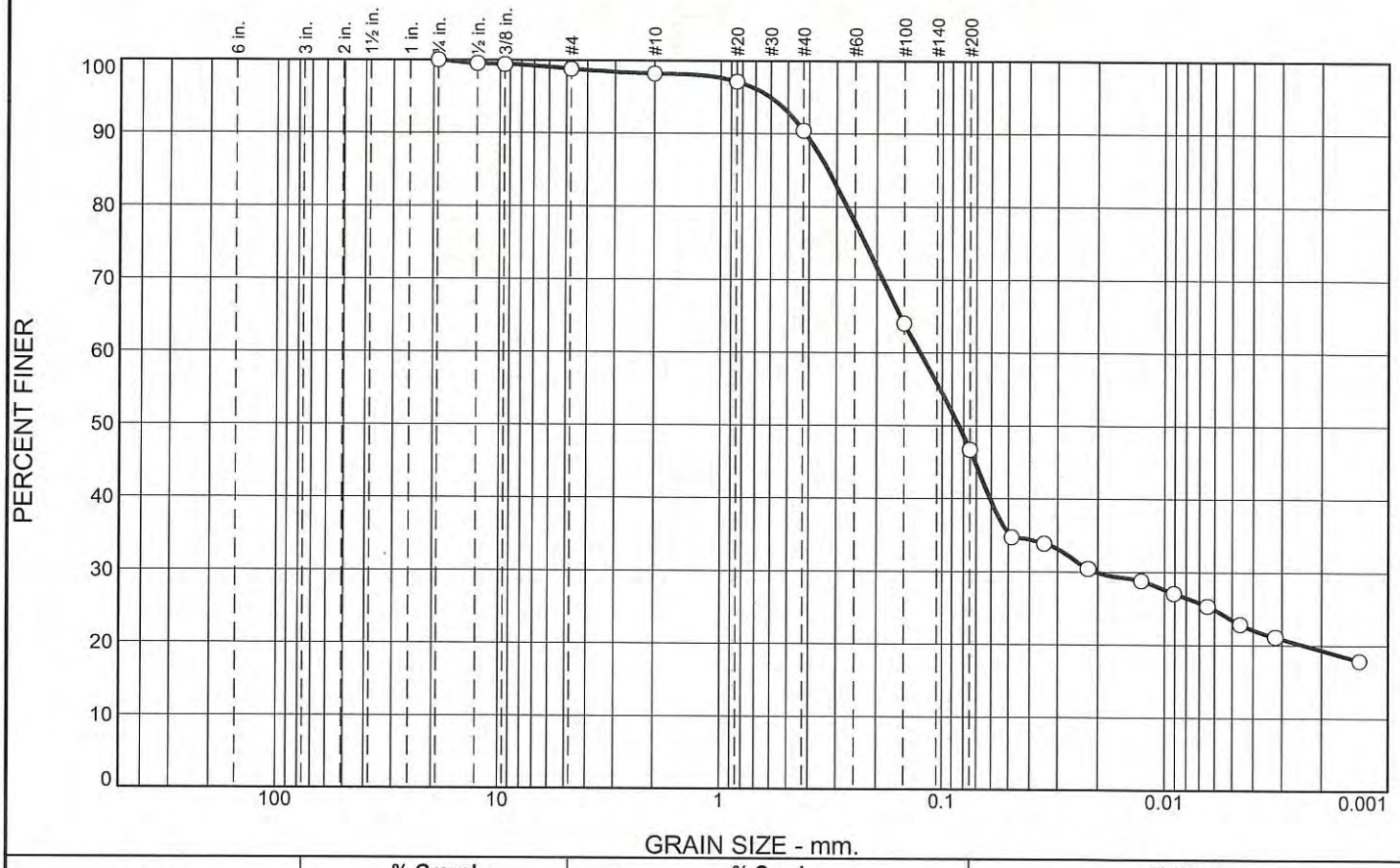
Mold Dia: 4.00 **Hammer Wt.:** 10 **Drop:** 18 **Layers:** five **Blows per Layer:** 25



Point No.	1	2	3	4
Wt. M+S	4073.2	4112.6	4073.2	3991.6
Wt. M	2048.2	2048.2	2048.2	2048.2
Wt. W+T	1899.2	1994.6	1955.3	1205.0
Wt. D+T	1802.3	1866.7	1809.3	1143.5
Tare	739.2	728.7	691.9	222.3
Moist.	9.1	11.2	13.1	6.7
Dry Den.	122.8	122.8	118.5	120.5

Test Results: **Max. Dry Den.=** 123.3 pcf **Opt. Moist.=** 10.3%

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.2	0.6	7.8	43.7	27.4	19.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75"	100.0		
0.5"	99.5		
0.375"	99.4		
#4	98.8		
#10	98.2		
#20	97.1		
#40	90.4		
#100	64.0		
#200	46.7		

* (no specification provided)

Material Description

Silty Sand (#31975)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4157 D_{85}= 0.3291 D_{60}= 0.1268
D_{50}= 0.0840 D_{30}= 0.0205 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B5-1 **Depth:** 0-5'

Date: 11/13/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31975

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-5' **Sample Number:** B5-1
Material Description: Silty Sand (#31975)
Date: 11/13/18
USCS Classification: SM
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
0.75"	100.0
0.5"	99.5
0.375"	99.4
#4	98.8
#10	98.2
#20	97.1
#40	90.4
#100	64.0
#200	46.7

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 98.2
Weight of hydrometer sample =58.52
Hygroscopic moisture correction:
Moist weight and tare = 92.79
Dry weight and tare = 91.40
Tare weight = 25.80
Hygroscopic moisture = 2.1%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	19.7	23.5	20.3	0.0137	23.5	12.4	0.0483	34.7
2.00	19.7	23.0	19.8	0.0137	23.0	12.5	0.0343	33.8
5.00	19.7	21.0	17.8	0.0137	21.0	12.9	0.0220	30.4
15.00	19.8	20.0	16.8	0.0137	20.0	13.0	0.0127	28.8
30.00	19.8	19.0	15.8	0.0137	19.0	13.2	0.0091	27.1
60.00	19.8	18.0	14.8	0.0137	18.0	13.3	0.0065	25.3
120.00	19.9	16.5	13.3	0.0137	16.5	13.6	0.0046	22.8
250.00	19.9	15.5	12.3	0.0137	15.5	13.8	0.0032	21.1
1440.00	20.1	13.5	10.4	0.0136	13.5	14.1	0.0013	17.9

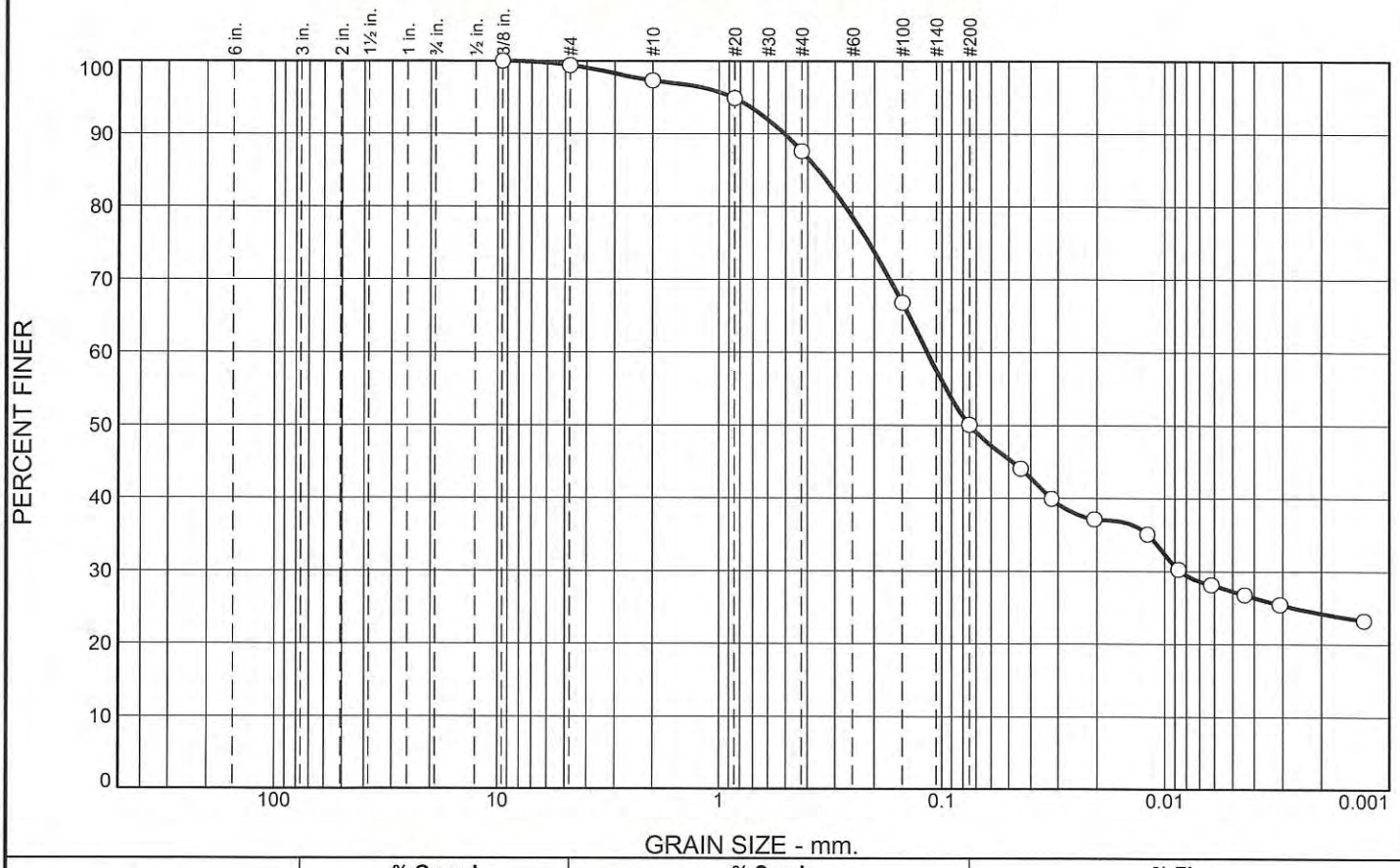
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.2	1.2	0.6	7.8	43.7	52.1	27.4	19.3	46.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0024	0.0205	0.0608	0.0840	0.1268	0.2706	0.3291	0.4157	0.6044

Fineness Modulus
0.64

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	2.1	9.7	37.5	25.9	24.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.375"	100.0		
#4	99.4		
#10	97.3		
#20	94.9		
#40	87.6		
#100	66.8		
#200	50.1		

* (no specification provided)

Material Description

Lean Clay (#31976)

Atterberg Limits

PL= 16.6 LL= 38.2 PI= 21.6

Coefficients

D_{90}= 0.5076 D_{85}= 0.3585 D_{60}= 0.1161
D_{50}= 0.0745 D_{30}= 0.0085 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B5-4 **Depth:** 15'

Date: 11/19/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31976

Tested By: L. Collins **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 15' **Sample Number:** B5-4
Material Description: Lean Clay (#31976)
Date: 11/19/18 **PL:** 16.6 **LL:** 38.2 **PI:** 21.6
USCS Classification: CL
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: L. Collins **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
0.375"	100.0
#4	99.4
#10	97.3
#20	94.9
#40	87.6
#100	66.8
#200	50.1

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 97.3
Weight of hydrometer sample =71.96
Hygroscopic moisture correction:
Moist weight and tare = 106.02
Dry weight and tare = 105.50
Tare weight = 80.44
Hygroscopic moisture = 2.1%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.1	35.0	31.9	0.0136	35.0	10.6	0.0443	44.1
2.00	20.1	32.0	28.9	0.0136	32.0	11.0	0.0320	39.9
5.00	20.1	30.0	26.9	0.0136	30.0	11.4	0.0206	37.2
15.00	20.1	28.5	25.4	0.0136	28.5	11.6	0.0120	35.1
30.00	20.1	25.0	21.9	0.0136	25.0	12.2	0.0087	30.2
60.00	20.0	23.5	20.4	0.0136	23.5	12.4	0.0062	28.1
120.00	20.0	22.5	19.4	0.0136	22.5	12.6	0.0044	26.7
250.00	20.1	21.5	18.4	0.0136	21.5	12.8	0.0031	25.4
1440.00	19.9	20.0	16.8	0.0137	20.0	13.0	0.0013	23.2

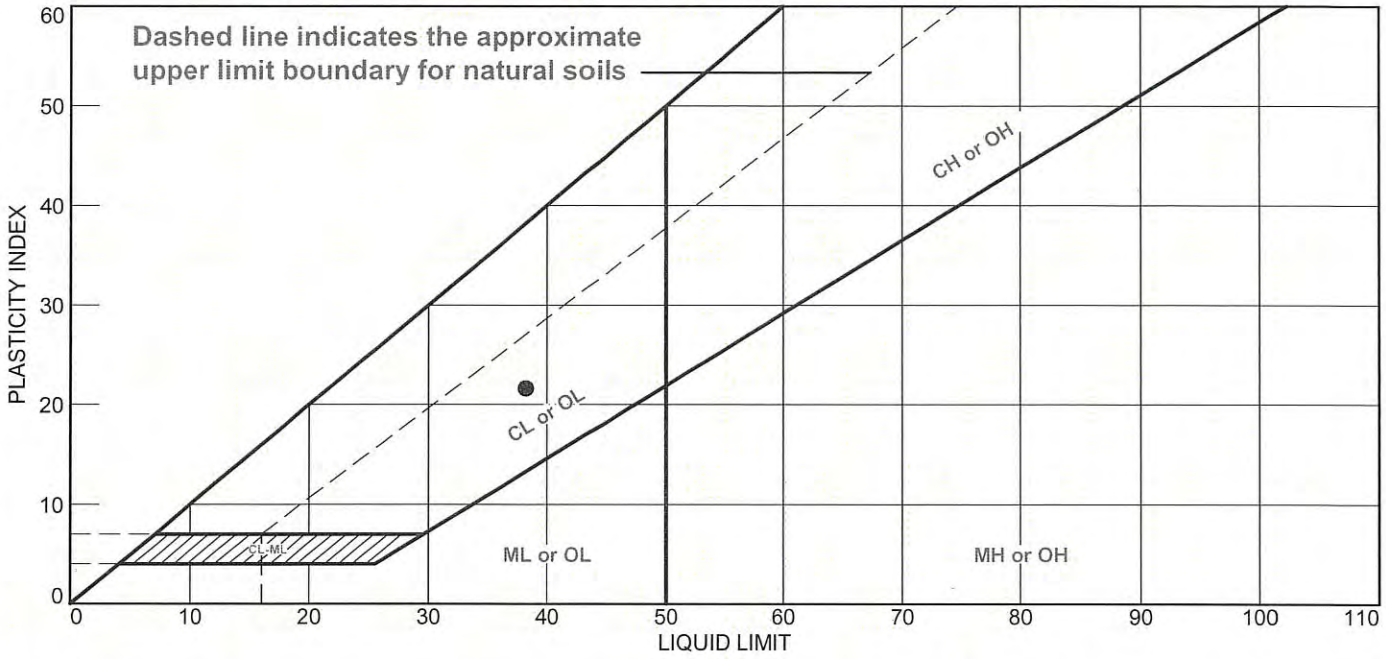
Fractional Components

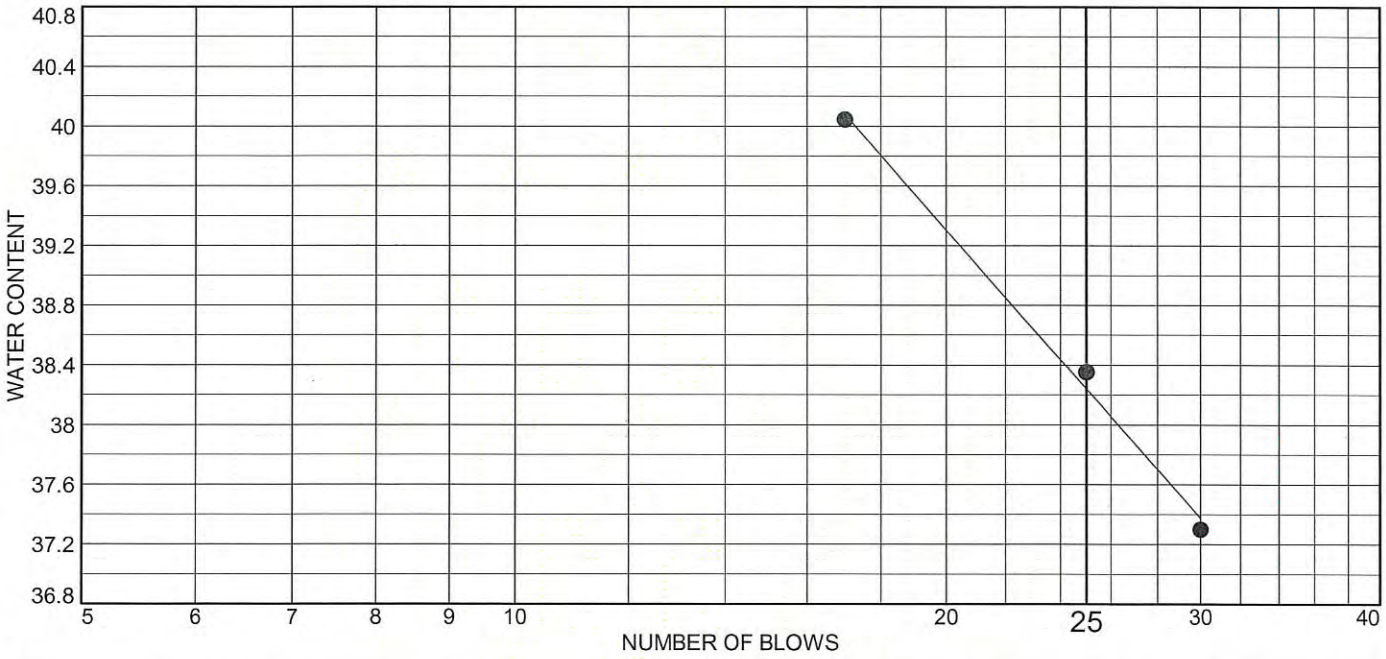
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.6	0.6	2.1	9.7	37.5	49.3	25.9	24.2	50.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0085	0.0323	0.0745	0.1161	0.2701	0.3585	0.5076	0.8641

Fineness Modulus
0.66

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay (#31976)	38.2	16.6	21.6	87.6	50.1	CL

Project No. 5015150030.36 **Client:** TerraCosta Consulting Group

Project: #2945 Tecolote Canyon Sewer

Sample Number: B5-4 **Depth:** 15'

Remarks:

amec

Figure #31976

Tested By: L. Collins **Checked By:** L. Collins

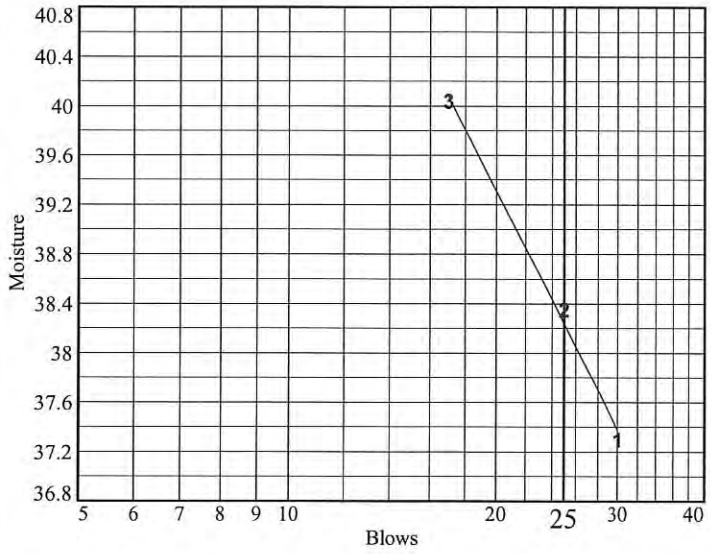
LIQUID AND PLASTIC LIMIT TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 15' **Sample Number:** B5-4
Material Description: Lean Clay (#31976)
%<#40: 87.6 **%<#200:** 50.1 **USCS:** CL
Tested by: L. Collins **Checked by:** L. Collins

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	17.25	21.22	20.92			
Dry+Tare	15.62	19.31	19.07			
Tare	11.25	14.33	14.45			
# Blows	30	25	17			
Moisture	37.3	38.4	40.0			

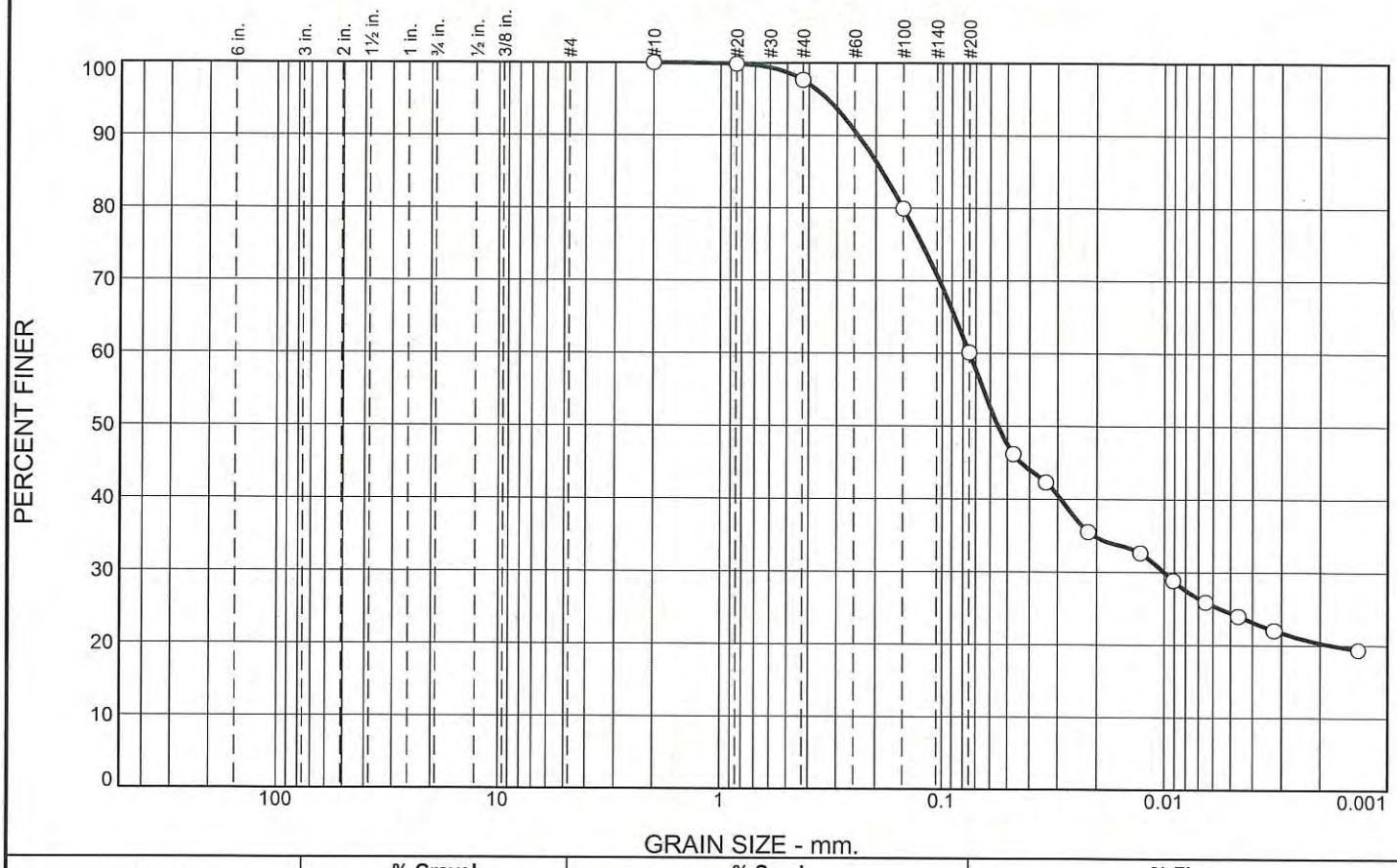


Liquid Limit= 38.2
Plastic Limit= 16.6
Plasticity Index= 21.6

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	18.96	18.98			
Dry+Tare	18.39	18.45			
Tare	15.01	15.20			
Moisture	16.9	16.3			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.4	37.5	39.8	20.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.8		
#40	97.6		
#100	79.9		
#200	60.1		

* (no specification provided)

Material Description

Lean Clay (#31977)

Atterberg Limits

PL= 16.4 LL= 27.6 PI= 11.2

Coefficients

D_{90}= 0.2407 D_{85}= 0.1873 D_{60}= 0.0748
D_{50}= 0.0552 D_{30}= 0.0100 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B6-1 **Depth:** 5'

Date: 11/15/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31977

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 5' **Sample Number:** B6-1
Material Description: Lean Clay (#31977)
Date: 11/15/18 **PL:** 16.4 **LL:** 27.6 **PI:** 11.2
USCS Classification: CL
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
#10	100.0
#20	99.8
#40	97.6
#100	79.9
#200	60.1

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 100.0
Weight of hydrometer sample =52.07
Hygroscopic moisture correction:
Moist weight and tare = 28.58
Dry weight and tare = 28.56
Tare weight = 26.24
Hygroscopic moisture = 0.9%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	19.9	27.0	23.8	0.0137	27.0	11.9	0.0471	46.2
2.00	19.9	25.0	21.8	0.0137	25.0	12.2	0.0337	42.3
5.00	19.9	21.5	18.3	0.0137	21.5	12.8	0.0218	35.5
15.00	19.9	20.0	16.8	0.0137	20.0	13.0	0.0127	32.6
30.00	20.0	18.0	14.9	0.0136	18.0	13.3	0.0091	28.8
60.00	20.0	16.5	13.4	0.0136	16.5	13.6	0.0065	25.9
120.00	20.0	15.5	12.4	0.0136	15.5	13.8	0.0046	24.0
250.00	20.0	14.5	11.4	0.0136	14.5	13.9	0.0032	22.0
1440.00	20.3	13.0	10.0	0.0136	13.0	14.2	0.0013	19.4

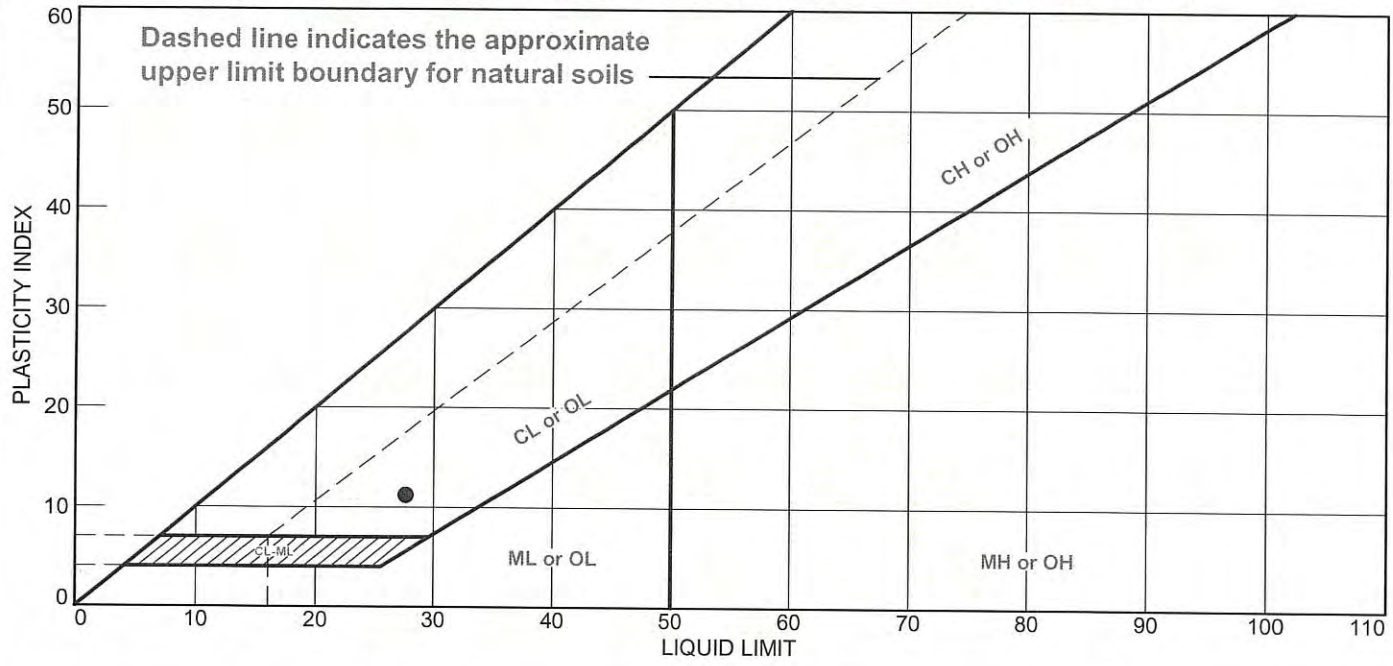
Fractional Components

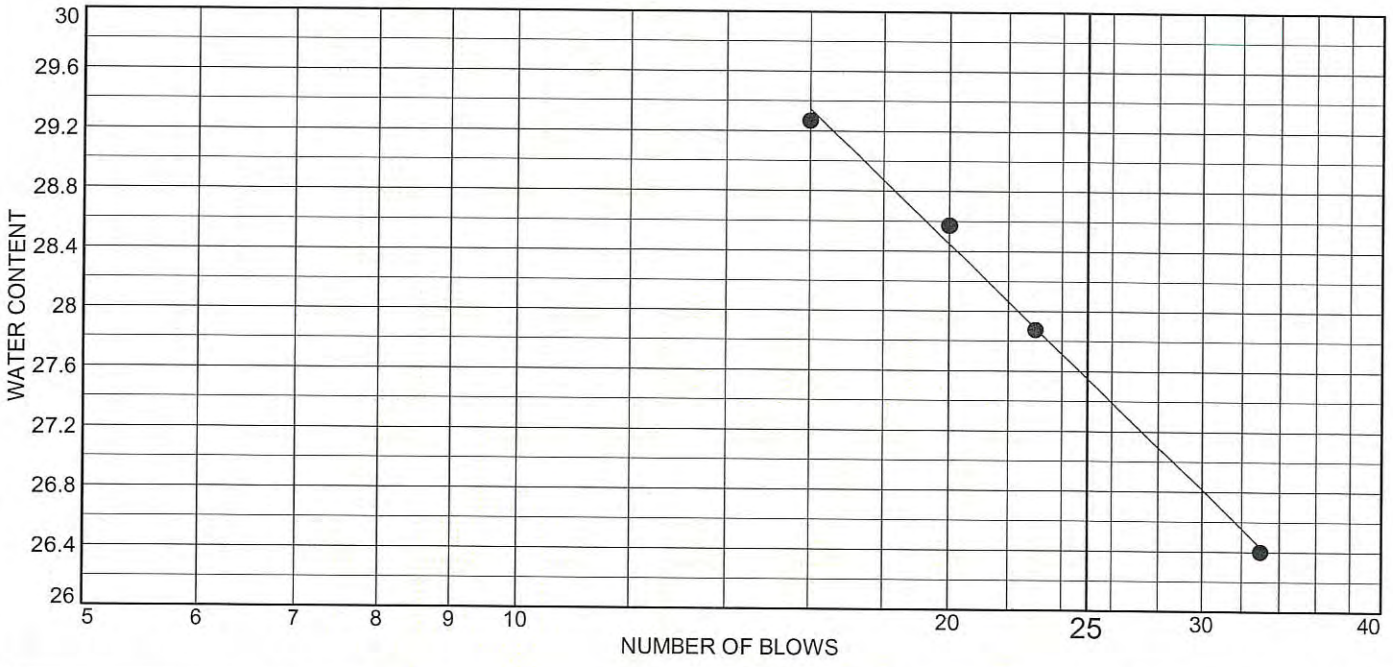
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	2.4	37.5	39.9	39.8	20.3	60.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0018	0.0100	0.0290	0.0552	0.0748	0.1506	0.1873	0.2407	0.3318

Fineness Modulus
0.27

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean Clay (#31977)	27.6	16.4	11.2	97.6	60.1	CL

Project No. 5015150030.36 **Client:** TerraCosta Consulting Group

Project: #2945 Tecolote Canyon Sewer

Sample Number: B6-1 **Depth:** 5'

Remarks:

amec

Figure #31977

Tested By: L. Collins **Checked By:** L. Collins

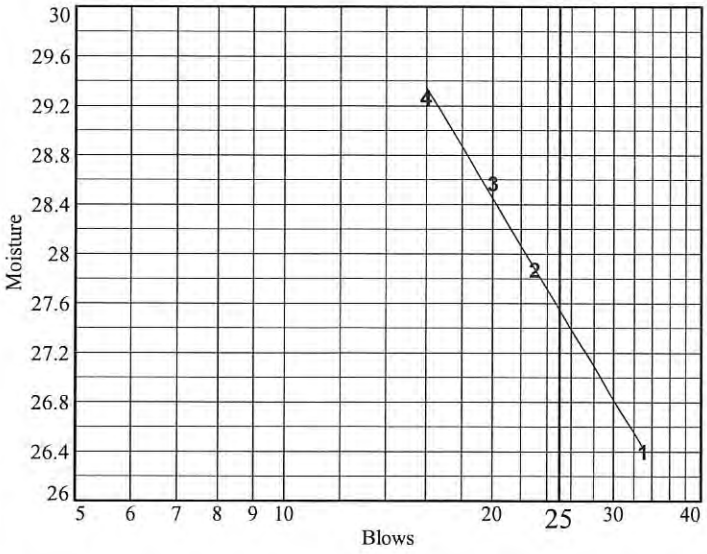
LIQUID AND PLASTIC LIMIT TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 5'
Sample Number: B6-1
Material Description: Lean Clay (#31977)
%<#40: 97.6
%<#200: 60.1
USCS: CL
Tested by: L. Collins
Checked by: L. Collins

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.73	20.96	22.69	23.85		
Dry+Tare	21.61	19.53	20.85	21.69		
Tare	13.58	14.4	14.41	14.31		
# Blows	33	23	20	16		
Moisture	26.4	27.9	28.6	29.3		



Liquid Limit= 27.6
Plastic Limit= 16.4
Plasticity Index= 11.2

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	18.53	18.71			
Dry+Tare	18.01	18.19			
Tare	14.91	14.93			
Moisture	16.8	16.0			

COMPACTION TEST REPORT

Curve No.: #31978

Project No.: 5015150030.36 **Date:** 11/9/18
Project: #2945 Tecolote Canyon Sewer
Client: TerraCosta Consulting Group
Sample Number: B9-1 **Depth:** 0-6'

Remarks:

MATERIAL DESCRIPTION

Description: Silty Sand (#31978)

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = **Plasticity Index =**
% < No.200 = 39.5 %

TEST RESULTS
Maximum dry density = 123.7 pcf
Optimum moisture = 10.1 %

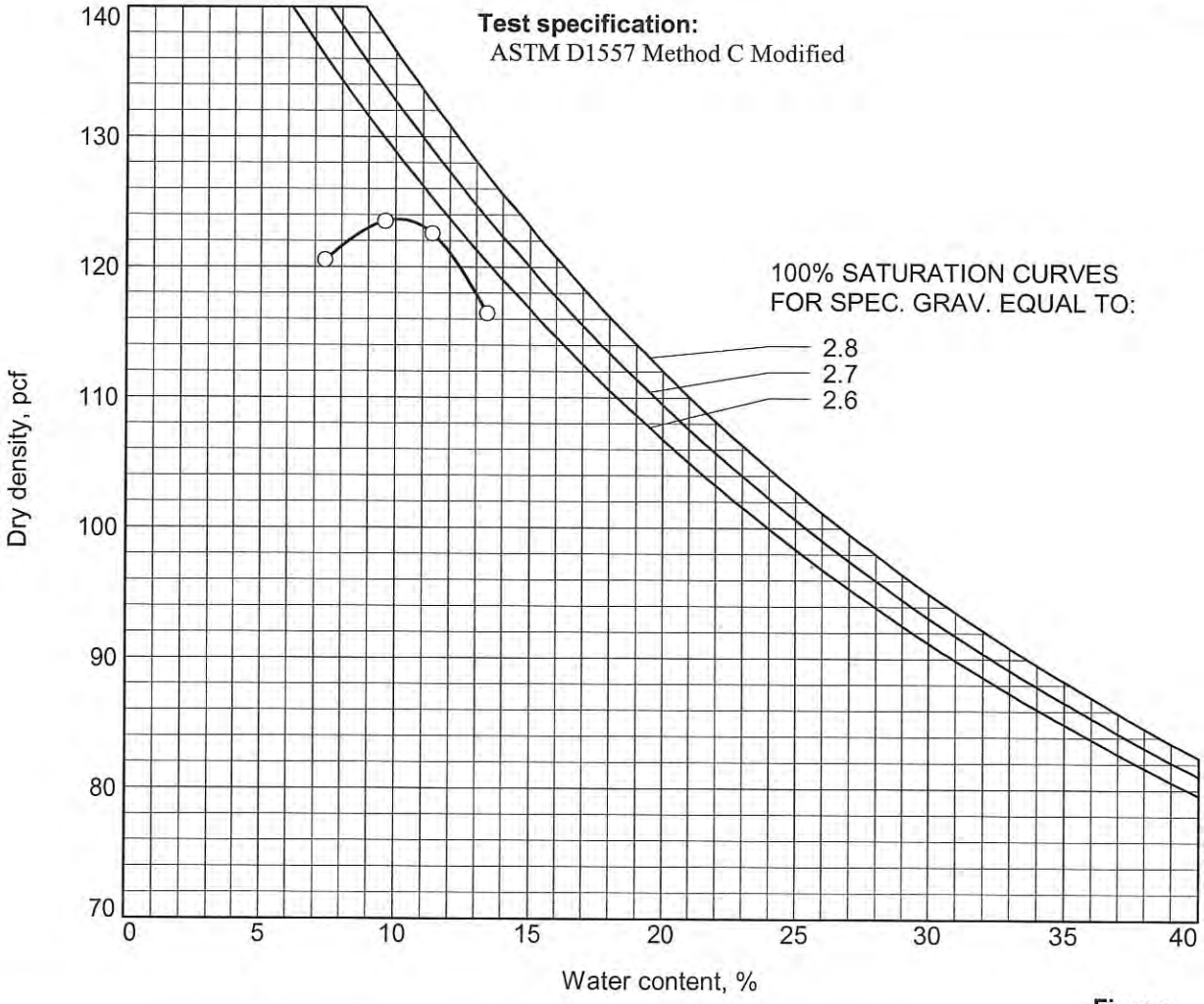


Figure #31978

AMEC

Tested By: B. Brown **Checked By:** L. Collins

MOISTURE DENSITY TEST DATA

12/10/2018

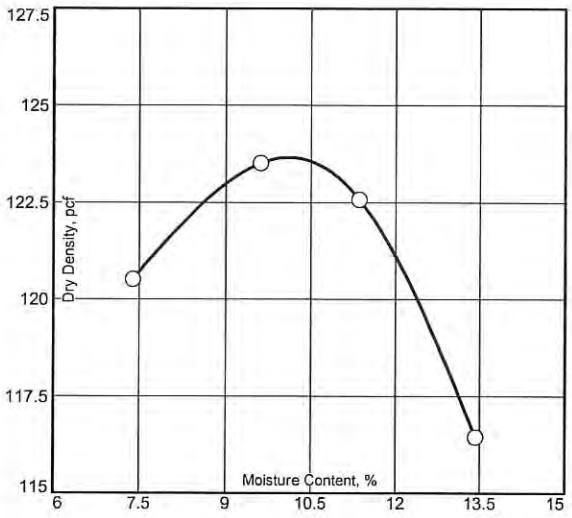
Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-6' **Sample Number:** B9-1
Description: Silty Sand (#31978)
Date: 11/9/18 **USCS Classification:** SM
Tested by: B. Brown **Checked by:** L. Collins
Percent passing 3/4 in. sieve: 100.0

Test Data and Results For Curve #31978

Test Specification:

Type of Test: ASTM D1557 Method C Modified

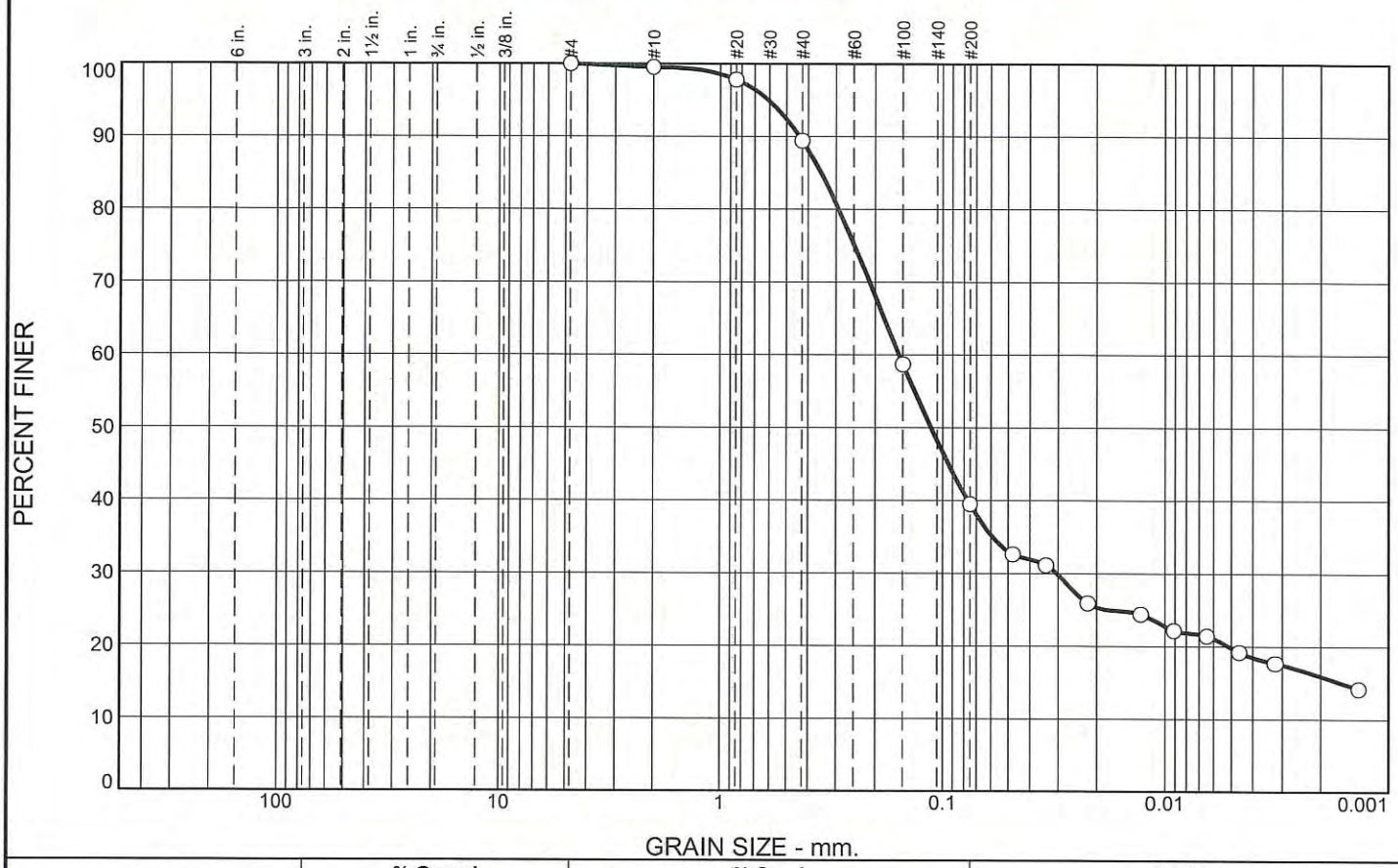
Mold Dia: 6.00 **Hammer Wt.:** 10 **Drop:** 18 **Layers:** five **Blows per Layer:** 56



Point No.	1	2	3	4
Wt. M+S	4094.9	4111.8	4045.1	4004.7
Wt. M	2048.2	2048.2	2048.2	2048.2
Wt. W+T	1374.7	1287.5	1914.3	1519.7
Wt. D+T	1274.2	1179.3	1773.3	1430.6
Tare	228.6	226.7	723.3	224.5
Moist.	9.6	11.4	13.4	7.4
Dry Den.	123.5	122.6	116.4	120.5

Test Results: **Max. Dry Den.=** 123.7 pcf **Opt. Moist.=** 10.1%

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	10.1	49.9	23.6	15.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.5		
#20	97.8		
#40	89.4		
#100	58.7		
#200	39.5		

* (no specification provided)

Material Description

Silty Sand (#31978)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4379 D_{85}= 0.3513 D_{60}= 0.1562
D_{50}= 0.1129 D_{30}= 0.0304 D_{15}= 0.0016
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B9-1 **Depth:** 0-6'

Date: 11/13/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31978

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-6' **Sample Number:** B9-1
Material Description: Silty Sand (#31978)
Date: 11/13/18
USCS Classification: SM
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
#4	100.0
#10	99.5
#20	97.8
#40	89.4
#100	58.7
#200	39.5

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 99.5
Weight of hydrometer sample =67.42
Hygroscopic moisture correction:
Moist weight and tare = 128.64
Dry weight and tare = 128.20
Tare weight = 84.91
Hygroscopic moisture = 1.0%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 **-** .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.0	25.0	21.9	0.0136	25.0	12.2	0.0477	32.6
2.00	20.0	24.0	20.9	0.0136	24.0	12.4	0.0339	31.1
5.00	20.0	20.5	17.4	0.0136	20.5	12.9	0.0219	25.9
15.00	20.0	19.5	16.4	0.0136	19.5	13.1	0.0128	24.4
30.00	20.0	18.0	14.9	0.0136	18.0	13.3	0.0091	22.2
60.00	20.0	17.5	14.4	0.0136	17.5	13.4	0.0065	21.4
120.00	20.0	16.0	12.9	0.0136	16.0	13.7	0.0046	19.2
250.00	20.0	15.0	11.9	0.0136	15.0	13.8	0.0032	17.7
1440.00	20.3	12.5	9.5	0.0136	12.5	14.2	0.0014	14.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.5	10.1	49.9	60.5	23.6	15.9	39.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0016	0.0052	0.0304	0.0767	0.1129	0.1562	0.2927	0.3513	0.4379	0.6069

Fineness Modulus
0.67

COMPACTION TEST REPORT

Curve No.: #31979

Project No.: 5015150030.36 **Date:** 11/7/18
Project: #2945 Tecolote Canyon Sewer
Client: TerraCosta Consulting Group
Sample Number: B11-1 **Depth:** 0-7'

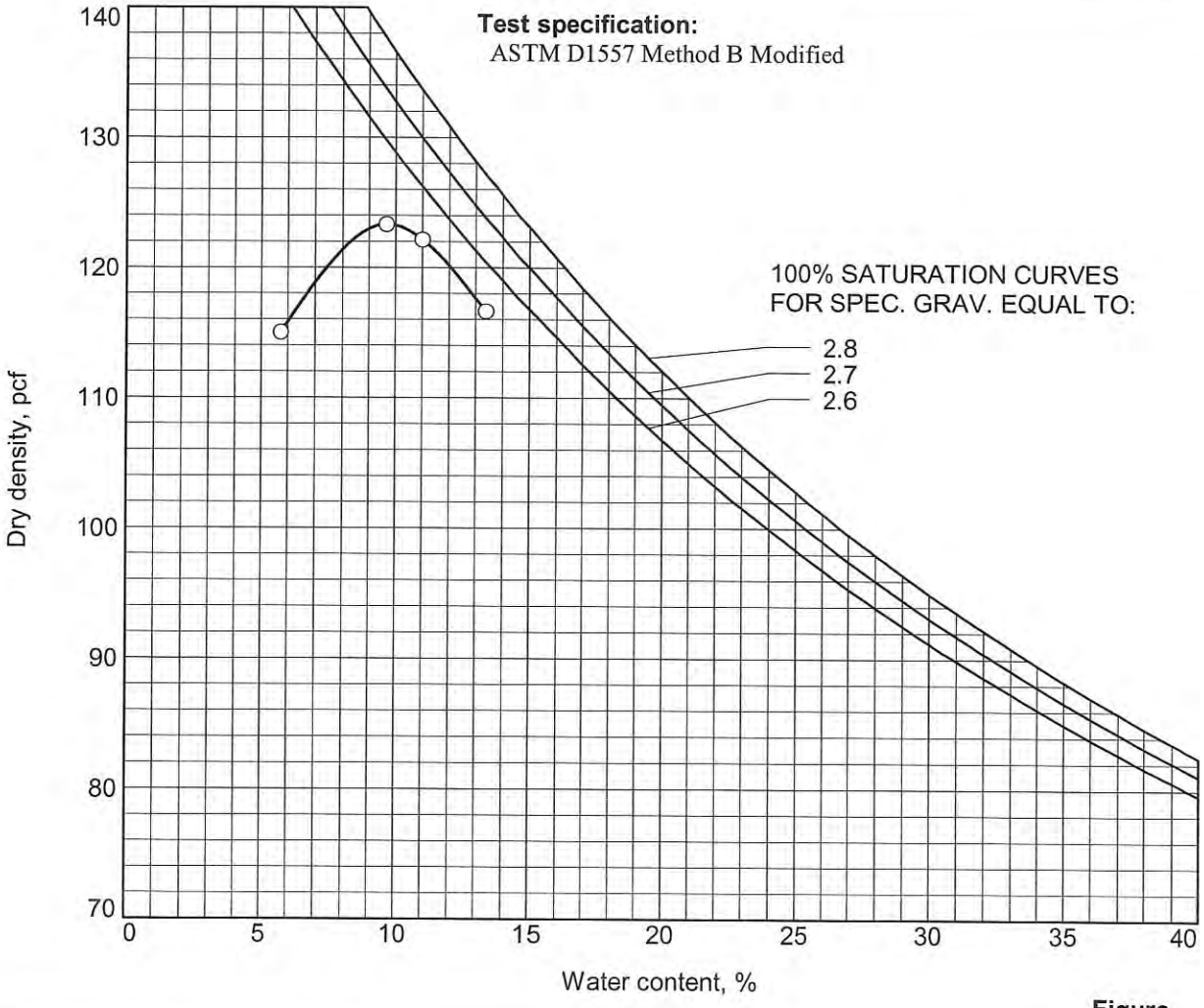
Remarks:

MATERIAL DESCRIPTION

Description: Silty Sand (#31979)

Classifications - **USCS:** SM **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = **Plasticity Index =**
% < No.200 = 45.9 %

TEST RESULTS
Maximum dry density = 123.3 pcf
Optimum moisture = 9.7 %



Figure

AMEC

Tested By: B. Brown **Checked By:** L. Collins

MOISTURE DENSITY TEST DATA

12/10/2018

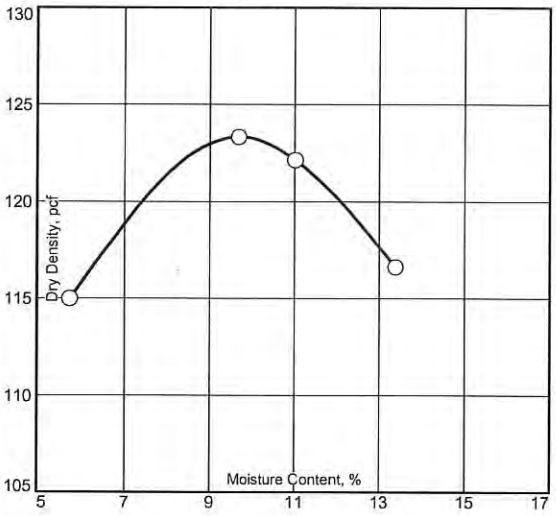
Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-7' **Sample Number:** B11-1
Description: Silty Sand (#31979)
Date: 11/7/18 **USCS Classification:** SM
Tested by: B. Brown **Checked by:** L. Collins
Percent passing 3/8 in. sieve: 98.9

Test Data and Results For Curve #31979

Test Specification:

Type of Test: ASTM D1557 Method B Modified

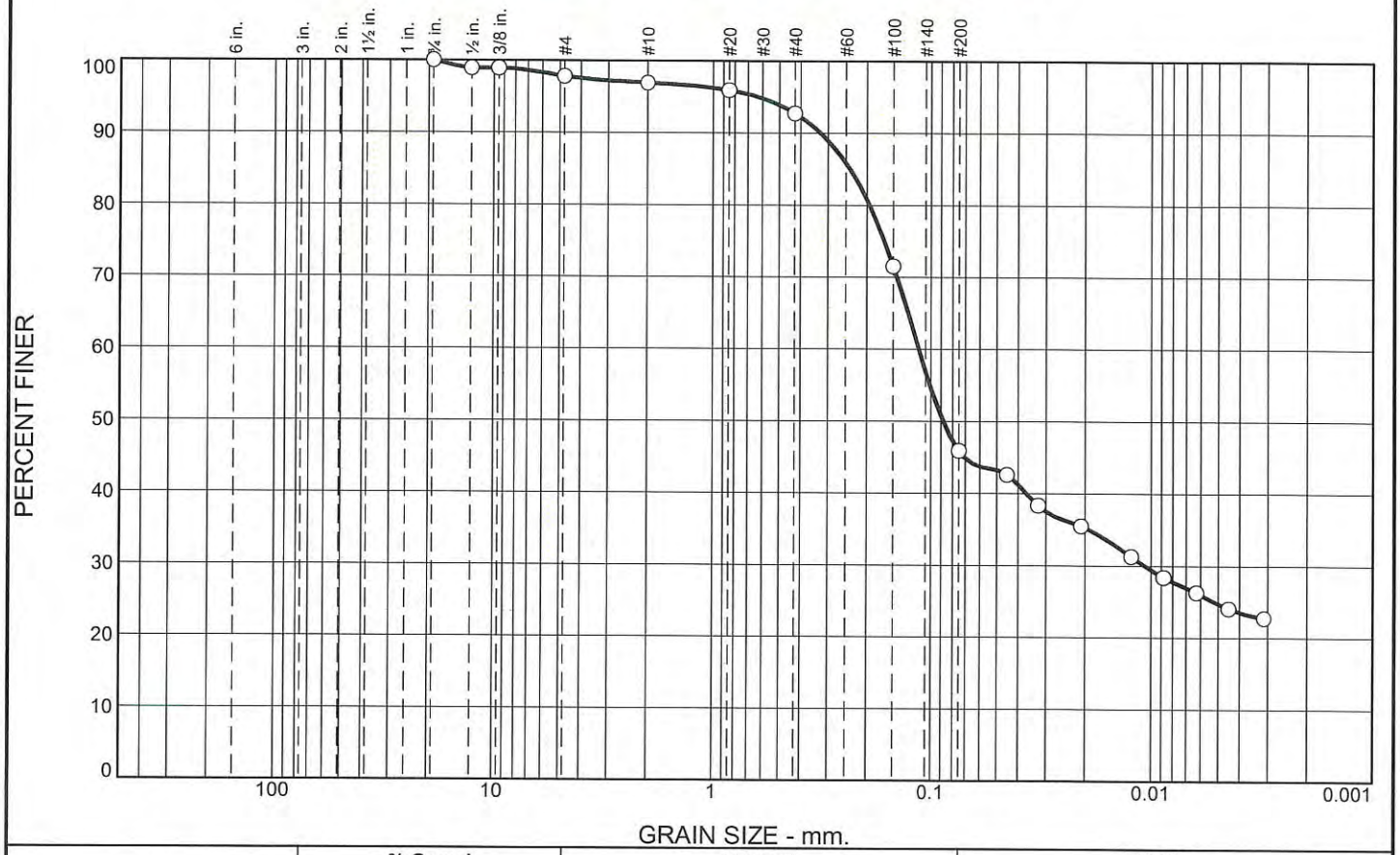
Mold Dia: 4.00 **Hammer Wt.:** 10 **Drop:** 18 **Layers:** five **Blows per Layer:** 25



Point No.	1	2	3	4
Wt. M+S	3824.9	3985.9	4031.5	4036.6
Wt. M	1986.8	1986.8	1986.8	1986.8
Wt. W+T	1161.8	1082.4	1053.9	1110.3
Wt. D+T	1109.3	967.2	970.9	1010.4
Tare	195.0	106.9	112.2	103.1
Moist.	5.7	13.4	9.7	11.0
Dry Den.	115.0	116.6	123.3	122.1

Test Results: **Max. Dry Den.=** 123.3 pcf **Opt. Moist.=** 9.7%

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.2	0.9	4.2	46.8	45.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75"	100.0		
0.5"	98.9		
0.375"	98.9		
#4	97.8		
#10	96.9		
#20	95.9		
#40	92.7		
#100	71.5		
#200	45.9		

* (no specification provided)

Material Description

Silty Sand (#31979)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3254 D_{85}= 0.2395 D_{60}= 0.1140
D_{50}= 0.0880 D_{30}= 0.0107 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B11-1 **Depth:** 0-7'

Date: 11/13/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31979

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 0-7' **Sample Number:** B11-1
Material Description: Silty Sand (#31979)
Date: 11/13/18
USCS Classification: SM
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
0.75"	100.0
0.5"	98.9
0.375"	98.9
#4	97.8
#10	96.9
#20	95.9
#40	92.7
#100	71.5
#200	45.9

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 96.9
Weight of hydrometer sample =68.93
Hygroscopic moisture correction:
Moist weight and tare = 132.85
Dry weight and tare = 132.04
Tare weight = 76.70
Hygroscopic moisture = 1.5%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	20.0	33.0	29.9	0.0136	33.0	10.9	0.0450	42.6
2.00	20.0	30.0	26.9	0.0136	30.0	11.4	0.0325	38.3
5.00	20.0	28.0	24.9	0.0136	28.0	11.7	0.0209	35.5
15.00	20.1	25.0	21.9	0.0136	25.0	12.2	0.0123	31.3
30.00	20.1	23.0	19.9	0.0136	23.0	12.5	0.0088	28.4
60.00	20.1	21.5	18.4	0.0136	21.5	12.8	0.0063	26.3
120.00	20.0	20.0	16.9	0.0136	20.0	13.0	0.0045	24.1
250.00	20.1	19.0	15.9	0.0136	19.0	13.2	0.0031	22.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.2	2.2	0.9	4.2	46.8	51.9			45.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0107	0.0367	0.0880	0.1140	0.1944	0.2395	0.3254	0.6306

Fineness Modulus
0.55

COMPACTION TEST REPORT

Curve No.: #31980

Project No.: 5015150030.36 **Date:** 11/7/18
Project: #2945 Tecolote Canyon Sewer
Client: TerraCosta Consulting Group
Sample Number: B7-2 **Depth:** 5'-10'

Remarks:

MATERIAL DESCRIPTION

Description: Silty Gravel (#31980)

Classifications - **USCS:** GM **AASHTO:**
Nat. Moist. = **Sp.G. =** 2.602
Liquid Limit = **Plasticity Index =**
% < No.200 = 31.6 %

ROCK CORRECTED TEST RESULTS	UNCORRECTED
Maximum dry density = 138.7 pcf	134.6 pcf
Optimum moisture = 6.6 %	7.5 %

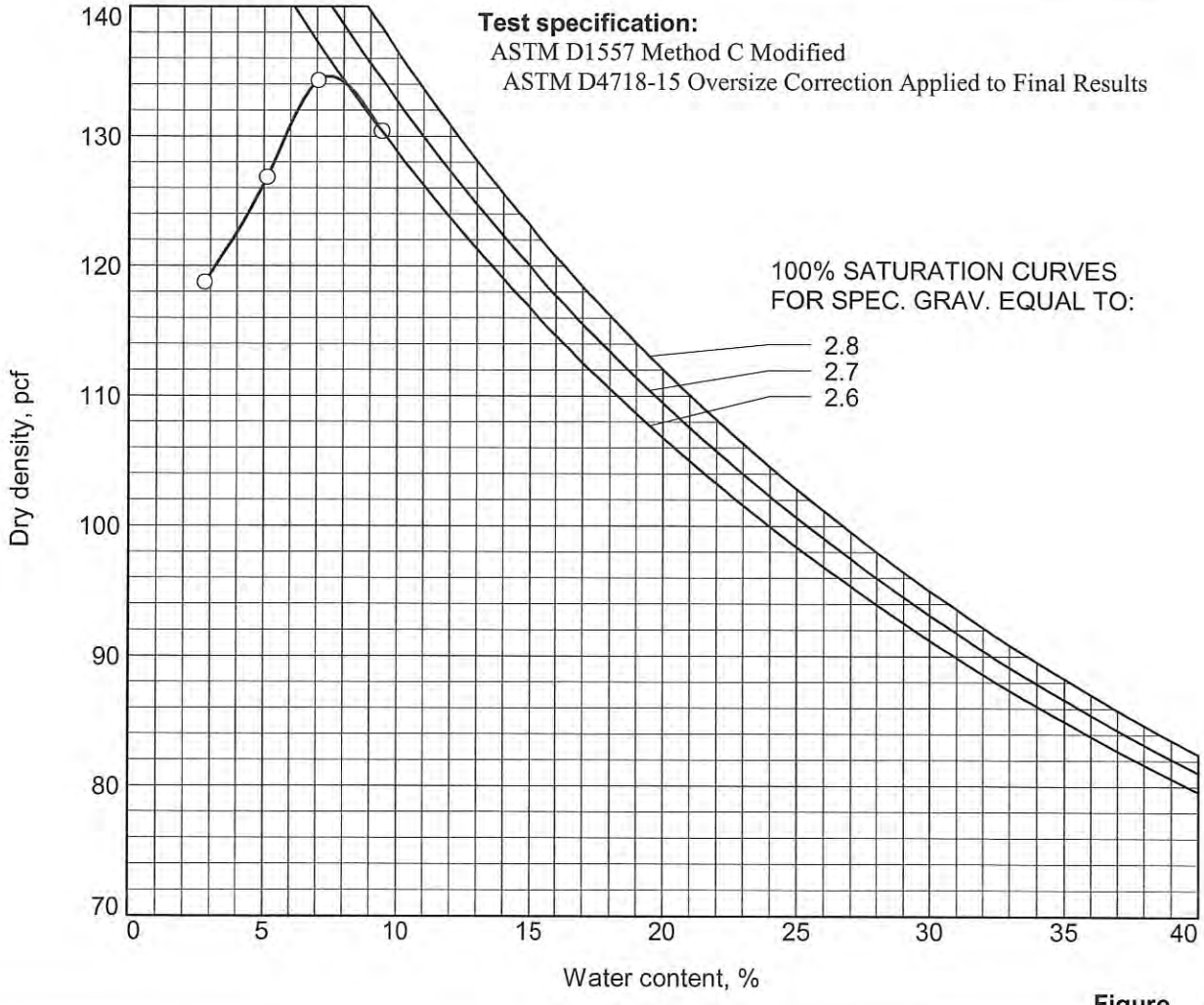


Figure #31980

AMEC

Tested By: B. Brown **Checked By:** L. Collins

MOISTURE DENSITY TEST DATA

12/10/2018

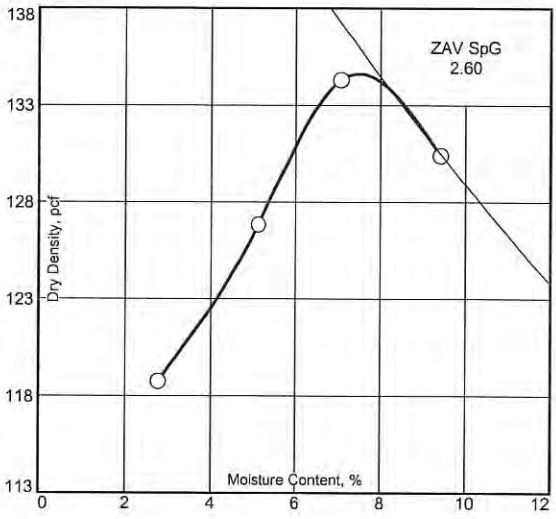
Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 5'-10'
Sample Number: B7-2
Description: Silty Gravel (#31980)
Date: 11/7/18
USCS Classification: GM
Tested by: B. Brown
Checked by: L. Collins

Test Data and Results For Curve #31980

Test Specification:

Type of Test: ASTM D1557 Method C Modified

Mold Dia: 6.00 **Hammer Wt.:** 10 **Drop:** 18 **Layers:** five **Blows per Layer:** 56



Point No.	1	2	3	4
Wt. M+S	7733.5	7695.5	7377.8	6995.3
Wt. M	2847.8	2847.8	2847.8	2847.8
Wt. W+T	2144.4	2091.4	2418.6	2241.6
Wt. D+T	2018.0	1941.0	2312.0	2186.8
Tare	228.1	343.4	228.6	226.1
Moist.	7.1	9.4	5.1	2.8
Dry Den.	134.3	130.4	126.8	118.7

Rock Corrected Results: **Max. Dry Den.=** 138.7 pcf **Opt. Moist.=** 6.6%
Uncorrected Results: **Max. Dry Den.=** 134.6 pcf **Opt. Moist.=** 7.5%

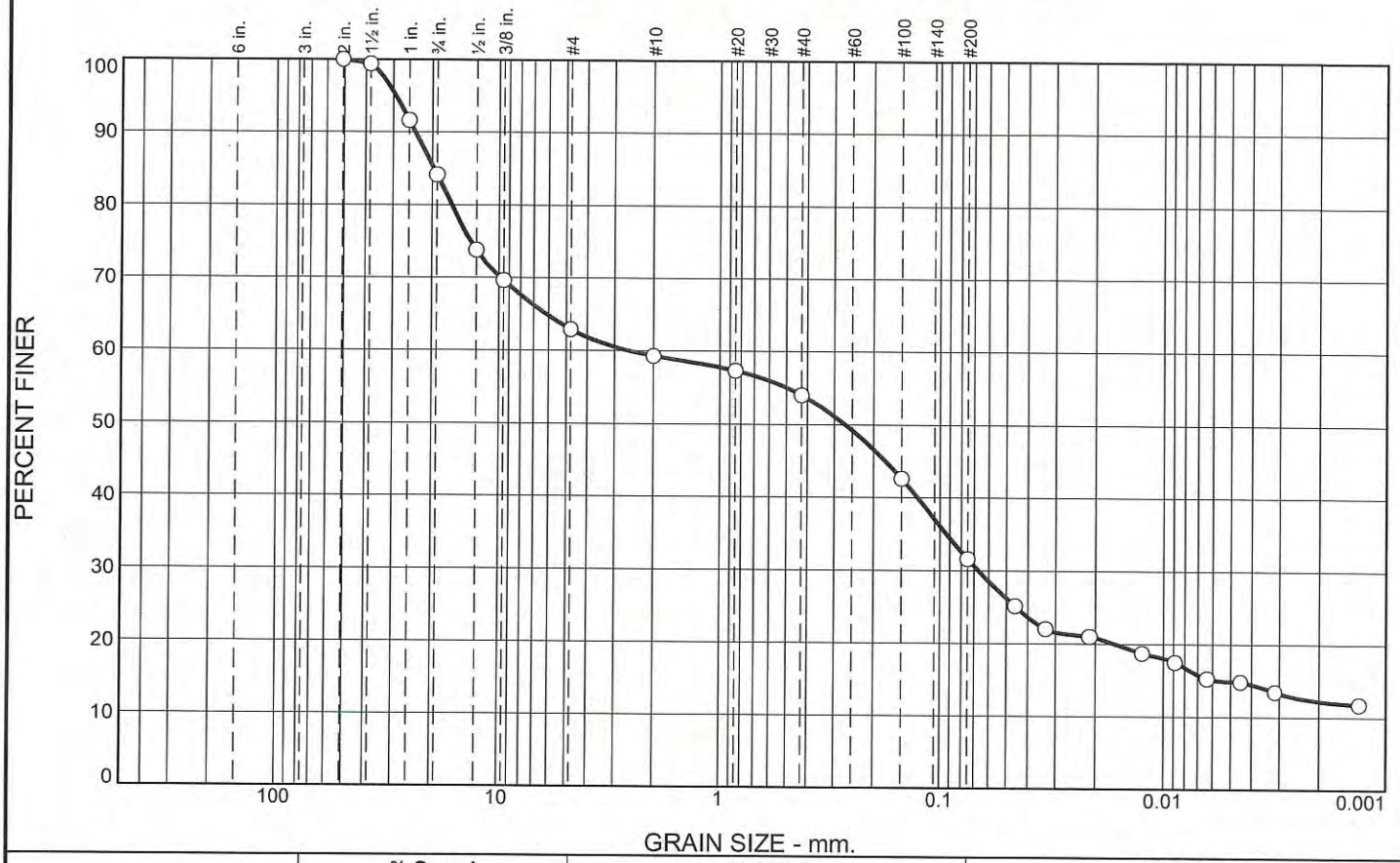
Rock Correction Data **Correction Method:** ASTM D4718-15

Percentage of Oversize Material (%> 3/4 in.): 15.9 **Bulk Specific Gravity of Oversize Material:** 2.65

Oversize Material Moisture Content: 2.0

Note: the rock correction was applied to the calculated max. density and opt. moisture values.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.9	21.2	3.6	5.3	22.4	19.4	12.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100.0		
1.5"	99.4		
1.0"	91.6		
0.75"	84.1		
0.5"	73.8		
0.375"	69.6		
#4	62.9		
#10	59.3		
#20	57.3		
#40	54.0		
#100	42.6		
#200	31.6		

* (no specification provided)

Material Description

Silty Gravel (#31980)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 23.8370 D_{85}= 19.6915 D_{60}= 2.5961
D_{50}= 0.2681 D_{30}= 0.0670 D_{15}= 0.0059
D_{10}= C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.

Sample Number: B7-2 **Depth:** 5'-10'

Date: 11/15/18

amec

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer

Project No: 5015150030.36 **Figure** #31980

Tested By: J. Iacovera **Checked By:** L. Collins

GRAIN SIZE DISTRIBUTION TEST DATA

12/10/2018

Client: TerraCosta Consulting Group
Project: #2945 Tecolote Canyon Sewer
Project Number: 5015150030.36
Depth: 5'-10' **Sample Number:** B7-2
Material Description: Silty Gravel (#31980)
Date: 11/15/18
USCS Classification: GM
Testing Remarks: Assumed specific gravity of 2.65 used for hydrometer calculations and soil particles smaller than 0.002mm have been classified as clay.
Tested by: J. Iacovera **Checked by:** L. Collins

Sieve Test Data

Sieve Opening Size	Percent Finer
2"	100.0
1.5"	99.4
1.0"	91.6
0.75"	84.1
0.5"	73.8
0.375"	69.6
#4	62.9
#10	59.3
#20	57.3
#40	54.0
#100	42.6
#200	31.6

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 59.3
Weight of hydrometer sample =68.19
Hygroscopic moisture correction:
Moist weight and tare = 146.35
Dry weight and tare = 143.71
Tare weight = 80.62
Hygroscopic moisture = 4.2%
Table of composite correction values:

Temp., deg. C:	19.1	20.3	20.9	21.3	22.6
Comp. corr.:	-3.5	-3.0	-2.8	-2.8	-2.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.294964 - .164 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
1.00	19.8	31.0	27.8	0.0137	31.0	11.2	0.0458	25.2
2.00	19.8	27.5	24.3	0.0137	27.5	11.8	0.0332	22.0
5.00	19.5	26.5	23.2	0.0137	26.5	11.9	0.0212	21.0
15.00	19.5	24.0	20.7	0.0137	24.0	12.4	0.0125	18.7
30.00	19.8	22.5	19.3	0.0137	22.5	12.6	0.0089	17.5
60.00	19.8	20.0	16.8	0.0137	20.0	13.0	0.0064	15.2
120.00	19.9	19.5	16.3	0.0137	19.5	13.1	0.0045	14.8
250.00	19.9	18.0	14.8	0.0137	18.0	13.3	0.0032	13.4
1440.00	20.1	16.0	12.9	0.0136	16.0	13.7	0.0013	11.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	15.9	21.2	37.1	3.6	5.3	22.4	31.3	19.4	12.2	31.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0059	0.0165	0.0670	0.1270	0.2681	2.5961	16.4157	19.6915	23.8370	29.2675

Fineness Modulus
3.16

wood.

LABORATORY TEST RESULTS OF SOIL SAMPLES

Project Name: Terracosta - Tecolote Canyon Swer Replacement (#2945) Reviewed by: _____ Date: _____
Project No.: 5015150030.36 Tested by: PG Date: 11/14/2018

				Soil Resistivity	Chemical Analysis in mg/kg (ppm)		
				CTM 643	CTM 643	CTM 422	CTM 417
Lab No.	Boring No.	Description	Depth (ft)	Min. Resistivity (ohm-cm)	pH	Cl	SO_4
31971	10 - 1	Silt with Sand	0 - 5	650	7.04	365	173
31972	2 - 1	Silty Sand	0 - 8	1,094	7.08	78	554
31973	3 - 2	Sandy Silt	5 - 10	630	7.63	222	397
31975	5 - 1	Silty Sand	0 - 5	1,113	7.46	117	167
31978	9 - 1	Silty Sand	0 - 6	892	6.99	159	317
31979	11 - 1	Silty Sand	0 - 7	463	7.97	324	656
31980	7 - 2	Silty Gravel	5 - 10	1,338	8.01	92	289

Notes:
NT = Not tested
CTM = CALTRANS Test Method
mg/kg = milligrams per kilogram of (parts per million) of dry soil
Chemical analysis for CTM 417 and 422 were made on 1:3 soil-to-water extract

Respectfully Submitted:
Wood Environment & Infrastructure Solutions, Inc.

David C. Wilson, P.E. #54734
Senior Associate Engineer - Materials

wood.

LABORATORY TEST RESULTS OF SOIL SAMPLES

Project Name: Terracosta - LA/LB Coast Guard, San Pedro, Home Port Project
Project No.: 5015150030.35

Reviewed by: _____ Date: _____
Tested by: PG Date: 11/7/2018

				Soil Resistivity	Chemical Analysis in mg/kg (ppm)		
				CTM 643	CTM 643	CTM 422	CTM 417
Lab No.	Boring No.	Description	Depth (ft)	Min. Resistivity (ohm-cm)	pH	Cl	SO_4
31919*	2 - 7	Clay	50 - 52	135	7.38	3,276	1,149

Notes:
NT = Not tested
CTM = CALTRANS Test Method
mg/kg = milligrams per kilogram of (parts per million) of dry soil
*Chemical analysis for CTM 417 and 422 were made on 1:9 soil-to-water extract instead of standard 1:3 due to higher amount of Cl & SO_4

Respectfully Submitted:
Wood Environment & Infrastructure Solutions, Inc.

David C. Wilson, P.E. #54734
Senior Associate Engineer - Materials

APPENDIX C

SOUTHLAND GEOTECHNICAL CONSULTANTS
2013 BORING LOGS AND
LABORATORY TEST RESULTS

TerraCosta
Consulting Group

EXPLANATION OF GEOTECHNICAL BORING LOG

Tecolote Canyon Sewer Bridge
Project No. 268G21
November 6, 2013
Top of Hole Elevation ± 50 feet

Pacific Drilling
Fraste Drill Rig
6-inch Hollow Stem Auger
Sampler 140 lbs., 30-inch drop

Boring No. X
Sheet 1 of 1
Logged by ST
Sampled by ST

Depth in Feet	Graphic Log	Sample No.	Blows Per Foot	Dry Density (pcf)	Water Content (%)	USCS Soil Type	Geotechnical Description
0		Bulk 1					Bulk sample - sample number and depth interval shown
		CAL1	28	118.7	7.4		Relatively undisturbed drive sample (Modified California Sampler) (number indicates sample number CAL1)
		Bulk 2					
5		SPT-1	24				Standard Penetration Test (number indicates sample number SPT-1)
10		SPT-2	10				
15		SPT-3	55			SP	USCS Unified Soil Classification System
20							Total depth = 19 feet No groundwater encountered at time of drilling Backfilled 05 Sep 08
25							
30							

SGC

GEOTECHNICAL BORING LOG

Tecolote Canyon Sewer Bridge
Project No. 268G21
November 6, 2013
Top of Hole Elevation: 51 feet (approx)

Pacific Drilling
Fraste Track-mounted Drill Rig
6-inch Hollow Stem Auger
Sampler: 140lbs., 30-incn drop

SOUTH Boring
Sheet 1 of 1
Logged by ST
Sampled by ST

Depth in Feet	Graphic Log	Sample No.	Blows Per Foot	Dry Density (pcf)	Water Content (%)	USCS Soil Type	Geotechnical Description
0						SM	FILL @ 0' - Brown, dry to damp, loose, silty fine sand; some medium sand grains: increased moisture with depth (appears locally-derived fil/trench backfill soils)
5		SPT-1	4	-	12.6		@ 5-7'- Approximated gradational zone to alluvium
						SM	ALLUVIUM @ 7' - Brown, damp to wet (with depth), loose, silty to clayey fine to some medium sand
10		CAL1	8	105.9	22.2		@ 11' - approx depth of groundwater table
		Bulk 1 @ 10-15'					
15		SPT-2	4	-	24.1		
20		SPT-3	10	-	18.6		@ 20' - gravel and medium sand in sampler
		Bulk 2 @ 20-25'					@ 22' - interbedded clayey fine sand, silty fine sand, medium sand and gravel layers
25		SPT-4	20	-	18.3		@ 25' - gravel and medium sand in sampler
30							Total depth = 26.5 feet Groundwater encountered at depth of approx.11 feet at time of drilling Backfilled 06Nov2013 (bentonite chips, overlain by soil)

SGC

GEOTECHNICAL BORING LOG

Tecolote Canyon Sewer Bridge
Project No. 268G21
November 6, 2013
Top of Hole Elevation: 51 feet (approx)

Pacific Drilling
Fraste Track-mounted Drill Rig
6-inch Hollow Stem Auger
Sampler: 140lbs., 30-incn drop

NORTH Boring
Sheet 1 of 1
Logged by ST
Sampled by ST

Depth in Feet	Graphic Log	Sample No.	Blows Per Foot	Dry Density (pcf)	Water Content (%)	USCS Soil Type	Geotechnical Description
0						SM-ML	FILL @ 0' - Light orange-bown, dry, loose, silty fine sand to sandy silt; increased density with depth, increased moisture with depth (appears locally-derived fill soils)
5		CAL1	7	88.5	10.7		@ 5-7'- Approximated gradational zone to alluvium
		Bulk 1 @ 5-10'				SM-ML	ALLUVIUM @ 7' - Reddish brown to dark brown, damp, loose, silty fine sand to sandy silt
10		SPT-1	16	-	11.9		increasing density and moisture with depth
15		CAL2	25	115.4	15.3		
		Bulk 2 @ 15-19'					
20							Total depth = 19 feet - effective refusal on rock No groundwater encountered at time of drilling Backfilled 06Nov2013 (with soil)
25							
30							

SGC

APPENDIX C

LABORATORY TEST RESULTS

Classification

Soils were classified using the Unified Soil Classification System (USCS) in general accordance with ASTM D 2487 and D2488. The USCS symbols for the soil types are indicated on the geotechnical boring logs in Appendix B.

In Situ Moisture/Density

The in situ field moisture contents and field dry densities of soil samples from the exploratory borings are indicated on the geotechnical boring logs in Appendix B.

Maximum Dry Density/Optimum Moisture Content

The maximum dry density and optimum moisture content of a selected sample of the onsite soils at the project site were evaluated. The tests were performed in general accordance with ASTM D1557. The results of the test are presented in the following table (and on a following page).

SAMPLE NUMBER	SAMPLE DESCRIPTION	MAX DRY DENSITY (pcf)	OPT MOISTURE CONTENT (%)
North Boring Bulk 1 @ 5-10'	Brown silty fine sand (SM) with gravel (fill/alluvium)	120.2	10.8

Expansion Index

The expansion potential of a selected sample of the onsite soils at the project site was evaluated in general accordance with ASTM Test Method D4829. The results of the test are presented below:

SAMPLE NUMBER	SAMPLE DESCRIPTION	EXPANSION INDEX	EXPANSION POTENTIAL
North Boring Bulk 1 @5-10'	Brown silty fine sand (SM) with gravel (fill/alluvium)	52	medium

LABORATORY TEST RESULTS
(continued)

Direct Shear Tests (Remolded and Undisturbed)

Direct shear tests were performed on an undisturbed sample and a remolded sample of the onsite soils. The remolded sample was remolded to 90 percent of its laboratory maximum dry density (ASTM D1557). The samples were tested using a direct shear device of the strain control type in which the rate of deformation is approximately 0.005 inch per minute. The samples are sheared under various normal loads to obtain the internal angle of friction and cohesion. Prior to shearing, the samples were saturated and drained to simulate extreme moisture conditions. The results of the tests are presented in the following table (and on following pages).

SAMPLE NUMBER	SAMPLE DESCRIPTION	FRICTION ANGLE (degrees)	COHESION (psf)
South Boring CAL1 @ 11-11.5' (undisturbed)	Brown, silty fine sand (SM) (fill/alluvium)	36	73
North Boring Bulk 1 @ 5-10' (remolded)	Brown, silty fine sand (SM) (fill/alluvium)	29	176

Soluble Sulfate Content

The soluble sulfate contents of selected samples of the onsite soils were evaluated in general accordance with California Test Method No. 417. The results of the tests are presented below:

SAMPLE NUMBER	SAMPLE DESCRIPTION	SOLUBLE SULFATE CONTENT (%)
South Boring Bulk 1 @ 10-15'	Brown silty fine sand (SM) (fill/alluvium)	0.017
North Boring Bulk 1 @ 5-10'	Brown, silty fine sand (SM) (fill/alluvium)	0.038

LABORATORY TEST RESULTS
(continued)

Soluble Chloride Content

The soluble chloride contents of selected samples of the onsite soils were evaluated in general accordance with California Test Method No. 422. The results of the tests are presented below:

SAMPLE NUMBER	SAMPLE DESCRIPTION	SOLUBLE CHLORIDE CONTENT (%)
South Boring Bulk 1 @ 10-15'	Brown silty fine sand (SM) (fill/alluvium)	0.013
North Boring Bulk 1 @ 5-10'	Brown, silty fine sand (SM) (fill/alluvium)	0.037

pH

The pH of samples of the onsite soils were evaluated and the test results are presented in the following table.

SAMPLE NUMBER	SAMPLE DESCRIPTION	pH
South Boring Bulk 1 @ 10-15'	Brown silty fine sand (SM) (fill/alluvium)	8.2
North Boring Bulk 1 @ 5-10'	Brown silty fine sand (fill/alluvium)	7.8

LABORATORY TEST RESULTS
(continued)

Minimum Resistivity

The minimum resistivity values of selected samples of the onsite soils were evaluated in general accordance with California Test Method 643. The results of the tests are presented below:

SAMPLE NUMBER	WATER ADDED (ml)	RESISTIVITY (ohm-cm)
South Boring Bulk 1 @ 10-15' (fill/alluvium)	10 5 5 5 5 5	3100 2200 1500 1300 1500 1700
California Department of Transportation, Division of Construction, Method for Estimating the Service Life of Steel Culverts, 1999. 34 years to perforation for a 16 gauge metal culvert 44 years to perforation for a 14 gauge metal culvert 61 years to perforation for a 12 gauge metal culvert 78 years to perforation for a 10 gauge metal culvert 95 years to perforation for an 8 gauge metal culvert		

continued

LABORATORY TEST RESULTS
(continued)

SAMPLE NUMBER	WATER ADDED (ml)	RESISTIVITY (ohm-cm)
North Boring	10	2200
	5	1100
	5	620
Bulk 1 @10-15'	5	470
	5	450
(fill/alluvium)	5	480
	5	510

California Department of Transportation, Division of Construction,
Method for Estimating the Service Life of Steel Culverts, 1999.
22 years to perforation for a 16 gauge metal culvert
29 years to perforation for a 14 gauge metal culvert
40 years to perforation for a 12 gauge metal culvert
51 years to perforation for a 10 gauge metal culvert
62 years to perforation for an 8 gauge metal culvert

12/5/2013

SC ST Southern California Soil & Testing

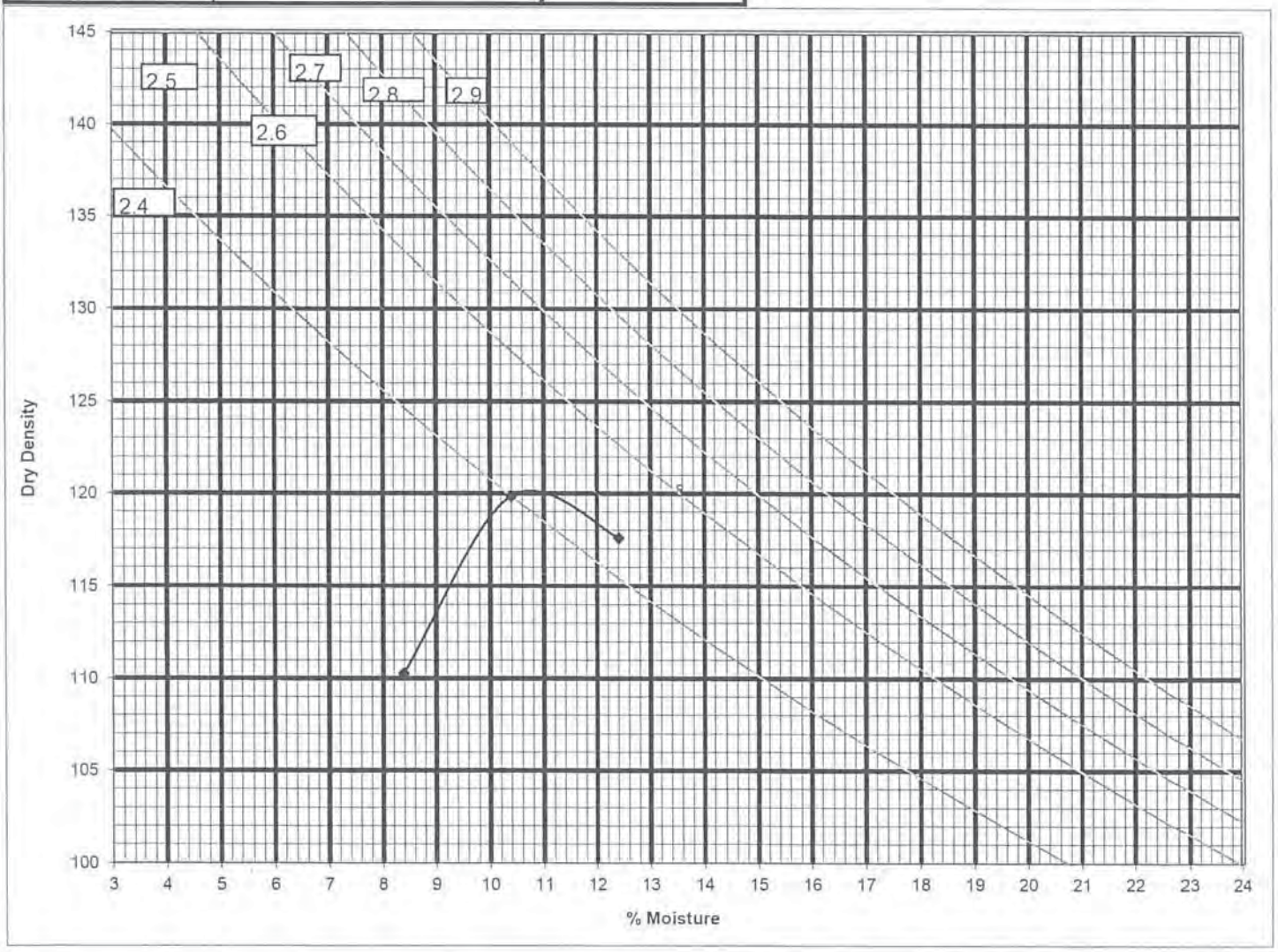
Maximum Density & Optimum Moisture

Project Name: Southland Geotechnical #268G21				Job Number: 1312018		
SOIL DESCRIPTION: Brown Silty Sand w/Gravel				Location:		
Sample Number: B-2, Bulk 1 at 5-10' NORTH Boring				+4% Trace	Date: 12/3/13	
POINT % added	0	2	4			
SOIL &MOLD	3802	3996	3994			
MOLD	1994	1994	1994			
SOIL	1808	2002	2000			
WET DENS.	119.5	132.3	132.2			
WET SOIL	500.0	500.0	500.0			
DRY SOIL	461.3	452.9	444.8			
%MOISTURE	8.4	10.4	12.4			
DRY DENS.	110.2	119.9	117.6			

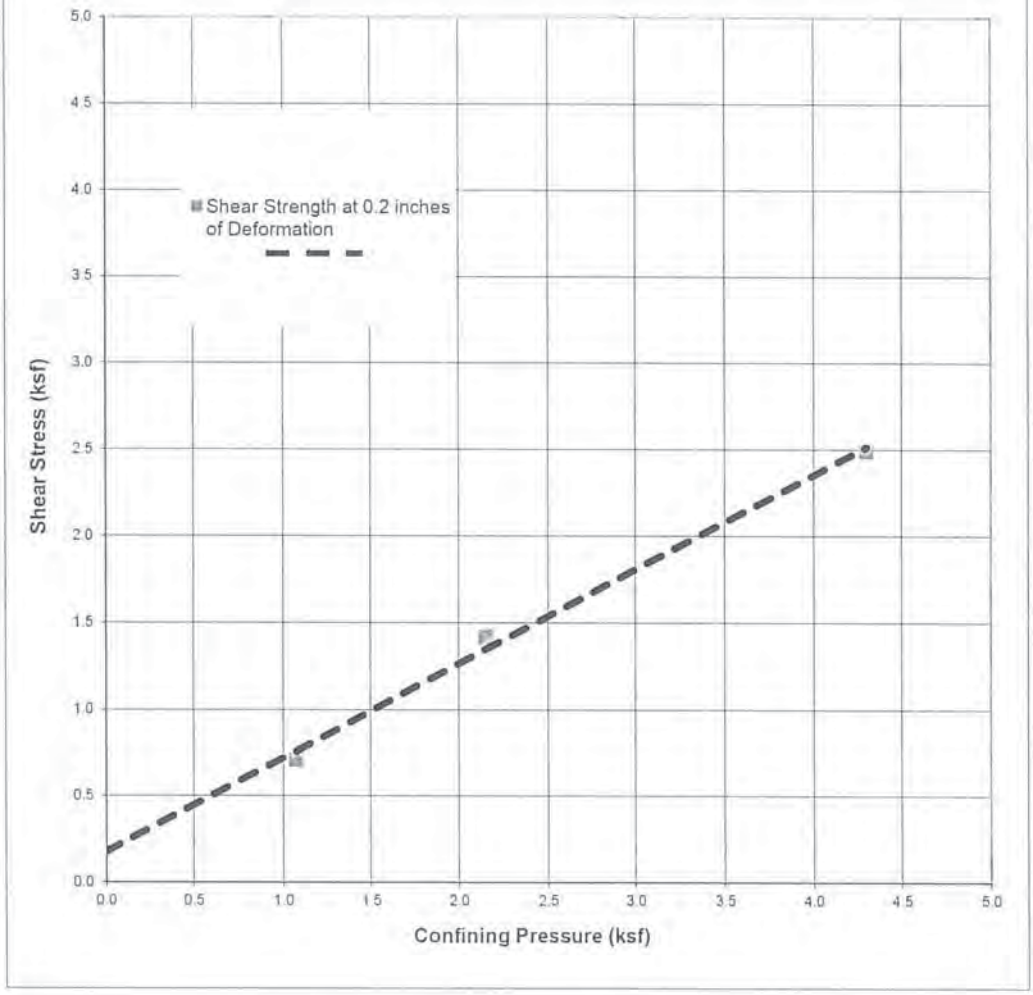
SCALP	#4
C.F. MOLD	1/30 cu.ft.
LAYERS	5
HAMMER	10 lb.
DROP	18"
BLOWS/LAYER	25
SETUP BY	DH
TESTED BY	TS

	WT. RETAINED	%RETAINED
+3/4"		
+3/8"		
+#4		
TOTAL		

ASTM D1557	A
MAXIMUM DENSITY	120.2
OPTIMUM M.C.	10.8



Direct Shear Test Results



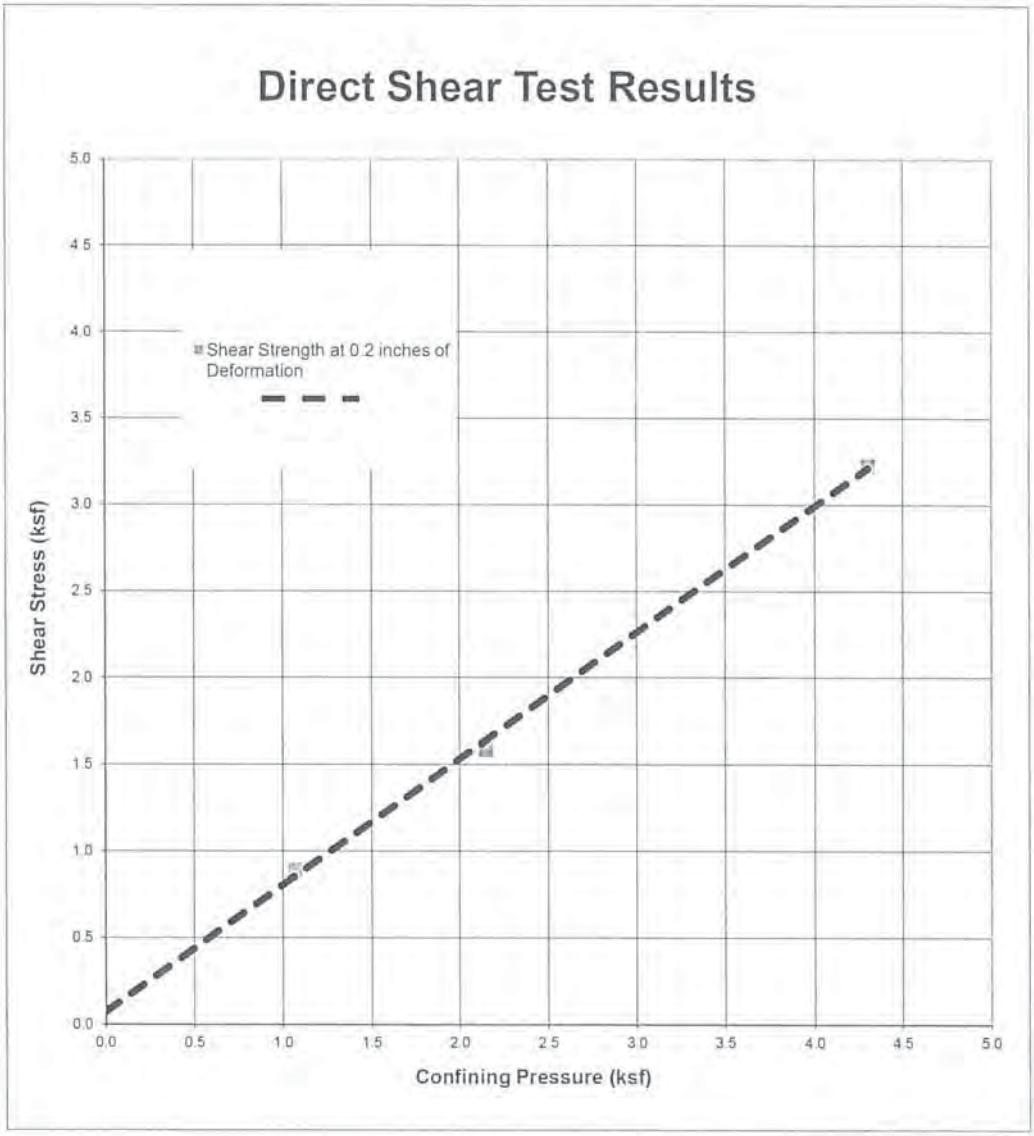
SAMPLE	DESCRIPTION	INTERNAL FRICTION ANGLE(DEG.)	COHESION INTERCEPT (PSF)
B-2 Bulk 1@5-10 NORTH Boring	Dark Brown Silty Sand W/Clay (Remold To 90%)		
Shear Strength at 0.2 inches of Deformation		29	176

SOUTHERN CALIFORNIA SOIL & TESTING

Southland Geotech #268G21

By:	CA	Date:	12/13/2013
Job Number:	1312018		

Direct Shear Test Results



SAMPLE	DESCRIPTION	INTERNAL FRICTION ANGLE(DEG.)	COHESION INTERCEPT (PSF)
CAL 1@11-11.5 SOUTH Boring *Shear Strength at 0.2 inches of Deformation*	Brown Silty Sand	36	73

SC ST SOUTHERN CALIFORNIA SOIL & TESTING

Southland Geo #268G21

By:	CA	Date:	12/5/2013
Job Number:	1312018		

APPENDIX D

FAULTS LOCATED
WITHIN 100 MILES OF THE SITE

TerraCosta
Consulting Group

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*                    *
*    E Q F A U L T   *
*                    *
*    Version 3.00    *
*                    *
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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 9842-0000

DATE: 01-25-2019

JOB NAME: Test Run

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: CDMGFLTE.DAT

SITE COORDINATES:
SITE LATITUDE: 32.7776
SITE LONGITUDE: 117.1853

SEARCH RADIUS: 100 mi

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

FAULT-DATA FILE USED: CDMGFLTE.DAT

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	ESTIMATED MAX. EARTHQUAKE EVENT: PEAK SITE ACCEL. g	ESTIMATED MAX. EARTHQUAKE EVENT: EST. SITE INTENSITY MOD.MERC.
ROSE CANYON	0.5(0.8)	6.9	0.580	X
CORONADO BANK	13.7(22.1)	7.4	0.254	IX
NEWPORT-INGLEWOOD (Offshore)	29.7(47.8)	6.9	0.109	VII
ELSINORE-JULIAN	39.1(62.9)	7.1	0.098	VII
ELSINORE-TEMECULA	42.6(68.6)	6.8	0.078	VII
EARTHQUAKE VALLEY	44.8(72.1)	6.5	0.064	VI
ELSINORE-COYOTE MOUNTAIN	49.5(79.7)	6.8	0.070	VI
PALOS VERDES	56.0(90.1)	7.1	0.074	VII
ELSINORE-GLEN IVY	60.5(97.4)	6.8	0.060	VI
SAN JACINTO-COYOTE CREEK	61.1(98.3)	6.8	0.059	VI
SAN JACINTO-ANZA	61.3(98.6)	7.2	0.073	VII
SAN JACINTO - BORREGO	64.6(103.9)	6.6	0.051	VI
SAN JACINTO-SAN JACINTO VALLEY	68.3(109.9)	6.9	0.057	VI
NEWPORT-INGLEWOOD (L.A.Basin)	71.6(115.2)	6.9	0.055	VI
CHINO-CENTRAL AVE. (Elsinore)	74.6(120.0)	6.7	0.059	VI
SUPERSTITION MTN. (San Jacinto)	74.9(120.5)	6.6	0.046	VI
LAGUNA SALADA	75.8(122.0)	7.0	0.056	VI
WHITTIER	78.9(126.9)	6.8	0.049	VI
ELMORE RANCH	79.3(127.6)	6.6	0.044	VI
SUPERSTITION HILLS (San Jacinto)	80.0(128.7)	6.6	0.043	VI
COMPTON THRUST	81.0(130.3)	6.8	0.058	VI
ELYSIAN PARK THRUST	85.3(137.2)	6.7	0.053	VI
SAN JACINTO-SAN BERNARDINO	85.7(137.9)	6.7	0.043	VI
SAN ANDREAS - Southern	86.5(139.2)	7.4	0.062	VI
SAN ANDREAS - San Bernardino	86.5(139.2)	7.3	0.059	VI
SAN ANDREAS - Coachella	88.0(141.7)	7.1	0.052	VI
PINTO MOUNTAIN	92.5(148.8)	7.0	0.048	VI
BURNT MTN.	93.3(150.2)	6.4	0.035	V
BRAWLEY SEISMIC ZONE	94.4(152.0)	6.4	0.034	V
IMPERIAL	94.5(152.1)	7.0	0.047	VI
SAN JOSE	95.7(154.0)	6.5	0.044	VI
EUREKA PEAK	95.9(154.3)	6.4	0.034	V
CUCAMONGA	98.2(158.1)	7.0	0.055	VI
SIERRA MADRE	98.4(158.3)	7.0	0.055	VI

****

-END OF SEARCH- 34 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE ROSE CANYON FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 0.5 MILES (0.8 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5800 g

APPENDIX E

SUMMARY OF HISTORICAL EARTHQUAKES

TerraCosta Consulting Group

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


JOB NUMBER: 0042-0000
                                                DATE: 01-25-2019

JOB NAME: Test Run

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  4.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  32.7776
   SITE LONGITUDE:  117.1853

SEARCH DATES:
           START DATE:   1800
           END DATE:   2000

SEARCH RADIUS:
           100.0 mi
           160.9 km

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

MINIMUM DEPTH VALUE (km):  0.0
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EARTHQUAKE SEARCH RESULTS

Page 1

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
MGI	32.8000	117.1000	05/25/1803	0 0 0.0	0.0	5.00	0.165	VIII	5.2(8.3)
MGI	32.7000	117.2000	05/20/1920	1330 0.0	0.0	4.00	0.095	VII	5.4(8.7)
MGI	32.7000	117.2000	09/08/1915	742 0.0	0.0	4.00	0.095	VII	5.4(8.7)
MGI	32.7000	117.2000	04/19/1906	028 0.0	0.0	4.30	0.112	VII	5.4(8.7)
DMG	32.7000	117.2000	05/27/1862	20 0 0.0	0.0	5.90	0.259	IX	5.4(8.7)
PAS	32.6790	117.1510	06/18/1985	32228.7	5.7	4.00	0.081	VII	7.1(11.4)
T-A	32.6700	117.1700	04/15/1865	840 0.0	0.0	4.30	0.092	VII	7.5(12.0)
T-A	32.6700	117.1700	12/00/1856	0 0 0.0	0.0	5.00	0.133	VIII	7.5(12.0)
T-A	32.6700	117.1700	01/25/1863	1020 0.0	0.0	4.30	0.092	VII	7.5(12.0)
T-A	32.6700	117.1700	05/24/1865	0 0 0.0	0.0	5.00	0.133	VIII	7.5(12.0)
T-A	32.6700	117.1700	10/21/1862	0 0 0.0	0.0	5.00	0.133	VIII	7.5(12.0)
PAS	32.6150	117.1520	10/29/1986	23815.3	14.6	4.10	0.062	VI	11.4(18.3)
PAS	32.6270	117.3770	06/29/1983	8 836.4	5.0	4.60	0.066	VI	15.2(24.5)
DMG	33.0000	117.3000	11/22/1800	2130 0.0	0.0	6.50	0.166	VIII	16.7(26.9)
DMG	32.8500	117.4830	02/23/1943	92112.0	0.0	4.00	0.042	VI	18.0(28.9)
MGI	33.0000	117.0000	12/29/1914	10 0 0.0	0.0	4.00	0.041	V	18.7(30.2)
DMG	33.0000	117.0000	03/03/1906	2025 0.0	0.0	4.50	0.053	VI	18.7(30.2)
MGI	33.0000	117.0000	09/21/1856	730 0.0	0.0	5.00	0.069	VI	18.7(30.2)
MGI	32.8000	116.8000	08/14/1927	1448 0.0	0.0	4.60	0.049	VI	22.4(36.1)
DMG	32.8000	116.8000	10/23/1894	23 3 0.0	0.0	5.70	0.088	VII	22.4(36.1)
MGI	32.7000	116.7000	03/21/1918	2325 0.0	0.0	4.00	0.030	V	28.7(46.2)
GSP	33.0700	116.8000	12/04/1991	071057.5	15.0	4.20	0.032	V	30.1(48.4)
MGI	33.2000	117.0000	07/20/1923	7 0 0.0	0.0	4.00	0.028	V	31.1(50.0)
MGI	33.1000	116.8000	06/22/1918	557 0.0	0.0	4.00	0.028	V	31.5(50.7)
PAS	32.9470	117.7360	01/15/1989	153955.2	6.0	4.20	0.029	V	34.0(54.7)
DMG	33.2670	117.0170	06/07/1935	1633 0.0	0.0	4.00	0.025	V	35.2(56.6)
MGI	33.0000	116.6000	06/11/1917	354 0.0	0.0	4.00	0.024	V	37.2(59.9)
PAS	32.3020	116.8810	08/19/1978	931 5.7	19.8	4.10	0.025	V	37.3(60.0)
DMG	32.8000	117.8330	01/24/1942	214148.0	0.0	4.00	0.024	V	37.6(60.5)
PAS	32.9450	117.8060	09/07/1984	11 313.4	6.0	4.30	0.028	V	37.8(60.8)
DMG	32.7170	117.8330	11/06/1950	205546.0	0.0	4.40	0.030	V	37.8(60.9)
DMG	32.5830	117.8000	04/19/1939	741 0.0	0.0	4.50	0.031	V	38.2(61.4)
PAS	32.9700	117.8030	07/14/1986	03246.2	10.0	4.00	0.024	IV	38.2(61.5)
GSP	32.9700	117.8100	04/04/1990	085439.3	6.0	4.00	0.024	IV	38.6(62.1)
DMG	33.1000	116.6330	02/08/1952	174028.0	0.0	4.00	0.023	IV	39.0(62.7)
PAS	32.9450	117.8310	07/29/1986	81741.8	10.0	4.10	0.025	V	39.2(63.1)
GSP	32.9850	117.8180	06/21/1995	211736.2	6.0	4.30	0.027	V	39.4(63.4)
PAS	32.9330	117.8410	07/29/1986	81741.6	10.0	4.30	0.027	V	39.5(63.6)
DMG	33.2000	116.7200	05/12/1930	172548.5	0.0	4.20	0.026	V	39.7(63.9)
USG	33.0170	117.8170	07/14/1986	11112.6	10.0	4.12	0.024	V	40.2(64.7)
USG	33.0170	117.8170	07/16/1986	1247 3.7	10.0	4.11	0.024	V	40.2(64.7)
DMG	33.2000	116.7000	01/01/1920	235 0.0	0.0	5.00	0.038	V	40.5(65.2)
MGI	33.1000	116.6000	08/19/1917	710 0.0	0.0	4.00	0.023	IV	40.6(65.3)
MGI	33.1000	116.6000	08/10/1921	19 6 0.0	0.0	4.00	0.023	IV	40.6(65.3)
MGI	33.1000	116.6000	08/10/1921	2151 0.0	0.0	4.00	0.023	IV	40.6(65.3)
MGI	33.1000	116.6000	02/16/1915	1330 0.0	0.0	4.00	0.023	IV	40.6(65.3)
MGI	33.1000	116.6000	02/05/1922	1915 0.0	0.0	4.00	0.023	IV	40.6(65.3)
MGI	33.1000	116.6000	05/28/1917	1017 0.0	0.0	4.00	0.023	IV	40.6(65.3)
MGI	33.1000	116.6000	05/11/1915	1145 0.0	0.0	4.00	0.023	IV	40.6(65.3)
MGI	33.1000	116.6000	03/04/1915	1250 0.0	0.0	4.00	0.023	IV	40.6(65.3)
MGI	33.1000	116.6000	02/09/1920	220 0.0	0.0	4.00	0.023	IV	40.6(65.3)
T-A	32.2500	117.5000	01/13/1877	20 0 0.0	0.0	5.00	0.038	V	40.8(65.6)
PAS	32.9860	117.8440	10/01/1986	201218.6	6.0	4.00	0.023	IV	40.8(65.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
PAS	32.9900	117.8490	07/13/1986	14 133.0	12.0	4.60	0.031	V	41.2(66.3)
MGI	32.6000	116.5000	05/03/1918	425 0.0	0.0	4.00	0.022	IV	41.7(67.0)
PAS	32.7590	117.9060	10/18/1976	172753.1	13.8	4.20	0.025	V	41.9(67.4)
PAS	32.9710	117.8700	07/13/1986	1347 8.2	6.0	5.30	0.044	VI	41.9(67.4)
PAS	32.7140	117.9100	10/18/1976	172652.6	15.1	4.20	0.024	V	42.3(68.1)
DMG	33.1500	116.5830	12/02/1935	319 0.0	0.0	4.00	0.022	IV	43.3(69.7)
DMG	33.1100	116.5230	01/24/1957	205449.9	3.9	4.60	0.029	V	44.7(72.0)
MGI	33.2000	116.6000	10/12/1920	1748 0.0	0.0	5.30	0.042	VI	44.7(72.0)
DMG	33.0020	116.4360	07/02/1957	65638.5	12.8	4.10	0.022	IV	46.1(74.2)
DMG	33.0000	116.4330	06/04/1940	1035 8.3	0.0	5.10	0.037	V	46.2(74.4)
PAS	32.7560	117.9880	01/12/1975	212214.8	15.3	4.80	0.031	V	46.6(75.0)
PAS	33.1380	116.5010	10/10/1984	212258.9	11.6	4.50	0.026	V	46.8(75.3)
PAS	33.0330	117.9440	02/22/1983	21830.4	10.0	4.30	0.024	IV	47.4(76.2)
DMG	33.1670	116.5000	06/23/1932	22552.7	0.0	4.00	0.020	IV	47.9(77.1)
DMG	33.1670	116.5000	06/23/1932	23037.1	0.0	4.00	0.020	IV	47.9(77.1)
DMG	33.1000	116.4500	11/23/1953	1339 7.0	0.0	4.30	0.023	IV	48.1(77.4)
DMG	33.0970	116.4440	08/18/1959	215221.3	17.3	4.30	0.023	IV	48.3(77.7)
DMG	32.9670	116.3830	10/31/1942	15 758.0	0.0	4.00	0.020	IV	48.3(77.8)
DMG	32.6800	116.3540	01/21/1970	1124 0.4	8.0	4.10	0.021	IV	48.7(78.4)
PAS	32.6250	118.0090	07/11/1981	215029.4	5.0	4.30	0.023	IV	49.0(78.9)
DMG	32.0830	117.0000	05/10/1948	34925.0	0.0	4.00	0.020	IV	49.2(79.1)
DMG	33.1670	116.4670	08/01/1960	193930.0	0.0	4.20	0.022	IV	49.5(79.7)
DMG	33.4540	116.8980	07/29/1936	142252.8	10.0	4.00	0.019	IV	49.6(79.8)
DMG	33.4560	116.8960	06/16/1938	55916.9	10.0	4.00	0.019	IV	49.7(80.0)
DMG	33.1170	116.4170	10/21/1940	64933.0	0.0	4.50	0.025	V	50.3(81.0)
DMG	33.1170	116.4170	06/04/1940	103656.0	0.0	4.00	0.019	IV	50.3(81.0)
T-A	33.5000	117.0700	12/29/1880	7 0 0.0	0.0	4.30	0.022	IV	50.3(81.0)
DMG	32.1670	117.6670	10/29/1935	1017 0.0	0.0	4.50	0.025	V	50.6(81.5)
GSP	33.1100	116.4000	04/01/1984	071702.3	11.0	4.00	0.019	IV	51.0(82.0)
DMG	33.5000	117.0000	08/08/1925	1013 0.0	0.0	4.50	0.025	V	51.0(82.1)
DMG	33.0380	116.3610	02/26/1957	211652.2	0.0	4.10	0.020	IV	51.0(82.2)
GSP	32.7260	118.0680	12/27/2000	002714.1	6.0	4.10	0.020	IV	51.4(82.7)
DMG	32.1130	116.7850	04/23/1968	131825.4	10.0	4.20	0.021	IV	51.5(82.8)
DMG	32.7000	116.3000	02/24/1892	720 0.0	0.0	6.70	0.078	VII	51.7(83.2)
DMG	32.3330	116.4670	01/13/1935	224 0.0	0.0	4.00	0.019	IV	51.9(83.5)
DMG	32.6000	116.3170	06/15/1946	194653.0	0.0	4.80	0.029	V	51.9(83.6)
DMG	33.1670	116.4170	12/05/1939	173352.0	0.0	4.00	0.019	IV	52.0(83.7)
DMG	33.1670	116.4170	10/14/1935	1550 0.0	0.0	4.00	0.019	IV	52.0(83.7)
DMG	33.1670	116.4170	07/10/1938	18 6 0.0	0.0	4.00	0.019	IV	52.0(83.7)
DMG	32.6800	118.0770	10/28/1973	22 0 2.7	8.0	4.50	0.024	V	52.2(84.0)
DMG	33.5000	116.9170	11/04/1935	355 0.0	0.0	4.50	0.024	V	52.2(84.1)
PAS	33.4200	116.6980	06/05/1978	16 3 3.9	11.9	4.40	0.023	IV	52.5(84.6)
DMG	32.9610	116.2900	08/25/1971	23 033.0	8.0	4.00	0.018	IV	53.4(86.0)
DMG	32.9230	116.2720	10/14/1969	131842.7	10.0	4.50	0.024	IV	53.9(86.8)
DMG	32.9520	116.2790	09/13/1973	173039.8	8.0	4.80	0.028	V	53.9(86.8)
DMG	33.1210	116.3490	05/25/1971	10 252.9	8.0	4.10	0.019	IV	53.9(86.8)
GSP	32.6810	118.1090	06/20/1997	043540.5	6.0	4.70	0.026	V	54.1(87.0)
DMG	32.0000	117.0670	06/23/1939	2048 0.0	0.0	4.50	0.024	IV	54.1(87.1)
DMG	33.1830	116.3830	10/14/1949	02925.0	0.0	4.10	0.019	IV	54.2(87.3)
PAS	32.9050	116.2610	12/25/1975	71852.3	3.6	4.00	0.018	IV	54.3(87.4)
DMG	33.0530	116.3060	04/02/1967	201538.6	1.0	4.30	0.021	IV	54.4(87.5)
DMG	32.2000	116.5500	11/05/1949	43524.0	0.0	5.10	0.032	V	54.4(87.5)
DMG	32.2000	116.5500	11/06/1949	23 510.0	0.0	4.00	0.018	IV	54.4(87.5)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	32.2000	116.5500	11/04/1949	204238.0	0.0	5.70	0.044	VI	54.4(87.5)
DMG	32.2000	116.5500	11/11/1949	1354 0.0	0.0	4.20	0.020	IV	54.4(87.5)
DMG	32.2000	116.5500	11/05/1949	20 2 7.0	0.0	4.00	0.018	IV	54.4(87.5)
DMG	33.4880	116.7770	06/12/1959	11 313.0	5.7	4.00	0.018	IV	54.4(87.6)
MGI	33.5000	116.8000	06/02/1917	435 0.0	0.0	4.00	0.018	IV	54.6(87.9)
MGI	33.5000	116.8000	11/26/1916	17 5 0.0	0.0	4.00	0.018	IV	54.6(87.9)
MGI	33.5000	116.8000	05/31/1917	435 0.0	0.0	4.00	0.018	IV	54.6(87.9)
MGI	33.5000	116.8000	03/30/1918	16 5 0.0	0.0	4.60	0.025	V	54.6(87.9)
DMG	33.4500	116.6830	04/25/1955	25515.0	0.0	4.00	0.018	IV	54.8(88.1)
DMG	32.0000	117.0000	02/11/1949	95725.0	0.0	4.00	0.018	IV	54.8(88.1)
DMG	32.0000	117.0000	04/27/1942	112754.0	0.0	4.00	0.018	IV	54.8(88.1)
DMG	32.5290	118.0820	05/26/1973	234633.3	8.0	4.30	0.021	IV	54.9(88.3)
DMG	32.9900	116.2680	11/08/1958	132044.1	2.4	4.10	0.019	IV	55.2(88.8)
DMG	32.9500	116.2500	11/14/1951	2355 3.0	0.0	4.10	0.019	IV	55.5(89.4)
GSP	32.6850	118.1380	06/20/1997	053855.0	6.0	4.20	0.020	IV	55.7(89.6)
DMG	33.4000	116.5670	02/04/1953	43616.0	0.0	4.30	0.021	IV	55.9(90.0)
DMG	33.4830	116.7000	12/28/1948	125341.0	0.0	4.00	0.018	IV	56.2(90.4)
DMG	31.9920	116.9270	04/10/1968	104237.8	10.0	4.50	0.023	IV	56.3(90.6)
DMG	33.2670	116.4000	06/06/1940	2321 4.0	0.0	4.00	0.018	IV	56.6(91.1)
DMG	32.0830	116.6670	11/25/1934	818 0.0	0.0	5.00	0.030	V	56.7(91.2)
DMG	32.0830	116.6670	09/27/1934	2140 0.0	0.0	4.00	0.017	IV	56.7(91.2)
DMG	32.0830	116.6670	10/12/1938	1231 0.0	0.0	4.00	0.017	IV	56.7(91.2)
DMG	33.0430	116.2600	08/22/1961	231933.6	12.1	4.40	0.022	IV	56.7(91.2)
DMG	32.0000	117.5000	06/25/1939	1 9 0.0	0.0	4.00	0.017	IV	56.7(91.3)
DMG	32.0000	117.5000	05/01/1939	2353 0.0	0.0	5.00	0.030	V	56.7(91.3)
DMG	32.0000	117.5000	05/03/1939	828 0.0	0.0	4.00	0.017	IV	56.7(91.3)
DMG	32.0000	117.5000	06/24/1939	1627 0.0	0.0	5.00	0.030	V	56.7(91.3)
DMG	32.0000	117.5000	05/01/1939	2357 0.0	0.0	4.50	0.023	IV	56.7(91.3)
DMG	32.0000	117.5000	05/03/1939	2358 0.0	0.0	4.50	0.023	IV	56.7(91.3)
DMG	33.4170	116.5670	12/22/1950	2 536.0	0.0	4.00	0.017	IV	56.8(91.4)
GSP	32.6260	118.1510	06/20/1997	080413.6	6.0	4.60	0.024	IV	57.1(91.8)
MGI	32.8000	116.2000	07/23/1929	1155 0.0	0.0	4.30	0.020	IV	57.2(92.1)
DMG	32.8170	116.2000	11/22/1953	81138.0	0.0	4.10	0.018	IV	57.2(92.1)
DMG	33.4670	116.6330	02/20/1934	1035 0.0	0.0	4.00	0.017	IV	57.3(92.2)
DMG	32.7180	118.1720	04/28/1938	6 728.0	10.0	4.50	0.023	IV	57.4(92.4)
DMG	32.1000	116.6000	01/07/1950	93735.0	0.0	4.00	0.017	IV	57.9(93.2)
DMG	33.0330	116.2330	09/20/1961	5 410.0	0.0	4.00	0.017	IV	57.9(93.3)
DMG	33.3330	116.4330	02/12/1954	94428.0	0.0	4.50	0.022	IV	58.0(93.4)
DMG	33.0500	116.2380	08/23/1961	1 047.8	11.9	4.70	0.025	V	58.0(93.4)
DMG	33.0190	116.2250	08/20/1969	152957.2	0.6	4.00	0.017	IV	58.1(93.5)
DMG	33.0210	116.2230	01/13/1963	23938.9	13.0	4.20	0.019	IV	58.3(93.8)
DMG	33.4000	116.5000	10/11/1918	4 0 0.0	0.0	4.00	0.017	IV	58.5(94.1)
GSP	32.8220	116.1750	05/24/1992	122225.8	12.0	4.10	0.018	IV	58.7(94.5)
DMG	32.7500	118.2000	06/25/1939	149 0.0	0.0	4.50	0.022	IV	58.9(94.9)
DMG	33.4670	116.5830	03/27/1937	742 0.0	0.0	4.50	0.022	IV	59.0(94.9)
DMG	33.4670	116.5830	01/04/1938	029 0.0	0.0	4.50	0.022	IV	59.0(94.9)
DMG	33.4670	116.5830	03/27/1937	528 0.0	0.0	4.00	0.017	IV	59.0(94.9)
DMG	33.4670	116.5830	03/26/1937	2124 0.0	0.0	4.00	0.017	IV	59.0(94.9)
DMG	33.2000	116.3000	05/12/1930	414 0.0	0.0	4.00	0.017	IV	59.0(94.9)
DMG	33.3680	116.4440	03/25/1937	232026.7	10.0	4.00	0.017	IV	59.2(95.2)
DMG	33.2830	116.3500	04/13/1949	75336.0	0.0	4.10	0.018	IV	59.6(96.0)
PAS	33.0580	116.2110	03/22/1982	85328.6	4.6	4.50	0.022	IV	59.7(96.1)
DMG	33.5080	116.6310	08/11/1967	05711.4	10.7	4.10	0.018	IV	59.7(96.1)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	31.9540	117.5060	09/29/1972	141341.2	8.0	4.30	0.020	IV	59.9(96.3)
DMG	33.4200	116.4900	03/29/1937	17 316.8	10.0	4.00	0.017	IV	59.9(96.3)
DMG	31.9390	116.8930	04/10/1968	1055 3.2	10.0	4.30	0.020	IV	60.4(97.1)
GSP	32.5880	116.1670	03/13/1999	133120.4	6.0	4.30	0.019	IV	60.6(97.5)
GSP	32.5920	116.1650	02/19/1999	030832.2	3.0	4.20	0.018	IV	60.7(97.6)
DMG	32.5330	116.1830	02/22/1939	1030 0.0	0.0	4.00	0.017	IV	60.7(97.6)
DMG	32.5330	116.1830	11/12/1939	1849 0.0	0.0	4.00	0.017	IV	60.7(97.6)
DMG	32.0000	116.7000	12/02/1929	1124 0.0	0.0	4.50	0.022	IV	60.7(97.7)
GSP	32.5930	116.1630	04/07/1999	062640.1	8.0	4.00	0.017	IV	60.8(97.8)
GSP	32.5870	116.1630	04/18/1999	155301.1	7.0	4.20	0.018	IV	60.8(97.9)
DMG	32.0830	117.8330	09/13/1940	144548.0	0.0	4.50	0.022	IV	61.0(98.2)
DMG	33.5060	116.5850	05/21/1967	144234.4	19.4	4.70	0.024	IV	61.1(98.3)
DMG	33.5330	116.6330	09/21/1942	7 754.0	0.0	4.00	0.016	IV	61.1(98.4)
DMG	32.9500	116.1500	10/25/1942	185939.0	0.0	4.00	0.016	IV	61.2(98.5)
DMG	32.1670	116.4170	09/17/1950	194330.0	0.0	4.50	0.021	IV	61.5(98.9)
DMG	33.2910	116.3170	03/19/1966	142156.0	10.9	4.00	0.016	IV	61.5(99.0)
DMG	32.1000	116.5000	01/08/1937	1246 0.0	0.0	4.00	0.016	IV	61.5(99.0)
PAS	33.5580	116.6670	06/15/1982	234921.3	12.2	4.80	0.025	V	61.6(99.2)
DMG	33.2350	116.2660	04/09/1968	93833.0	5.2	4.00	0.016	IV	61.9(99.6)
DMG	32.8670	118.2500	02/13/1952	151337.0	0.0	4.70	0.024	IV	62.1(99.9)
DMG	33.3430	116.3460	04/28/1969	232042.9	20.0	5.80	0.042	VI	62.3(100.3)
PAS	33.4840	116.5130	08/11/1976	152455.5	15.4	4.30	0.019	IV	62.4(100.4)
DMG	32.8940	116.1190	09/16/1961	194939.4	18.5	4.40	0.020	IV	62.4(100.4)
DMG	33.2000	116.2330	04/05/1942	92039.0	0.0	4.00	0.016	IV	62.4(100.4)
DMG	31.9700	116.6980	04/23/1968	132234.8	10.0	4.00	0.016	IV	62.6(100.7)
DMG	33.4170	116.4170	01/02/1943	141118.0	0.0	4.50	0.021	IV	62.6(100.8)
DMG	33.3000	116.3000	01/04/1940	8 711.0	0.0	4.00	0.016	IV	62.7(100.8)
DMG	33.4830	116.5000	02/15/1951	104759.0	0.0	4.80	0.025	V	62.8(101.0)
DMG	33.4830	116.5000	02/15/1951	104957.0	0.0	4.80	0.025	V	62.8(101.0)
PAS	33.5200	116.5580	08/02/1975	014 7.7	13.4	4.70	0.023	IV	62.8(101.0)
DMG	33.4260	116.4210	03/25/1937	20 4 8.3	10.0	4.00	0.016	IV	62.9(101.2)
DMG	33.3150	116.3050	04/09/1968	1831 3.8	12.6	4.70	0.023	IV	63.0(101.4)
PAS	33.5010	116.5130	02/25/1980	104738.5	13.6	5.50	0.035	V	63.3(101.8)
DMG	33.5340	116.5610	09/23/1956	112441.9	12.2	4.30	0.019	IV	63.5(102.2)
DMG	33.5000	116.5000	09/30/1916	211 0.0	0.0	5.00	0.027	V	63.7(102.5)
DMG	33.7000	117.1000	06/11/1902	245 0.0	0.0	4.50	0.021	IV	63.9(102.8)
PAS	33.4580	116.4340	02/12/1979	44842.3	3.9	4.20	0.018	IV	64.0(103.0)
DMG	33.3330	116.3000	08/06/1933	332 0.0	0.0	4.70	0.023	IV	64.0(103.0)
DMG	33.3330	116.3000	08/05/1933	2331 0.0	0.0	4.40	0.020	IV	64.0(103.0)
DMG	33.5450	117.8070	10/27/1969	1316 2.3	6.5	4.50	0.021	IV	64.0(103.0)
DMG	33.2000	116.2000	05/28/1892	1115 0.0	0.0	6.30	0.053	VI	64.1(103.1)
GSG	31.8490	117.1980	01/29/1995	160231.5	12.0	4.40	0.020	IV	64.1(103.2)
DMG	32.6000	116.1000	12/24/1941	73012.0	0.0	4.50	0.021	IV	64.2(103.4)
DMG	33.2790	116.2490	01/07/1966	191023.0	-1.7	4.00	0.016	IV	64.3(103.5)
DMG	33.5000	116.4830	02/23/1941	183614.0	0.0	4.50	0.021	IV	64.3(103.5)
GSP	33.3990	116.3540	07/26/1997	031456.0	11.0	4.80	0.024	V	64.4(103.7)
DMG	33.4670	116.4330	05/12/1939	1925 2.2	0.0	4.50	0.021	IV	64.5(103.8)
DMG	33.1670	116.1670	11/16/1937	1057 0.0	0.0	4.00	0.016	IV	64.8(104.3)
GSP	33.6320	116.7190	07/19/1999	220927.5	14.0	4.20	0.018	IV	64.8(104.4)
DMG	33.7000	117.4000	04/11/1910	757 0.0	0.0	5.00	0.027	V	64.9(104.4)
DMG	33.7000	117.4000	05/15/1910	1547 0.0	0.0	6.00	0.045	VI	64.9(104.4)
DMG	33.7000	117.4000	05/13/1910	620 0.0	0.0	5.00	0.027	V	64.9(104.4)
PAS	33.4830	116.4380	07/02/1988	02658.2	12.6	4.00	0.016	IV	65.1(104.8)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.6500	116.7500	09/05/1950	191956.0	0.0	4.80	0.024	V	65.3(105.0)
GSP	33.6500	116.7400	12/02/1989	231647.8	14.0	4.20	0.017	IV	65.5(105.4)
DMG	32.7860	116.0550	07/04/1938	215945.3	10.0	4.00	0.016	IV	65.6(105.6)
DMG	32.7960	116.0550	11/30/1965	84325.1	16.4	4.00	0.016	IV	65.6(105.6)
DMG	33.0020	116.0850	11/21/1964	172559.7	4.1	4.20	0.017	IV	65.6(105.6)
DMG	33.2370	116.1900	04/14/1968	125558.7	10.8	4.30	0.018	IV	65.8(105.9)
DMG	33.6820	117.5530	07/05/1938	18 655.7	10.0	4.50	0.020	IV	66.0(106.1)
GSP	33.5100	116.4500	02/18/1990	155259.9	9.0	4.10	0.016	IV	66.1(106.3)
DMG	33.7100	116.9250	09/23/1963	144152.6	16.5	5.00	0.026	V	66.1(106.4)
DMG	33.1170	116.1170	06/18/1943	161546.0	0.0	4.50	0.020	IV	66.2(106.5)
DMG	33.7380	117.1870	04/27/1962	91232.1	5.7	4.10	0.016	IV	66.3(106.7)
DMG	33.6990	117.5110	05/31/1938	83455.4	10.0	5.50	0.034	V	66.3(106.8)
DMG	33.5010	116.4290	02/23/1971	0 739.2	8.0	4.20	0.017	IV	66.4(106.8)
DMG	32.3340	116.1700	08/24/1963	204749.5	4.8	4.10	0.016	IV	66.5(107.1)
PAS	33.4600	116.3700	09/07/1984	175730.3	15.2	4.10	0.016	IV	66.7(107.3)
DMG	33.3100	116.2240	05/22/1968	132655.4	7.5	4.40	0.019	IV	66.7(107.3)
USG	32.7700	118.3340	06/16/1985	1027 0.7	5.0	4.14	0.017	IV	66.7(107.3)
DMG	31.8110	117.1310	12/22/1964	205433.2	2.3	5.60	0.036	V	66.8(107.5)
DMG	33.4000	116.3000	02/09/1890	12 6 0.0	0.0	6.30	0.052	VI	66.8(107.6)
PAS	33.7010	116.8370	08/22/1979	2 136.3	5.0	4.10	0.016	IV	66.8(107.6)
DMG	33.3330	116.2360	10/05/1962	1529 2.6	13.9	4.10	0.016	IV	67.0(107.8)
DMG	32.7170	116.0330	06/01/1959	163536.0	0.0	4.60	0.021	IV	67.0(107.9)
DMG	33.3330	116.2330	06/09/1942	5 633.0	0.0	4.00	0.015	IV	67.1(108.0)
DMG	33.1670	116.1170	04/09/1968	233 9.0	0.0	4.30	0.018	IV	67.5(108.6)
DMG	33.1670	116.1170	04/09/1968	23930.0	0.0	4.40	0.019	IV	67.5(108.6)
DMG	33.7170	117.5070	08/06/1938	22 056.0	10.0	4.00	0.015	IV	67.5(108.6)
DMG	33.1900	116.1290	04/09/1968	22859.1	11.1	6.40	0.054	VI	67.5(108.6)
DMG	33.7170	117.5170	06/19/1935	1117 0.0	0.0	4.00	0.015	IV	67.6(108.8)
DMG	32.8170	118.3500	12/26/1951	04654.0	0.0	5.90	0.042	V	67.6(108.9)
DMG	33.2830	116.1830	03/23/1954	41450.0	0.0	5.10	0.027	V	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	95748.0	0.0	4.00	0.015	IV	67.7(108.9)
DMG	33.2830	116.1830	10/26/1944	225410.0	0.0	4.20	0.017	IV	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	10 139.0	0.0	4.20	0.017	IV	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	13 8 4.0	0.0	4.30	0.018	IV	67.7(108.9)
DMG	33.2830	116.1830	03/20/1954	6 353.0	0.0	4.30	0.018	IV	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	957 7.0	0.0	4.60	0.021	IV	67.7(108.9)
DMG	33.2830	116.1830	04/04/1954	42920.0	0.0	4.10	0.016	IV	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	101957.0	0.0	4.50	0.020	IV	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	14 057.0	0.0	4.10	0.016	IV	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	95429.0	0.0	6.20	0.049	VI	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	143750.0	0.0	4.00	0.015	IV	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	102117.0	0.0	5.50	0.034	V	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	102610.0	0.0	4.00	0.015	IV	67.7(108.9)
DMG	33.2830	116.1830	03/20/1954	41919.0	0.0	4.90	0.024	V	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	95556.0	0.0	5.00	0.026	V	67.7(108.9)
DMG	33.2830	116.1830	03/19/1954	101522.0	0.0	4.50	0.020	IV	67.7(108.9)
DMG	33.7250	117.4980	01/03/1956	02548.9	13.7	4.70	0.022	IV	67.9(109.2)
DMG	33.7330	117.4670	10/26/1954	162226.0	0.0	4.10	0.016	IV	67.9(109.3)
DMG	33.7500	117.0000	06/06/1918	2232 0.0	0.0	5.00	0.026	V	68.0(109.4)
DMG	33.7500	117.0000	04/21/1918	223225.0	0.0	6.80	0.066	VI	68.0(109.4)
DMG	33.2170	116.1330	08/15/1945	175624.0	0.0	5.70	0.037	V	68.1(109.5)
DMG	32.0250	116.4240	08/20/1961	42843.0	12.6	4.60	0.021	IV	68.3(110.0)
DMG	33.2000	116.1170	12/28/1950	52211.0	0.0	4.20	0.017	IV	68.4(110.1)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.1330	116.0830	10/16/1940	175213.0	0.0	4.00	0.015	IV	68.4(110.1)
DMG	33.1330	116.0830	10/06/1940	181953.0	0.0	4.00	0.015	IV	68.4(110.1)
DMG	33.1330	116.0830	02/28/1940	1728 7.0	0.0	4.50	0.020	IV	68.4(110.1)
DMG	33.1330	116.0830	05/07/1936	1147 0.0	0.0	4.50	0.020	IV	68.4(110.1)
PAS	32.2020	116.2290	12/12/1979	213741.0	5.5	4.00	0.015	IV	68.4(110.1)
DMG	32.7500	116.0000	02/19/1919	458 0.0	0.0	4.50	0.020	IV	68.8(110.8)
DMG	33.1030	116.0610	04/09/1968	111754.5	4.8	4.00	0.015	IV	68.9(110.9)
DMG	33.4080	116.2610	03/25/1937	1649 1.8	10.0	6.00	0.043	VI	68.9(110.9)
DMG	33.3670	118.1500	04/16/1942	72833.0	0.0	4.00	0.015	IV	69.1(111.2)
DMG	33.7480	117.4790	06/22/1971	104119.0	8.0	4.20	0.017	IV	69.1(111.2)
PAS	33.1360	116.0710	02/29/1984	2 731.7	6.6	4.30	0.018	IV	69.1(111.3)
PAS	31.7940	117.4100	03/31/1979	213656.7	5.0	4.70	0.022	IV	69.2(111.3)
PAS	33.4710	118.0610	02/27/1984	101815.0	6.0	4.00	0.015	IV	69.7(112.1)
DMG	32.2000	116.2000	03/03/1957	11 6 3.0	0.0	4.40	0.018	IV	69.9(112.4)
DMG	33.3490	116.1880	05/19/1969	144033.0	8.6	4.50	0.019	IV	69.9(112.5)
DMG	32.9670	116.0000	10/29/1942	162157.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	11/02/1943	165716.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	11/22/1942	63951.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	11/02/1943	18 134.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	11/02/1943	164759.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	11/02/1943	1753 5.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	11/16/1943	18 9 9.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	10/21/1942	163439.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	10/26/1942	434 4.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	10/29/1942	173552.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	10/29/1942	1556 0.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	01/08/1943	024 3.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	08/17/1943	155058.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	02/24/1943	15831.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	03/07/1943	205631.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	10/21/1942	162519.0	0.0	5.00	0.025	V	70.0(112.6)
DMG	32.9670	116.0000	11/02/1943	175041.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	11/12/1942	0 737.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	10/21/1942	214928.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	10/21/1942	225031.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	10/21/1942	1638 6.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	10/21/1942	191028.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	10/22/1942	181326.0	0.0	5.00	0.025	V	70.0(112.6)
DMG	32.9670	116.0000	10/22/1942	113951.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	08/20/1944	113310.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	04/27/1943	32833.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	11/03/1942	101834.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	10/22/1942	125553.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	11/02/1942	125942.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	11/03/1942	5 629.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	03/26/1943	62957.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	04/30/1943	155256.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	10/21/1942	162654.0	0.0	5.00	0.025	V	70.0(112.6)
DMG	32.9670	116.0000	10/30/1942	53545.0	0.0	4.50	0.019	IV	70.0(112.6)
DMG	32.9670	116.0000	11/07/1942	439 6.0	0.0	4.00	0.015	IV	70.0(112.6)
DMG	32.9670	116.0000	10/21/1942	162213.0	0.0	6.50	0.055	VI	70.0(112.6)
DMG	32.9670	116.0000	04/07/1943	34614.0	0.0	4.00	0.015	IV	70.0(112.6)
PAS	32.0580	116.3370	01/29/1980	1949 3.3	5.0	4.40	0.018	IV	70.1(112.8)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.0500	116.0170	08/26/1955	52322.0	0.0	4.30	0.017	IV	70.3(113.1)
DMG	33.1040	116.0360	04/09/1968	34810.3	4.8	4.70	0.021	IV	70.3(113.1)
DMG	33.0000	116.0000	05/18/1920	625 0.0	0.0	4.50	0.019	IV	70.4(113.3)
DMG	33.1130	116.0370	04/09/1968	3 353.5	5.0	5.20	0.028	V	70.4(113.4)
DMG	31.8590	116.6570	11/15/1972	205117.4	8.0	4.00	0.015	IV	70.5(113.5)
GSP	33.2240	116.0880	07/10/1998	212913.8	12.0	4.10	0.016	IV	70.6(113.6)
DMG	33.0400	116.0050	05/11/1968	810 4.0	8.8	4.20	0.016	IV	70.8(113.9)
DMG	33.2330	116.0860	08/26/1965	133814.0	-2.0	4.50	0.019	IV	71.0(114.2)
DMG	32.9830	115.9830	05/23/1942	154729.0	0.0	5.00	0.025	V	71.1(114.5)
GSP	33.6200	117.9000	04/07/1989	200730.2	13.0	4.50	0.019	IV	71.3(114.8)
DMG	33.2670	116.1000	01/04/1954	233152.0	0.0	4.20	0.016	IV	71.3(114.8)
DMG	32.1020	116.2580	05/07/1966	32657.4	12.7	4.50	0.019	IV	71.4(114.9)
DMG	33.5670	117.9830	07/07/1937	1112 0.0	0.0	4.00	0.015	IV	71.4(114.9)
DMG	33.5670	117.9830	04/17/1934	1833 0.0	0.0	4.00	0.015	IV	71.4(114.9)
DMG	33.8000	117.0000	12/25/1899	1225 0.0	0.0	6.40	0.052	VI	71.4(114.9)
DMG	33.0560	115.9930	04/09/1968	35836.0	7.9	4.30	0.017	IV	71.7(115.4)
DMG	33.5750	117.9830	03/11/1933	518 4.0	0.0	5.20	0.027	V	71.8(115.6)
PAS	33.5080	118.0710	11/20/1988	53928.7	6.0	4.50	0.019	IV	71.9(115.6)
DMG	33.1070	116.0070	04/09/1968	8 038.5	4.0	4.00	0.015	IV	72.0(115.8)
DMG	33.0480	115.9860	04/16/1968	33029.9	8.3	4.80	0.022	IV	72.0(115.8)
DMG	31.9940	116.3700	08/20/1961	125245.9	8.2	4.00	0.015	IV	72.0(115.9)
DMG	32.0280	116.3230	09/20/1961	1036 2.6	11.4	4.20	0.016	IV	72.1(116.1)
DMG	31.8670	116.5710	02/27/1937	12918.4	10.0	5.00	0.025	V	72.4(116.5)
DMG	33.2780	116.0850	08/26/1965	125351.0	1.0	4.20	0.016	IV	72.5(116.6)
MGI	33.8000	116.9000	04/29/1918	2 0 0.0	0.0	4.00	0.014	IV	72.5(116.6)
MGI	33.8000	116.9000	06/14/1918	1024 0.0	0.0	4.00	0.014	IV	72.5(116.6)
MGI	33.8000	116.9000	04/23/1918	1415 0.0	0.0	4.00	0.014	IV	72.5(116.6)
MGI	33.8000	116.9000	12/18/1920	1726 0.0	0.0	4.00	0.014	IV	72.5(116.6)
DMG	32.0320	116.3090	08/27/1963	121 1.8	14.6	4.00	0.014	IV	72.5(116.7)
DMG	33.0830	115.9830	12/15/1937	958 0.0	0.0	4.00	0.014	IV	72.8(117.1)
DMG	33.0830	115.9830	12/10/1938	312 0.0	0.0	4.00	0.014	IV	72.8(117.1)
DMG	33.0830	115.9830	07/13/1940	163923.0	0.0	4.00	0.014	IV	72.8(117.1)
DMG	33.0830	115.9830	07/14/1940	0 144.0	0.0	4.00	0.014	IV	72.8(117.1)
DMG	33.0830	115.9830	03/02/1934	2130 0.0	0.0	4.50	0.019	IV	72.8(117.1)
GSP	32.7270	115.9260	01/13/1999	132056.0	2.0	4.40	0.018	IV	73.2(117.8)
GSP	33.2500	116.0500	08/31/1990	033800.0	8.0	4.20	0.016	IV	73.4(118.1)
DMG	33.6170	117.9670	03/11/1933	154 7.8	0.0	6.30	0.048	VI	73.5(118.2)
DMG	33.5170	118.1000	03/22/1941	82240.0	0.0	4.00	0.014	IV	73.5(118.3)
DMG	33.3330	116.1000	06/12/1943	192141.0	0.0	4.00	0.014	IV	73.6(118.4)
DMG	33.6000	118.0000	03/11/1933	217 0.0	0.0	4.50	0.019	IV	73.8(118.7)
DMG	33.6000	118.0000	03/11/1933	231 0.0	0.0	4.40	0.018	IV	73.8(118.7)
DMG	32.7920	115.9140	10/12/1936	135631.8	10.0	4.00	0.014	IV	73.8(118.8)
DMG	33.2400	116.0360	04/28/1961	63021.2	-1.2	4.20	0.016	IV	73.8(118.8)
DMG	33.0390	115.9490	05/06/1968	173147.6	6.7	4.00	0.014	IV	73.9(118.9)
DMG	33.8330	117.4000	06/05/1940	82727.0	0.0	4.00	0.014	IV	73.9(118.9)
DMG	33.5610	118.0580	01/15/1937	183547.0	10.0	4.00	0.014	IV	74.0(119.0)
DMG	32.3830	116.0000	01/03/1956	1424 1.0	0.0	4.70	0.021	IV	74.1(119.3)
DMG	32.7640	115.9080	10/12/1936	17 750.1	10.0	4.00	0.014	IV	74.2(119.3)
DMG	33.6000	118.0170	12/25/1935	1715 0.0	0.0	4.50	0.018	IV	74.4(119.7)
MGI	33.8000	117.6000	04/22/1918	2115 0.0	0.0	5.00	0.024	V	74.5(119.9)
DMG	33.8000	117.6000	09/16/1903	1210 0.0	0.0	4.00	0.014	IV	74.5(119.9)
DMG	33.2000	116.0000	08/15/1951	1227 9.0	0.0	4.00	0.014	IV	74.6(120.0)
DMG	33.1670	115.9830	07/21/1940	836 3.0	0.0	4.40	0.017	IV	74.6(120.1)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.3170	116.0670	09/04/1944	125528.0	0.0	4.10	0.015	IV	74.7(120.2)
DMG	32.9550	115.9110	04/10/1967	04717.3	4.4	4.00	0.014	IV	74.9(120.5)
DMG	33.2310	116.0040	05/26/1957	155933.6	15.1	5.00	0.024	IV	75.2(121.0)
DMG	33.2830	116.0330	03/16/1949	18 027.0	0.0	4.00	0.014	IV	75.3(121.1)
DMG	33.2830	116.0330	03/29/1951	233929.0	0.0	4.40	0.017	IV	75.3(121.1)
DMG	33.6170	118.0170	03/15/1933	111332.0	0.0	4.90	0.023	IV	75.3(121.1)
DMG	33.6170	118.0170	03/14/1933	19 150.0	0.0	5.10	0.025	V	75.3(121.1)
DMG	33.6170	118.0170	10/02/1933	1326 1.0	0.0	4.00	0.014	IV	75.3(121.1)
DMG	33.6170	118.0330	05/21/1938	944 0.0	0.0	4.00	0.014	IV	75.9(122.1)
MGI	33.7000	117.9000	07/08/1902	945 0.0	0.0	4.00	0.014	IV	75.9(122.1)
DMG	33.8000	116.7000	08/11/1911	1820 0.0	0.0	4.00	0.014	IV	75.9(122.2)
DMG	33.8000	116.7000	08/11/1911	2340 0.0	0.0	4.50	0.018	IV	75.9(122.2)
DMG	31.9670	116.3000	05/31/1961	72339.0	0.0	4.00	0.014	IV	76.1(122.5)
DMG	33.2880	116.0180	07/27/1965	14 441.4	0.6	4.30	0.016	IV	76.2(122.6)
DMG	31.7000	116.9000	11/21/1952	192618.0	0.0	4.10	0.015	IV	76.2(122.7)
DMG	33.6590	117.9810	10/20/1961	20 714.5	6.1	4.00	0.014	IV	76.3(122.7)
DMG	33.0360	115.9030	10/05/1964	121 9.5	-2.0	4.10	0.015	IV	76.4(123.0)
DMG	33.6540	117.9940	10/20/1961	194950.5	4.6	4.30	0.016	IV	76.4(123.0)
GSP	33.2100	115.9700	07/19/1991	024136.8	3.0	4.00	0.014	IV	76.4(123.0)
DMG	33.6650	117.9790	10/20/1961	214240.7	7.2	4.00	0.014	IV	76.5(123.1)
DMG	32.8850	115.8650	10/27/1963	145822.4	-2.0	4.40	0.017	IV	77.0(123.8)
DMG	32.5000	115.9000	06/25/1941	1715 0.0	0.0	4.00	0.014	IV	77.1(124.1)
PAS	33.0290	115.8880	11/26/1987	1739 2.0	1.8	4.30	0.016	IV	77.2(124.2)
GSP	33.8060	117.7150	03/07/2000	002028.2	11.0	4.00	0.014	III	77.3(124.4)
PAS	33.0170	115.8810	11/24/1987	185040.3	0.0	4.30	0.016	IV	77.4(124.6)
DMG	33.7670	117.8170	08/22/1936	521 0.0	0.0	4.00	0.014	III	77.4(124.6)
DMG	33.9000	117.2000	12/19/1880	0 0 0.0	0.0	6.00	0.039	V	77.5(124.7)
DMG	33.0330	115.8830	08/27/1945	112520.0	0.0	4.00	0.014	III	77.5(124.8)
PAS	32.9930	115.8720	11/24/1987	133259.9	0.0	4.20	0.015	IV	77.6(124.8)
DMG	33.1000	115.9000	04/25/1957	2249 0.0	0.0	4.20	0.015	IV	77.7(125.1)
DMG	33.1000	115.9000	04/25/1957	22 5 0.0	0.0	4.20	0.015	IV	77.7(125.1)
DMG	33.1000	115.9000	04/25/1957	2248 0.0	0.0	4.10	0.014	IV	77.7(125.1)
DMG	32.7000	115.8500	11/01/1941	142434.0	0.0	4.00	0.014	III	77.7(125.1)
DMG	32.0500	116.1670	02/06/1958	111530.0	0.0	4.50	0.018	IV	77.8(125.1)
DMG	33.6800	117.9930	11/20/1961	85334.7	4.4	4.00	0.014	III	77.8(125.2)
DMG	33.6710	118.0120	10/20/1961	223534.2	5.6	4.10	0.014	IV	78.0(125.5)
DMG	33.8000	116.6000	09/10/1931	436 0.0	0.0	4.00	0.014	III	78.3(125.9)
PAS	32.9320	115.8470	09/05/1982	52126.6	4.2	4.40	0.017	IV	78.3(126.1)
USG	32.6450	115.8440	02/28/1988	5 259.5	7.1	4.21	0.015	IV	78.5(126.3)
DMG	32.0500	116.1500	03/01/1945	111958.0	0.0	4.40	0.017	IV	78.5(126.4)
DMG	32.1170	116.0830	07/09/1951	9 622.0	0.0	4.20	0.015	IV	78.8(126.8)
DMG	33.0450	115.8630	12/17/1968	225351.2	8.0	4.70	0.020	IV	78.8(126.9)
MGI	33.8000	117.8000	05/19/1917	635 0.0	0.0	4.00	0.014	III	79.0(127.1)
MGI	33.8000	117.8000	11/04/1926	2238 0.0	0.0	4.60	0.019	IV	79.0(127.1)
MGI	33.8000	117.8000	05/20/1917	945 0.0	0.0	4.00	0.014	III	79.0(127.1)
MGI	33.8000	117.8000	11/09/1926	1535 0.0	0.0	4.60	0.019	IV	79.0(127.1)
MGI	33.8000	117.8000	11/07/1926	1948 0.0	0.0	4.60	0.019	IV	79.0(127.1)
MGI	33.8000	117.8000	11/10/1926	1723 0.0	0.0	4.60	0.019	IV	79.0(127.1)
MGI	33.8000	117.8000	05/19/1917	719 0.0	0.0	4.00	0.014	III	79.0(127.1)
PAS	33.5380	118.2070	05/25/1982	134430.3	13.7	4.10	0.014	IV	79.0(127.2)
DMG	33.6170	118.1170	01/20/1934	2117 0.0	0.0	4.50	0.018	IV	79.1(127.3)
DMG	33.5000	118.2500	06/18/1920	10 8 0.0	0.0	4.50	0.018	IV	79.2(127.5)
DMG	33.0530	115.8550	10/05/1964	12455.5	0.0	4.40	0.017	IV	79.4(127.8)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	31.9670	116.2170	02/18/1955	152728.0	0.0	4.70	0.019	IV	79.5(127.9)
PAS	33.0130	115.8390	11/24/1987	131556.5	2.4	6.00	0.039	V	79.7(128.3)
PAS	33.1330	115.8730	11/24/1987	133355.8	0.0	4.00	0.013	III	79.9(128.6)
DMG	33.0000	115.8330	01/08/1946	185418.0	0.0	5.40	0.028	V	79.9(128.6)
DMG	33.2670	115.9330	12/30/1960	214025.0	0.0	4.00	0.013	III	80.0(128.7)
PAS	31.8640	116.3420	12/09/1984	8 3 9.0	6.0	4.30	0.016	IV	80.0(128.7)
DMG	33.6830	118.0500	03/11/1933	658 3.0	0.0	5.50	0.030	V	80.0(128.8)
DMG	33.6830	118.0500	03/11/1933	1250 0.0	0.0	4.40	0.017	IV	80.0(128.8)
DMG	31.8990	116.2900	06/04/1964	10 341.3	-0.5	4.10	0.014	IV	80.0(128.8)
DMG	33.9330	117.3670	10/24/1943	02921.0	0.0	4.00	0.013	III	80.5(129.5)
DMG	32.1520	116.0200	02/16/1967	194127.4	5.3	4.00	0.013	III	80.5(129.5)
PAS	32.9790	115.8160	11/25/1987	135410.0	0.6	4.20	0.015	IV	80.6(129.7)
PAS	32.9960	115.8160	11/27/1987	11010.5	6.0	4.70	0.019	IV	80.8(130.0)
PAS	32.9950	115.8130	12/02/1987	4 3 6.2	1.7	4.00	0.013	III	81.0(130.3)
PAS	32.9800	115.8090	11/28/1987	03910.9	0.8	4.20	0.015	IV	81.0(130.4)
DMG	33.0330	115.8210	09/30/1971	224611.3	8.0	5.10	0.024	IV	81.0(130.4)
PAS	33.0140	115.8150	11/24/1987	131848.9	6.0	4.10	0.014	IV	81.1(130.5)
PAS	33.0360	115.8200	11/24/1987	21435.5	4.7	4.50	0.017	IV	81.1(130.6)
DMG	32.9310	115.7980	01/12/1972	1231 9.6	0.0	4.00	0.013	III	81.2(130.6)
DMG	33.8540	117.7520	10/04/1961	22131.6	4.3	4.10	0.014	IV	81.2(130.7)
DMG	33.2830	115.9170	03/28/1952	11622.0	0.0	4.20	0.015	IV	81.3(130.8)
PAS	33.0330	115.8140	11/24/1987	22159.6	4.5	4.00	0.013	III	81.4(131.0)
DMG	31.7500	116.5000	05/01/1935	1825 0.0	0.0	4.00	0.013	III	81.5(131.1)
DMG	31.7500	116.5000	04/29/1935	2149 0.0	0.0	4.00	0.013	III	81.5(131.1)
DMG	31.7500	116.5000	04/29/1935	20 8 0.0	0.0	5.00	0.022	IV	81.5(131.1)
DMG	31.7500	116.5000	05/01/1935	655 0.0	0.0	4.00	0.013	III	81.5(131.1)
DMG	31.7500	116.5000	05/01/1935	352 0.0	0.0	4.00	0.013	III	81.5(131.1)
DMG	31.7500	116.5000	05/01/1935	0 7 0.0	0.0	4.50	0.017	IV	81.5(131.1)
DMG	31.7500	116.5000	05/01/1935	1823 0.0	0.0	4.00	0.013	III	81.5(131.1)
DMG	33.7000	118.0670	07/20/1940	4 113.0	0.0	4.00	0.013	III	81.5(131.2)
DMG	33.7000	118.0670	03/11/1933	85457.0	0.0	5.10	0.024	IV	81.5(131.2)
DMG	33.7000	118.0670	03/11/1933	51022.0	0.0	5.10	0.024	IV	81.5(131.2)
DMG	33.7000	118.0670	02/08/1940	165617.0	0.0	4.00	0.013	III	81.5(131.2)
PAS	33.0220	115.8080	11/24/1987	62323.1	3.4	4.00	0.013	III	81.6(131.3)
DMG	32.5000	118.5500	02/24/1948	81510.0	0.0	5.30	0.026	V	81.6(131.4)
PAS	33.0400	115.8120	11/24/1987	253 0.7	3.5	4.70	0.019	IV	81.6(131.4)
MGI	33.8000	117.9000	05/22/1902	740 0.0	0.0	4.30	0.015	IV	81.8(131.6)
PAS	33.0470	115.8080	11/24/1987	143629.9	0.0	4.00	0.013	III	82.0(131.9)
DMG	33.7500	118.0000	11/16/1934	2126 0.0	0.0	4.00	0.013	III	82.0(131.9)
DMG	31.8330	116.3330	06/27/1932	10 720.0	0.0	4.50	0.017	IV	82.0(132.0)
DMG	31.8330	116.3330	06/27/1932	1016 9.0	0.0	4.00	0.013	III	82.0(132.0)
DMG	31.8330	116.3330	06/26/1932	103222.0	0.0	4.00	0.013	III	82.0(132.0)
DMG	31.8330	116.3330	06/27/1932	94643.0	0.0	4.00	0.013	III	82.0(132.0)
DMG	33.1830	115.8500	04/25/1957	222148.0	0.0	4.20	0.015	IV	82.2(132.4)
DMG	33.1830	115.8500	04/25/1957	222412.0	0.0	5.10	0.023	IV	82.2(132.4)
PAS	33.0500	115.8000	11/24/1987	21647.2	6.0	4.00	0.013	III	82.5(132.7)
PAS	33.0480	115.7980	11/24/1987	21523.2	5.0	4.80	0.020	IV	82.5(132.8)
DMG	33.9170	116.7500	01/25/1933	1444 0.0	0.0	4.00	0.013	III	82.6(132.9)
PAS	33.0080	115.7860	11/24/1987	1321 0.2	6.0	4.10	0.014	IV	82.7(133.0)
DMG	32.5510	115.7850	01/23/1971	22 736.0	8.0	4.10	0.014	III	82.9(133.4)
DMG	32.0000	116.1000	12/15/1959	152419.0	0.0	4.30	0.015	IV	83.0(133.5)
DMG	33.6300	118.2000	09/13/1929	132338.2	0.0	4.00	0.013	III	83.1(133.7)
DMG	33.6330	118.2000	11/01/1940	20 046.0	0.0	4.00	0.013	III	83.2(133.9)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.9500	116.8500	09/28/1946	719 9.0	0.0	5.00	0.022	IV	83.2(133.9)
PAS	31.9430	116.1550	08/06/1980	94622.7	7.4	4.00	0.013	III	83.3(134.0)
PAS	32.9420	115.7630	11/24/1987	133439.9	14.0	4.80	0.020	IV	83.3(134.0)
DMG	32.8330	115.7500	02/24/1933	1933 0.0	0.0	4.50	0.017	IV	83.4(134.2)
DMG	32.1000	116.0000	02/03/1960	83718.0	0.0	4.50	0.017	IV	83.4(134.2)
DMG	33.9170	116.7000	11/17/1943	112841.0	0.0	4.50	0.017	IV	83.5(134.4)
DMG	31.9000	116.2000	08/21/1960	212732.0	0.0	4.00	0.013	III	83.5(134.4)
DMG	33.9330	116.7500	08/06/1938	228 0.0	0.0	4.00	0.013	III	83.6(134.6)
DMG	33.9330	116.7500	10/28/1944	183016.0	0.0	4.40	0.016	IV	83.6(134.6)
PAS	31.9370	116.1520	11/07/1984	142326.8	6.0	4.00	0.013	III	83.7(134.6)
PAS	33.0670	115.7810	11/24/1987	13248.1	4.0	4.20	0.014	IV	83.8(134.9)
PAS	33.0720	115.7820	11/24/1987	153 3.2	4.2	4.00	0.013	III	83.8(134.9)
DMG	33.9680	116.8820	06/27/1959	162211.1	13.8	4.00	0.013	III	84.0(135.2)
DMG	33.9500	117.5830	04/11/1941	12024.0	0.0	4.00	0.013	III	84.1(135.4)
DMG	31.7920	116.3340	06/12/1963	221516.9	8.8	4.80	0.020	IV	84.3(135.6)
DMG	33.9960	117.2700	02/17/1952	123658.3	16.0	4.50	0.017	IV	84.3(135.6)
DMG	32.4170	115.8000	05/13/1960	123640.0	0.0	4.10	0.014	III	84.3(135.7)
DMG	33.2330	115.8330	06/14/1942	222549.0	0.0	4.00	0.013	III	84.4(135.8)
DMG	33.2330	115.8330	06/24/1942	235240.0	0.0	4.00	0.013	III	84.4(135.8)
DMG	33.2330	115.8330	06/14/1942	213623.0	0.0	4.00	0.013	III	84.4(135.8)
PAS	33.0820	115.7750	11/24/1987	15414.5	4.9	5.80	0.033	V	84.4(135.8)
DMG	34.0000	117.2500	07/23/1923	73026.0	0.0	6.25	0.042	VI	84.5(136.0)
DMG	34.0000	117.2500	11/01/1932	445 0.0	0.0	4.00	0.013	III	84.5(136.0)
DMG	31.7000	116.5000	01/12/1941	12 8 0.0	0.0	4.00	0.013	III	84.5(136.0)
DMG	33.7330	118.1000	03/11/1933	15 9 0.0	0.0	4.40	0.016	IV	84.5(136.0)
DMG	33.7330	118.1000	03/11/1933	1447 0.0	0.0	4.40	0.016	IV	84.5(136.0)
DMG	33.7330	118.1000	03/11/1933	1350 0.0	0.0	4.40	0.016	IV	84.5(136.0)
DMG	34.0000	117.2830	11/07/1939	1852 8.4	0.0	4.70	0.019	IV	84.6(136.1)
PAS	31.7820	116.3400	07/24/1981	113846.2	15.0	4.60	0.018	IV	84.6(136.2)
MGI	33.5000	116.0000	09/30/1916	425 0.0	0.0	4.00	0.013	III	84.8(136.4)
DMG	33.7500	118.0830	03/11/1933	515 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	513 0.0	0.0	4.70	0.019	IV	84.8(136.5)
DMG	33.7500	118.0830	03/21/1933	326 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	440 0.0	0.0	4.70	0.019	IV	84.8(136.5)
DMG	33.7500	118.0830	03/16/1933	1530 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/17/1933	1651 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	230 0.0	0.0	5.10	0.023	IV	84.8(136.5)
DMG	33.7500	118.0830	03/20/1933	1358 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	336 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	227 0.0	0.0	4.60	0.018	IV	84.8(136.5)
DMG	33.7500	118.0830	03/15/1933	540 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	211 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	436 0.0	0.0	4.60	0.018	IV	84.8(136.5)
DMG	33.7500	118.0830	03/16/1933	1529 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	15 2 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/14/1933	2242 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	347 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/18/1933	2052 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	22 0 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	524 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	6 1 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1653 0.0	0.0	4.80	0.020	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1547 0.0	0.0	4.00	0.013	III	84.8(136.5)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7500	118.0830	03/11/1933	1956 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1147 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1357 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/13/1933	1532 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	835 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	3 9 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	222 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	1651 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/14/1933	1219 0.0	0.0	4.50	0.017	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	439 0.0	0.0	4.90	0.021	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	8 8 0.0	0.0	4.50	0.017	IV	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	1825 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	521 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	2231 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/16/1933	1456 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/15/1933	432 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1944 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	2240 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	618 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/13/1933	1929 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/14/1933	036 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/13/1933	432 0.0	0.0	4.70	0.019	IV	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	616 0.0	0.0	4.60	0.018	IV	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	546 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	04/02/1933	8 0 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	751 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	04/02/1933	1536 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	04/01/1933	642 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	759 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/13/1933	131828.0	0.0	5.30	0.025	V	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	2232 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/19/1933	2123 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	611 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	555 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1138 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1129 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1141 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	2 5 0.0	0.0	4.30	0.015	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	323 0.0	0.0	5.00	0.022	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	216 0.0	0.0	4.80	0.020	IV	84.8(136.5)
DMG	33.7500	118.0830	03/30/1933	1225 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	339 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/25/1933	1346 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/15/1933	2 8 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	259 0.0	0.0	4.60	0.018	IV	84.8(136.5)
DMG	33.7500	118.0830	03/13/1933	343 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	23 5 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	1738 0.0	0.0	4.50	0.017	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	832 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	837 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	553 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1045 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	448 0.0	0.0	4.00	0.013	III	84.8(136.5)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7500	118.0830	03/11/1933	926 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	3 5 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/23/1933	840 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	311 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	635 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/31/1933	1049 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	740 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	252 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	210 0.0	0.0	4.60	0.018	IV	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	027 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	257 0.0	0.0	4.20	0.014	IV	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	2354 0.0	0.0	4.50	0.017	IV	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	034 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/13/1933	617 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	910 0.0	0.0	5.10	0.023	IV	84.8(136.5)
DMG	33.7500	118.0830	03/23/1933	1831 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	258 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	1025 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/12/1933	2128 0.0	0.0	4.10	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	11 0 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	911 0.0	0.0	4.40	0.016	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	2 9 0.0	0.0	5.00	0.022	IV	84.8(136.5)
DMG	33.7500	118.0830	03/11/1933	2 4 0.0	0.0	4.90	0.021	IV	84.8(136.5)
DMG	32.2000	115.9000	05/31/1960	191736.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.8000	118.0000	10/21/1913	938 0.0	0.0	4.00	0.013	III	84.8(136.5)
DMG	33.9500	116.7330	04/26/1942	151023.0	0.0	4.00	0.013	III	85.0(136.9)
DMG	34.0000	117.0000	06/30/1923	022 0.0	0.0	4.50	0.017	IV	85.1(136.9)
DMG	33.9670	116.8000	09/07/1945	153424.0	0.0	4.30	0.015	IV	85.1(136.9)
DMG	33.5430	118.3400	09/14/1963	35116.2	2.2	4.20	0.014	IV	85.1(137.0)
DMG	33.8980	116.5690	11/17/1964	145228.2	10.3	4.00	0.013	III	85.1(137.0)
DMG	31.5700	117.4880	05/01/1939	202223.3	10.0	4.00	0.013	III	85.2(137.2)
MGI	34.0000	117.4000	05/22/1907	652 0.0	0.0	4.60	0.017	IV	85.3(137.3)
DMG	33.2160	115.8080	04/25/1957	215738.7	-0.3	5.20	0.024	V	85.3(137.3)
DMG	32.9830	115.7330	01/24/1951	717 2.6	0.0	5.60	0.030	V	85.4(137.4)
DMG	32.9830	115.7330	01/24/1951	733 7.0	0.0	4.00	0.013	III	85.4(137.4)
MGI	33.7000	116.2000	08/12/1917	11 0 0.0	0.0	4.00	0.013	III	85.4(137.4)
T-A	34.0000	117.4200	09/10/1920	1415 0.0	0.0	4.30	0.015	IV	85.5(137.6)
T-A	34.0000	117.4200	04/12/1888	1315 0.0	0.0	4.30	0.015	IV	85.5(137.6)
DMG	31.5500	116.9830	09/05/1959	91744.0	0.0	4.00	0.013	III	85.6(137.7)
DMG	31.7870	116.3000	01/18/1965	65719.5	6.3	4.00	0.013	III	85.7(137.9)
DMG	32.8560	115.7100	09/18/1936	144032.1	10.0	4.50	0.017	IV	85.8(138.0)
DMG	34.0170	117.0500	02/19/1940	12 655.7	0.0	4.60	0.017	IV	85.9(138.3)
DMG	33.9730	116.7690	06/10/1944	111531.9	10.0	4.00	0.013	III	86.0(138.3)
DMG	32.9500	115.7170	06/14/1953	41729.9	0.0	5.50	0.028	V	86.0(138.4)
DMG	32.9500	115.7170	06/14/1953	42958.0	0.0	4.80	0.019	IV	86.0(138.4)
PAS	34.0230	117.2450	10/02/1985	234412.4	15.2	4.80	0.019	IV	86.1(138.5)
DMG	33.9760	116.7750	10/17/1965	94519.0	17.0	4.90	0.020	IV	86.1(138.5)
GSP	34.0240	117.2300	03/11/1998	121851.8	14.0	4.50	0.016	IV	86.1(138.5)
MGI	33.7500	116.2500	11/19/1917	1730 0.0	0.0	4.00	0.013	III	86.2(138.6)
DMG	31.8000	116.2670	06/12/1963	221556.0	0.0	4.70	0.018	IV	86.2(138.7)
DMG	31.8000	116.2670	06/20/1963	446 8.0	0.0	4.00	0.013	III	86.2(138.7)
DMG	31.8000	116.2670	06/11/1963	154948.0	0.0	4.00	0.013	III	86.2(138.7)
DMG	31.8000	116.2670	06/12/1963	85536.0	0.0	4.00	0.013	III	86.2(138.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	32.7330	115.7000	04/21/1960	233920.0	0.0	4.20	0.014	IV	86.3(138.9)
DMG	34.0000	117.5000	07/03/1908	1255 0.0	0.0	4.00	0.013	III	86.3(138.9)
MGI	34.0000	117.5000	12/16/1858	10 0 0.0	0.0	7.00	0.061	VI	86.3(138.9)
DMG	31.7960	116.2690	06/11/1963	152338.3	-2.0	5.80	0.033	V	86.3(138.9)
DMG	33.1670	115.7670	05/10/1955	43840.0	0.0	4.30	0.015	IV	86.4(139.1)
GSP	33.9510	117.7090	01/05/1998	181406.5	11.0	4.30	0.015	IV	86.5(139.1)
DMG	32.9000	115.7000	10/02/1928	19 1 0.0	0.0	5.00	0.021	IV	86.6(139.3)
DMG	33.7500	118.1330	03/11/1933	11 4 0.0	0.0	4.60	0.017	IV	86.6(139.4)
DMG	33.1750	115.7640	10/28/1963	81417.1	0.9	4.00	0.013	III	86.8(139.6)
DMG	33.7830	116.2830	03/04/1937	16 4 0.0	0.0	4.00	0.013	III	86.8(139.7)
DMG	32.9150	115.6970	05/23/1963	63635.7	1.2	4.30	0.015	IV	86.8(139.8)
DMG	33.7670	118.1170	11/04/1939	2141 0.0	0.0	4.00	0.013	III	86.9(139.9)
DMG	33.9760	116.7210	06/12/1944	104534.7	10.0	5.10	0.022	IV	87.0(139.9)
DMG	34.0330	117.3170	09/03/1935	647 0.0	0.0	4.50	0.016	IV	87.0(140.0)
PAS	33.9760	116.7130	08/06/1984	81436.6	14.2	4.30	0.015	IV	87.1(140.2)
DMG	32.6000	115.7000	12/19/1958	1437 0.0	0.0	4.10	0.013	III	87.2(140.3)
DMG	32.6000	115.7000	04/26/1963	1 342.0	0.0	4.00	0.013	III	87.2(140.3)
DMG	33.9590	116.6510	09/23/1949	214440.1	12.2	4.00	0.013	III	87.2(140.3)
DMG	34.0330	117.3500	04/18/1940	184343.9	0.0	4.40	0.015	IV	87.2(140.3)
DMG	34.0430	117.2280	04/03/1939	25044.7	10.0	4.00	0.013	III	87.4(140.7)
DMG	33.8800	116.4370	04/17/1959	1619 0.2	22.2	4.20	0.014	IV	87.5(140.8)
DMG	32.0000	116.0000	02/07/1930	2323 0.0	0.0	4.50	0.016	IV	87.5(140.8)
DMG	32.0000	116.0000	07/19/1954	20 154.0	0.0	4.80	0.019	IV	87.5(140.8)
DMG	32.0000	116.0000	07/20/1963	14518.0	0.0	4.20	0.014	IV	87.5(140.8)
DMG	32.2830	115.8000	09/26/1959	34050.0	0.0	4.30	0.015	IV	87.6(140.9)
PAS	32.9140	115.6840	01/28/1988	254 2.4	5.9	4.70	0.018	IV	87.6(141.0)
DMG	33.9810	116.7020	06/12/1944	222119.5	10.0	4.20	0.014	IV	87.6(141.0)
GSP	34.0470	117.2550	02/21/2000	134943.1	15.0	4.50	0.016	IV	87.7(141.2)
DMG	33.7500	118.1670	05/16/1933	205855.0	0.0	4.00	0.012	III	87.9(141.4)
PAS	33.9790	116.6810	12/16/1988	553 5.0	8.1	4.80	0.019	IV	87.9(141.4)
DMG	33.9940	116.7120	06/12/1944	111636.0	10.0	5.30	0.025	V	88.3(142.1)
DMG	33.7830	118.1330	01/13/1940	749 7.0	0.0	4.00	0.012	III	88.4(142.2)
DMG	33.7830	118.1330	10/02/1933	91017.6	0.0	5.40	0.026	V	88.4(142.2)
DMG	33.7830	118.1330	11/20/1933	1032 0.0	0.0	4.00	0.012	III	88.4(142.2)
DMG	32.9900	115.6820	11/29/1964	142526.4	13.8	4.20	0.014	IV	88.4(142.2)
PAS	33.9670	116.6170	07/08/1986	102240.6	6.0	4.40	0.015	IV	88.4(142.3)
PAS	33.9670	116.6170	07/08/1986	155526.2	6.0	4.00	0.012	III	88.4(142.3)
DMG	33.7500	118.1830	08/04/1933	41748.0	0.0	4.00	0.012	III	88.5(142.4)
PAS	33.9530	116.5720	10/15/1986	22847.8	8.7	4.70	0.018	IV	88.5(142.5)
DMG	34.0140	116.7710	06/10/1944	111150.5	10.0	4.50	0.016	IV	88.6(142.6)
DMG	33.0270	115.6810	05/23/1963	1553 1.8	0.4	4.80	0.019	IV	88.9(143.0)
DMG	34.0000	116.7000	08/25/1944	73025.0	0.0	4.20	0.014	III	88.9(143.1)
DMG	32.3330	115.7500	12/15/1938	0 2 0.0	0.0	4.00	0.012	III	89.0(143.2)
PAS	33.9890	116.6490	07/17/1986	203515.0	6.2	4.00	0.012	III	89.2(143.5)
PAS	33.9910	116.6490	07/17/1986	215445.2	7.4	4.40	0.015	IV	89.3(143.7)
DMG	34.0290	116.7870	04/30/1954	03623.9	11.1	4.20	0.014	III	89.4(143.9)
MGI	34.0000	117.7000	12/03/1929	9 5 0.0	0.0	4.00	0.012	III	89.5(144.0)
PAS	33.0790	115.6800	04/26/1981	124043.4	6.0	4.20	0.014	III	89.7(144.3)
DMG	33.7830	116.2000	10/31/1943	131210.0	0.0	4.50	0.016	IV	89.7(144.4)
DMG	33.0080	115.6600	06/17/1965	74013.5	8.8	4.10	0.013	III	89.8(144.6)
T-A	34.0800	117.2500	10/07/1869	0 0 0.0	0.0	4.30	0.014	IV	90.0(144.8)
DMG	32.5000	115.6670	02/12/1932	23021.0	0.0	4.00	0.012	III	90.3(145.4)
DMG	31.6670	116.3670	07/17/1959	72630.0	0.0	4.90	0.020	IV	90.4(145.4)

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	32.1330	115.8330	06/10/1961	21742.0	0.0	4.10	0.013	III	90.5(145.6)
PAS	34.0060	117.7390	02/18/1989	717 4.8	3.3	4.30	0.014	IV	90.6(145.8)
PAS	33.9980	116.6060	07/08/1986	92044.5	11.7	5.60	0.028	V	90.6(145.9)
DMG	33.2330	115.7170	10/26/1942	615 4.0	0.0	4.50	0.016	IV	90.6(145.9)
DMG	33.2330	115.7170	10/26/1942	3 215.0	0.0	4.50	0.016	IV	90.6(145.9)
DMG	33.2330	115.7170	10/26/1942	34316.0	0.0	4.00	0.012	III	90.6(145.9)
DMG	33.2330	115.7170	10/22/1942	15038.0	0.0	5.50	0.027	V	90.6(145.9)
PAS	33.9870	116.5690	07/09/1986	01232.1	6.0	4.40	0.015	IV	90.7(146.0)
DMG	33.7830	118.2000	12/27/1939	192849.0	0.0	4.70	0.018	IV	90.8(146.2)
DMG	33.2840	115.7350	10/27/1963	145023.4	-2.0	4.00	0.012	III	90.9(146.3)
GSP	34.0850	116.9890	06/30/1992	214900.3	3.0	4.40	0.015	IV	91.0(146.4)
PAS	32.7880	115.6180	10/15/1979	2355 2.6	5.0	4.20	0.013	III	91.0(146.4)
GSG	31.8060	116.1280	03/23/1994	025916.2	22.0	5.00	0.020	IV	91.1(146.7)
DMG	32.7940	115.6150	04/23/1968	1624 9.5	5.0	4.10	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/01/1958	350 0.0	0.0	5.00	0.020	IV	91.2(146.7)
DMG	32.2500	115.7500	12/01/1958	32118.0	0.0	5.80	0.031	V	91.2(146.7)
DMG	32.2500	115.7500	01/25/1959	10 1 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	12/06/1958	324 0.0	0.0	4.40	0.015	IV	91.2(146.7)
DMG	32.2500	115.7500	03/22/1961	151115.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	12/01/1958	6 3 0.0	0.0	4.60	0.017	IV	91.2(146.7)
DMG	32.2500	115.7500	01/18/1959	1933 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	01/25/1959	345 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	01/18/1959	1813 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	12/01/1958	426 0.0	0.0	4.80	0.018	IV	91.2(146.7)
DMG	32.2500	115.7500	01/15/1959	635 0.0	0.0	4.10	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/01/1958	331 0.0	0.0	4.10	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/01/1958	843 0.0	0.0	4.10	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/01/1958	6 2 0.0	0.0	5.50	0.027	V	91.2(146.7)
DMG	32.2500	115.7500	12/04/1958	142 0.0	0.0	4.20	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	01/22/1959	023 0.0	0.0	4.60	0.017	IV	91.2(146.7)
DMG	32.2500	115.7500	01/22/1959	820 0.0	0.0	4.10	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/15/1958	621 0.0	0.0	4.60	0.017	IV	91.2(146.7)
DMG	32.2500	115.7500	01/22/1959	631 0.0	0.0	4.40	0.015	IV	91.2(146.7)
DMG	32.2500	115.7500	01/22/1959	739 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	12/08/1958	051 0.0	0.0	4.40	0.015	IV	91.2(146.7)
DMG	32.2500	115.7500	12/14/1958	0 7 0.0	0.0	4.20	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	02/26/1959	3 3 0.0	0.0	4.50	0.016	IV	91.2(146.7)
DMG	32.2500	115.7500	12/09/1958	1922 0.0	0.0	4.10	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/08/1958	052 0.0	0.0	4.50	0.016	IV	91.2(146.7)
DMG	32.2500	115.7500	12/02/1958	1358 0.0	0.0	4.20	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/01/1958	340 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	01/09/1959	1835 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	01/10/1959	15 2 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	12/03/1958	19 6 0.0	0.0	4.10	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/06/1958	331 0.0	0.0	4.50	0.016	IV	91.2(146.7)
DMG	32.2500	115.7500	12/02/1958	054 0.0	0.0	4.70	0.017	IV	91.2(146.7)
DMG	32.2500	115.7500	01/07/1959	1514 0.0	0.0	4.30	0.014	IV	91.2(146.7)
DMG	32.2500	115.7500	02/16/1959	643 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	12/20/1958	0 7 0.0	0.0	4.70	0.017	IV	91.2(146.7)
DMG	32.2500	115.7500	12/19/1958	1533 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	12/25/1958	127 0.0	0.0	4.60	0.017	IV	91.2(146.7)
DMG	32.2500	115.7500	01/14/1959	332 0.0	0.0	4.20	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/02/1958	957 0.0	0.0	4.30	0.014	IV	91.2(146.7)

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	32.2500	115.7500	12/20/1958	0 6 0.0	0.0	4.30	0.014	IV	91.2(146.7)
DMG	32.2500	115.7500	12/24/1958	2027 0.0	0.0	4.00	0.012	III	91.2(146.7)
DMG	32.2500	115.7500	12/02/1958	1156 0.0	0.0	4.10	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	03/04/1959	1659 0.0	0.0	4.10	0.013	III	91.2(146.7)
DMG	32.2500	115.7500	12/20/1958	3 5 0.0	0.0	4.50	0.016	IV	91.2(146.7)
DMG	32.2500	115.7500	12/17/1958	1330 0.0	0.0	4.30	0.014	IV	91.2(146.7)
DMG	32.2500	115.7500	12/23/1958	653 0.0	0.0	4.00	0.012	III	91.2(146.7)
GSP	32.6120	115.6280	07/27/1992	204008.8	15.0	4.10	0.013	III	91.2(146.8)
DMG	32.8830	115.6170	01/16/1946	11 654.0	0.0	4.20	0.013	III	91.3(146.9)
MGI	34.1000	117.2000	04/23/1923	2113 0.0	0.0	4.00	0.012	III	91.3(146.9)
PAS	33.0940	115.6550	06/13/1979	194645.9	6.0	4.10	0.013	III	91.3(147.0)
PAS	33.9650	117.8860	01/01/1976	172012.9	6.2	4.20	0.013	III	91.4(147.1)
MGI	34.1000	117.3000	11/22/1911	257 0.0	0.0	4.00	0.012	III	91.5(147.3)
DMG	34.1000	117.3000	02/16/1931	1327 0.0	0.0	4.00	0.012	III	91.5(147.3)
MGI	34.1000	117.3000	12/27/1901	11 0 0.0	0.0	4.60	0.017	IV	91.5(147.3)
MGI	34.1000	117.3000	07/15/1905	2041 0.0	0.0	5.30	0.024	V	91.5(147.3)
DMG	33.0380	118.7340	09/13/1937	221439.5	10.0	4.00	0.012	III	91.6(147.3)
DMG	33.2330	115.7000	08/30/1946	111645.0	0.0	4.60	0.017	IV	91.6(147.4)
DMG	33.7590	118.2530	08/31/1938	31814.2	10.0	4.50	0.016	IV	91.6(147.4)
DMG	33.6330	118.4000	10/17/1934	938 0.0	0.0	4.00	0.012	III	91.7(147.6)
DMG	33.9330	116.4000	12/10/1948	204257.0	0.0	4.40	0.015	IV	91.7(147.6)
PAS	34.0310	116.6570	07/08/1986	92412.8	6.0	4.40	0.015	IV	91.7(147.6)
GSP	34.0970	116.9960	12/05/1997	170438.9	4.0	4.10	0.013	III	91.7(147.6)
DMG	33.9330	116.3830	12/04/1948	234317.0	0.0	6.50	0.045	VI	92.2(148.4)
DMG	33.9670	116.4500	12/11/1948	161220.0	0.0	4.50	0.016	IV	92.4(148.7)
PAS	31.8940	115.9940	03/04/1979	183746.0	5.0	4.00	0.012	III	92.5(148.8)
GSP	33.9450	116.3990	07/05/1992	054938.2	3.0	4.00	0.012	III	92.5(148.8)
GSP	33.8760	116.2670	06/29/1992	160142.8	1.0	5.20	0.023	IV	92.5(148.9)
DMG	32.3000	115.7000	02/28/1961	212254.0	0.0	4.40	0.015	IV	92.5(148.9)
DMG	31.8000	116.1000	10/10/1953	1849 6.0	0.0	5.00	0.020	IV	92.6(149.0)
PAS	33.0980	115.6320	04/26/1981	12 928.4	3.8	5.70	0.029	V	92.7(149.2)
DMG	33.9330	116.3670	12/05/1948	0 721.0	0.0	4.90	0.019	IV	92.7(149.2)
DMG	31.8540	116.0320	07/23/1970	125947.0	8.0	4.40	0.015	IV	92.7(149.2)
DMG	33.7830	118.2500	11/14/1941	84136.3	0.0	5.40	0.025	V	92.7(149.2)
DMG	33.0560	115.6200	06/16/1965	242 6.1	-0.5	4.40	0.015	IV	92.7(149.2)
PAS	33.0990	115.6300	04/26/1981	12 557.4	4.2	4.00	0.012	III	92.8(149.4)
DMG	33.9630	116.4250	01/13/1950	5 719.4	5.9	4.10	0.013	III	92.8(149.4)
DMG	33.9670	116.4330	12/05/1948	04235.0	0.0	4.60	0.016	IV	92.9(149.5)
DMG	34.1000	116.8830	10/24/1935	1451 0.0	0.0	4.50	0.016	IV	92.9(149.6)
DMG	34.1000	116.8830	10/24/1935	1527 0.0	0.0	4.00	0.012	III	92.9(149.6)
DMG	34.1000	116.8830	10/24/1935	1452 0.0	0.0	4.50	0.016	IV	92.9(149.6)
DMG	34.1180	117.3410	09/22/1951	82239.1	11.9	4.30	0.014	IV	93.0(149.6)
GSP	33.9460	116.3790	04/24/1992	123605.7	10.0	4.10	0.013	III	93.1(149.8)
PAS	33.1100	115.6270	04/25/1981	21155.3	4.8	4.10	0.013	III	93.2(149.9)
DMG	34.1120	117.4260	03/19/1937	12338.4	10.0	4.00	0.012	III	93.2(149.9)
DMG	33.9330	116.3500	12/05/1948	04032.0	0.0	4.40	0.015	IV	93.2(150.0)
DMG	31.5000	117.7000	10/12/1940	34542.0	0.0	4.00	0.012	III	93.2(150.0)
DMG	32.8830	115.5830	04/13/1938	1929 0.0	0.0	4.50	0.015	IV	93.2(150.1)
DMG	33.8170	118.2170	10/22/1941	65718.5	0.0	4.90	0.019	IV	93.2(150.1)
DMG	32.1500	115.7670	06/10/1959	172046.0	0.0	4.10	0.013	III	93.3(150.1)
GSP	34.1200	116.9980	06/29/1992	144126.0	4.0	4.40	0.015	IV	93.3(150.2)
PAS	33.1030	115.6220	11/04/1976	133127.7	3.7	4.20	0.013	III	93.3(150.2)
PAS	32.8390	115.5780	10/15/1979	232552.6	8.1	4.00	0.012	III	93.4(150.3)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
T-A	33.5000	115.8200	05/00/1868	0 0 0.0	0.0	6.30	0.040	V	93.4(150.3)
DMG	32.2670	115.7000	06/11/1960	213656.0	0.0	4.50	0.015	IV	93.4(150.3)
PAS	33.1030	115.6210	11/04/1976	1139 8.4	0.9	4.10	0.013	III	93.4(150.3)
GSP	34.1120	116.9200	10/01/1998	181816.0	4.0	4.70	0.017	IV	93.4(150.3)
PAS	32.6630	115.5830	10/31/1980	125536.7	3.6	4.40	0.015	IV	93.4(150.3)
GSP	33.9020	116.2840	07/24/1992	181436.2	9.0	5.00	0.020	IV	93.4(150.4)
GSP	33.9050	116.2880	05/07/1995	110333.0	10.0	4.80	0.018	IV	93.5(150.4)
DMG	32.0000	118.5000	07/15/1943	2138 0.0	0.0	4.00	0.012	III	93.6(150.6)
DMG	34.1270	117.3380	02/23/1936	222042.7	10.0	4.50	0.015	IV	93.6(150.6)
PAS	33.1090	115.6190	11/04/1976	114940.4	2.2	4.10	0.012	III	93.6(150.6)
DMG	33.6630	118.4130	01/08/1967	738 5.3	17.7	4.00	0.012	III	93.6(150.7)
DMG	33.9000	118.1000	07/08/1929	1646 6.7	13.0	4.70	0.017	IV	93.7(150.9)
PAS	32.9040	115.5760	10/17/1979	191438.4	15.9	4.10	0.012	III	93.8(150.9)
DMG	33.0120	115.5920	04/11/1965	04646.1	-2.0	4.10	0.012	III	93.8(150.9)
GSP	33.9400	116.3410	05/04/1992	011602.6	6.0	4.00	0.012	III	93.9(151.1)
DMG	34.1160	117.4750	06/28/1960	20 048.0	12.0	4.10	0.012	III	93.9(151.1)
GSP	34.1210	116.9280	08/16/1998	133440.2	6.0	4.70	0.017	IV	93.9(151.2)
PAS	33.1170	115.6150	04/26/1976	64637.5	14.8	4.00	0.012	III	93.9(151.2)
DMG	34.1000	116.8000	10/24/1935	1448 7.6	0.0	5.10	0.021	IV	94.0(151.2)
DMG	32.4500	115.6170	03/25/1939	259 0.0	0.0	4.00	0.012	III	94.0(151.2)
DMG	32.4500	115.6170	03/21/1939	1351 0.0	0.0	4.00	0.012	III	94.0(151.2)
DMG	32.4500	115.6170	06/20/1935	724 0.0	0.0	4.00	0.012	III	94.0(151.2)
DMG	32.4500	115.6170	01/31/1939	1616 0.0	0.0	4.00	0.012	III	94.0(151.2)
DMG	32.4500	115.6170	04/17/1938	347 0.0	0.0	4.00	0.012	III	94.0(151.2)
DMG	34.0000	116.4670	12/05/1948	05057.0	0.0	4.40	0.015	IV	94.0(151.3)
DMG	34.0000	116.4670	12/06/1948	246 8.0	0.0	4.30	0.014	IV	94.0(151.3)
GSP	33.7300	116.0200	12/18/1989	062704.5	10.0	4.20	0.013	III	94.1(151.4)
GSP	32.9750	118.7910	03/04/1992	190627.0	6.0	4.20	0.013	III	94.1(151.4)
DMG	32.0330	115.8330	01/28/1932	171749.0	0.0	4.50	0.015	IV	94.1(151.4)
DMG	32.0330	115.8330	01/08/1932	23445.0	0.0	4.00	0.012	III	94.1(151.4)
DMG	32.5000	115.6000	12/08/1933	437 0.0	0.0	4.00	0.012	III	94.1(151.5)
DMG	33.2670	115.6670	08/10/1951	1130 8.0	0.0	4.40	0.015	IV	94.2(151.5)
DMG	34.0170	116.5000	07/26/1947	231351.0	0.0	4.10	0.012	III	94.2(151.7)
DMG	34.0170	116.5000	07/25/1947	15647.0	0.0	4.60	0.016	IV	94.2(151.7)
DMG	34.0170	116.5000	07/25/1947	161453.0	0.0	4.50	0.015	IV	94.2(151.7)
DMG	34.0170	116.5000	08/08/1947	64745.0	0.0	4.00	0.012	III	94.2(151.7)
DMG	34.0170	116.5000	08/01/1947	17 137.0	0.0	4.10	0.012	III	94.2(151.7)
DMG	34.0170	116.5000	07/30/1947	52217.0	0.0	4.20	0.013	III	94.2(151.7)
DMG	34.0170	116.5000	07/25/1947	75730.0	0.0	4.20	0.013	III	94.2(151.7)
DMG	34.0170	116.5000	07/25/1947	61949.0	0.0	5.20	0.022	IV	94.2(151.7)
DMG	34.0170	116.5000	07/24/1947	221046.0	0.0	5.50	0.026	V	94.2(151.7)
DMG	34.0170	116.5000	07/24/1947	225341.0	0.0	4.30	0.014	IV	94.2(151.7)
DMG	34.0170	116.5000	07/25/1947	51752.0	0.0	4.30	0.014	IV	94.2(151.7)
DMG	34.0170	116.5000	07/24/1947	225426.0	0.0	4.90	0.019	IV	94.2(151.7)
DMG	34.0170	116.5000	07/29/1947	163615.0	0.0	4.20	0.013	III	94.2(151.7)
DMG	34.0170	116.5000	07/26/1947	23 425.0	0.0	4.50	0.015	IV	94.2(151.7)
DMG	34.0170	116.5000	07/26/1947	24941.0	0.0	5.10	0.021	IV	94.2(151.7)
DMG	34.0170	116.5000	07/26/1947	12415.0	0.0	4.20	0.013	III	94.2(151.7)
DMG	34.0170	116.5000	07/25/1947	04631.0	0.0	5.00	0.020	IV	94.2(151.7)
PAS	32.9070	115.5660	10/16/1979	114655.3	11.4	4.80	0.018	IV	94.4(151.8)
DMG	33.1310	115.6110	10/27/1963	181250.7	7.8	4.20	0.013	III	94.4(151.9)
DMG	34.1400	117.3390	02/26/1936	93327.6	10.0	4.00	0.012	III	94.5(152.0)
DMG	34.1240	117.4800	05/15/1955	17 326.0	7.6	4.00	0.012	III	94.5(152.1)

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.2000	115.6330	10/27/1963	145245.2	-2.0	4.10	0.012	III	94.5(152.1)
GSG	33.9430	116.3250	04/23/1992	052316.2	5.0	4.00	0.012	III	94.5(152.1)
DMG	33.0370	115.5840	06/17/1965	73020.9	-1.3	4.30	0.014	IV	94.5(152.1)
DMG	34.1320	117.4260	04/15/1965	20 833.3	5.5	4.50	0.015	IV	94.5(152.1)
DMG	34.1330	116.9500	06/10/1938	1440 0.0	0.0	4.00	0.012	III	94.6(152.2)
PAS	33.0010	115.5760	10/16/1979	74947.2	8.5	4.00	0.012	III	94.6(152.2)
GSP	33.9510	116.3380	05/18/1992	154418.0	7.0	4.90	0.019	IV	94.6(152.2)
GSP	33.9470	116.3300	09/09/1992	125045.1	5.0	4.30	0.014	IV	94.6(152.3)
GSP	33.9330	116.3020	04/27/1992	031119.3	0.0	4.20	0.013	III	94.6(152.3)
DMG	33.6320	118.4670	01/08/1967	73730.4	11.4	4.00	0.012	III	94.7(152.3)
GSP	33.0300	115.5800	03/24/1989	231648.0	6.0	4.00	0.012	III	94.7(152.4)
USG	34.1390	117.3860	02/21/1987	231530.1	2.6	4.07	0.012	III	94.7(152.4)
PDP	33.9370	116.3060	07/25/1992	043160.0	5.0	4.90	0.019	IV	94.8(152.5)
DMG	33.9580	116.3460	01/08/1952	63427.4	11.4	4.40	0.014	IV	94.8(152.5)
PAS	33.9850	116.4020	02/15/1985	232626.6	2.3	4.00	0.012	III	94.8(152.6)
GSP	33.9430	116.3150	05/06/1992	023843.3	7.0	4.50	0.015	IV	94.8(152.6)
DMG	33.7710	116.0500	09/02/1956	24637.0	14.1	4.20	0.013	III	94.9(152.7)
PAS	34.1350	117.4480	01/08/1983	71930.4	4.6	4.10	0.012	III	94.9(152.8)
DMG	33.0190	115.5730	06/17/1965	743 5.0	-2.0	4.20	0.013	III	94.9(152.8)
DMG	32.9820	115.5660	05/23/1963	9 6 4.7	25.4	4.60	0.016	IV	94.9(152.8)
DMG	31.8330	116.0000	04/28/1956	641 0.0	0.0	4.30	0.014	III	95.1(153.0)
DMG	31.8330	116.0000	05/10/1956	114854.0	0.0	5.00	0.020	IV	95.1(153.0)
DMG	31.8330	116.0000	06/07/1956	6 4 0.0	0.0	4.10	0.012	III	95.1(153.0)
PAS	33.1170	115.5950	11/04/1976	141250.2	5.0	4.40	0.014	IV	95.1(153.0)
PAS	33.1180	115.5950	11/04/1976	62110.7	5.0	4.10	0.012	III	95.1(153.0)
GSP	33.9420	116.3040	05/04/1992	161949.7	12.0	4.80	0.018	IV	95.1(153.1)
PAS	33.1230	115.5960	11/04/1976	54820.9	5.0	4.20	0.013	III	95.1(153.1)
PAS	31.7760	116.0660	05/16/1976	232612.9	5.0	4.20	0.013	III	95.1(153.1)
DMG	34.1270	117.5210	12/27/1938	10 928.6	10.0	4.00	0.012	III	95.2(153.1)
DMG	32.2670	115.6670	05/17/1959	1257 0.0	0.0	4.00	0.012	III	95.2(153.1)
PAS	32.9500	115.5570	10/16/1979	33934.3	12.1	4.50	0.015	IV	95.2(153.2)
DMG	32.1590	115.7240	01/19/1972	15942.8	8.0	4.00	0.012	III	95.2(153.3)
DMG	32.2000	115.7000	10/16/1954	8 518.0	0.0	4.00	0.012	III	95.2(153.3)
DMG	33.8670	118.2000	11/13/1933	2128 0.0	0.0	4.00	0.012	III	95.3(153.4)
PAS	33.1810	115.6110	03/07/1989	02458.2	2.8	4.10	0.012	III	95.3(153.4)
PAS	33.1180	115.5900	11/04/1976	635 3.5	4.5	4.10	0.012	III	95.4(153.5)
DMG	33.9170	116.2500	08/15/1946	19 1 8.0	0.0	4.00	0.012	III	95.4(153.5)
GSP	33.9510	116.3110	04/26/1992	062608.0	0.0	4.20	0.013	III	95.4(153.6)
GSP	33.9530	116.3140	11/27/1996	014243.8	6.0	4.10	0.012	III	95.4(153.6)
PAS	32.0880	115.7650	04/13/1984	32835.6	6.0	4.10	0.012	III	95.5(153.7)
DMG	34.1000	116.7000	02/07/1889	520 0.0	0.0	5.30	0.023	IV	95.5(153.7)
MGI	33.8000	118.3000	12/31/1928	1045 0.0	0.0	4.00	0.012	III	95.5(153.7)
DMG	33.8000	118.3000	11/03/1931	16 5 0.0	0.0	4.00	0.012	III	95.5(153.7)
GSP	33.9570	116.3170	04/23/1992	022529.9	11.0	4.60	0.016	IV	95.6(153.8)
DMG	32.2500	115.6670	04/29/1932	165233.0	0.0	4.00	0.012	III	95.6(153.9)
DMG	34.0650	116.5740	08/26/1959	53250.2	16.7	4.30	0.014	III	95.6(153.9)
PAS	34.1510	116.9720	11/20/1978	655 9.5	6.1	4.30	0.014	III	95.6(153.9)
DMG	33.9960	117.9750	06/15/1967	458 5.5	10.0	4.10	0.012	III	95.6(153.9)
DMG	34.1000	117.6830	01/09/1934	1410 0.0	0.0	4.50	0.015	IV	95.7(154.0)
DMG	34.1000	117.6830	01/18/1934	214 0.0	0.0	4.00	0.012	III	95.7(154.0)
GSP	33.1920	115.6080	12/31/1997	122245.1	10.0	4.10	0.012	III	95.7(154.0)
DMG	33.7450	115.9970	09/01/1956	55752.8	15.1	4.00	0.012	III	95.7(154.1)
GSP	33.9610	116.3180	04/23/1992	045023.0	12.0	6.10	0.035	V	95.8(154.2)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	34.1170	116.7500	08/22/1942	125913.0	0.0	4.00	0.012	III	95.8(154.2)
DMG	31.7090	116.1370	02/16/1967	1738 8.0	2.8	4.20	0.013	III	95.9(154.3)
PAS	33.0140	115.5550	10/16/1979	65842.8	9.1	5.50	0.026	V	95.9(154.3)
DMG	33.8670	118.2170	06/19/1944	3 6 7.0	0.0	4.40	0.014	IV	95.9(154.4)
DMG	33.8670	118.2170	06/19/1944	0 333.0	0.0	4.50	0.015	IV	95.9(154.4)
PAS	32.9450	115.5430	10/16/1979	31625.4	7.2	4.10	0.012	III	95.9(154.4)
DMG	34.1400	117.5150	01/01/1965	8 418.0	5.9	4.40	0.014	IV	96.0(154.4)
PAS	32.9270	115.5400	10/16/1979	54910.2	10.4	5.10	0.021	IV	96.0(154.5)
PAS	32.9600	115.5440	10/16/1979	31047.1	9.4	4.50	0.015	IV	96.0(154.5)
GSP	34.1410	116.8570	09/19/1997	223714.5	10.0	4.10	0.012	III	96.0(154.5)
PAS	33.1820	115.5990	03/06/1989	221647.6	1.0	4.30	0.014	III	96.0(154.5)
PAS	32.9280	115.5390	10/16/1979	61948.7	9.2	5.10	0.021	IV	96.0(154.6)
DMG	33.9670	118.0500	01/30/1941	13446.9	0.0	4.10	0.012	III	96.1(154.6)
PAS	32.9130	115.5340	10/16/1979	6 439.0	8.0	4.00	0.012	III	96.2(154.9)
DMG	34.0000	116.3830	05/05/1944	134715.0	0.0	4.00	0.012	III	96.2(154.9)
PAS	33.1820	115.5940	03/07/1989	74344.1	0.5	4.20	0.013	III	96.3(155.0)
DMG	33.2000	115.6000	11/12/1942	175612.0	0.0	4.00	0.012	III	96.3(155.0)
DMG	31.5680	116.3630	08/13/1967	8 213.0	10.0	4.50	0.015	IV	96.4(155.1)
GSP	34.1680	117.3370	06/28/1997	214525.1	9.0	4.20	0.013	III	96.4(155.1)
PAS	34.0220	116.4260	08/14/1975	8 849.8	10.9	4.00	0.012	III	96.4(155.2)
T-A	34.1700	117.3200	12/02/1859	2210 0.0	0.0	4.30	0.014	III	96.4(155.2)
DMG	32.4170	115.5830	01/03/1936	14 7 0.0	0.0	4.00	0.012	III	96.5(155.2)
PAS	32.9090	115.5280	10/16/1979	1 013.9	4.8	4.60	0.016	IV	96.6(155.4)
DMG	33.9850	116.3400	02/01/1957	75215.4	11.0	4.60	0.016	IV	96.6(155.4)
PAS	32.8920	115.5260	01/12/1980	2011 6.4	5.0	4.10	0.012	III	96.6(155.4)
MGI	34.0000	118.0000	05/05/1929	1 7 0.0	0.0	4.60	0.016	IV	96.6(155.4)
MGI	34.0000	118.0000	12/25/1903	1745 0.0	0.0	5.00	0.020	IV	96.6(155.4)
MGI	34.0000	118.0000	05/05/1929	735 0.0	0.0	4.00	0.012	III	96.6(155.4)
PAS	32.9320	115.5300	10/16/1979	61346.5	8.0	4.10	0.012	III	96.6(155.4)
DMG	34.1670	116.9830	10/16/1951	1241 5.0	0.0	4.00	0.012	III	96.6(155.5)
DMG	33.1170	115.5670	07/29/1950	1714 0.0	0.0	4.30	0.014	III	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	175048.0	0.0	5.40	0.024	V	96.6(155.5)
DMG	33.1170	115.5670	07/29/1950	15 9 0.0	0.0	4.50	0.015	IV	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	175812.0	0.0	4.80	0.018	IV	96.6(155.5)
DMG	33.1170	115.5670	07/29/1950	143632.0	0.0	5.50	0.025	V	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	325 0.0	0.0	4.70	0.017	IV	96.6(155.5)
DMG	33.1170	115.5670	07/27/1950	12 2 0.0	0.0	4.20	0.013	III	96.6(155.5)
DMG	33.1170	115.5670	07/29/1950	017 0.0	0.0	4.50	0.015	IV	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	1727 0.0	0.0	4.70	0.017	IV	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	1730 0.0	0.0	4.10	0.012	III	96.6(155.5)
DMG	33.1170	115.5670	07/29/1950	1843 0.0	0.0	4.70	0.017	IV	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	1624 0.0	0.0	4.00	0.012	III	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	1817 0.0	0.0	4.20	0.013	III	96.6(155.5)
DMG	33.1170	115.5670	07/27/1950	2251 0.0	0.0	4.50	0.015	IV	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	1840 0.0	0.0	4.00	0.012	III	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	1949 0.0	0.0	4.20	0.013	III	96.6(155.5)
DMG	33.1170	115.5670	07/27/1950	112926.0	0.0	4.80	0.018	IV	96.6(155.5)
DMG	33.1170	115.5670	08/14/1950	1916 0.0	0.0	4.70	0.017	IV	96.6(155.5)
DMG	33.1170	115.5670	08/01/1950	83720.0	0.0	4.70	0.017	IV	96.6(155.5)
DMG	33.1170	115.5670	07/27/1950	954 0.0	0.0	4.10	0.012	III	96.6(155.5)
DMG	33.1170	115.5670	07/28/1950	2113 0.0	0.0	4.10	0.012	III	96.6(155.5)
DMG	32.9670	115.5330	02/13/1951	1716 0.0	0.0	4.20	0.013	III	96.7(155.6)
DMG	32.9670	115.5330	02/13/1951	174634.0	0.0	4.10	0.012	III	96.7(155.6)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	32.1500	115.7000	09/26/1959	75316.0	0.0	4.10	0.012	III	96.8(155.7)
DMG	33.8500	118.2670	03/11/1933	629 0.0	0.0	4.40	0.014	IV	96.8(155.8)
DMG	33.8500	118.2670	03/11/1933	1425 0.0	0.0	5.00	0.020	IV	96.8(155.8)
DMG	31.5000	116.5000	02/18/1939	557 0.0	0.0	4.00	0.012	III	96.9(155.9)
DMG	31.5000	116.5000	10/17/1954	225718.0	0.0	5.70	0.028	V	96.9(155.9)
GSP	34.1300	116.7340	06/30/1992	212254.4	12.0	4.80	0.018	IV	96.9(156.0)
GSP	33.8900	116.1600	10/12/1991	143932.0	3.0	4.00	0.012	III	96.9(156.0)
DMG	32.5830	115.5330	04/02/1947	151539.0	0.0	4.20	0.013	III	97.0(156.0)
PAS	32.9260	115.5230	10/16/1979	11421.3	9.6	4.30	0.014	III	97.0(156.0)
PAS	32.9470	115.5250	10/16/1979	139 3.3	2.0	4.00	0.012	III	97.0(156.1)
GSP	34.1100	117.7200	04/17/1990	223227.2	4.0	4.60	0.016	IV	97.0(156.1)
DMG	33.0000	115.5330	10/25/1955	174942.0	0.0	4.30	0.014	III	97.0(156.1)
PAS	32.8990	115.5190	10/16/1979	72324.2	9.0	4.20	0.013	III	97.0(156.1)
GSP	34.0040	116.3610	06/30/1992	143811.6	0.0	4.80	0.018	IV	97.1(156.3)
MGI	33.9000	118.2000	10/08/1927	1914 0.0	0.0	4.60	0.016	IV	97.1(156.3)
DMG	32.3540	115.5930	03/17/1972	029 1.2	8.0	4.50	0.015	IV	97.2(156.4)
GSP	34.1110	116.6460	06/28/1992	140928.8	7.0	4.10	0.012	III	97.2(156.4)
GSP	34.1800	117.0200	12/04/1991	081703.5	11.0	4.00	0.012	III	97.3(156.6)
PAS	32.9580	115.5200	10/16/1979	02214.2	10.0	4.20	0.013	III	97.4(156.7)
PAS	32.9340	115.5150	10/16/1979	61160.0	11.0	4.00	0.011	III	97.5(156.9)
DMG	32.1830	115.6670	09/21/1959	11753.0	0.0	4.30	0.013	III	97.5(156.9)
PAS	32.9030	115.5110	10/21/1977	132424.6	15.5	4.20	0.013	III	97.5(156.9)
PAS	32.9390	115.5150	10/16/1979	93641.1	9.9	4.00	0.011	III	97.5(156.9)
GSP	34.1630	116.8550	06/28/1992	144321.0	6.0	5.30	0.023	IV	97.5(156.9)
PAS	32.8730	115.5070	10/16/1979	12 145.6	14.4	4.00	0.011	III	97.6(157.1)
PAS	32.8860	115.5070	10/20/1977	102935.9	4.9	4.00	0.011	III	97.7(157.1)
DMG	33.9500	118.1330	10/25/1933	7 046.0	0.0	4.30	0.013	III	97.7(157.2)
DMG	34.0170	116.3670	06/06/1940	235637.2	0.0	4.40	0.014	IV	97.7(157.2)
GSP	32.8850	115.5050	06/14/2000	214918.7	4.0	4.50	0.015	IV	97.8(157.3)
DMG	33.7450	115.9480	04/02/1957	42247.4	4.5	4.10	0.012	III	97.8(157.4)
GSP	34.1920	117.0950	04/06/1994	190104.1	7.0	4.80	0.017	IV	97.8(157.4)
PAS	32.8800	115.5040	10/30/1977	53014.1	4.5	4.00	0.011	III	97.8(157.4)
PAS	32.8930	115.5050	10/21/1977	61236.2	5.9	4.30	0.013	III	97.8(157.4)
MGI	32.8000	115.5000	08/20/1915	4 0 0.0	0.0	4.00	0.011	III	97.8(157.4)
DMG	32.8000	115.5000	06/23/1915	359 0.0	0.0	6.25	0.037	V	97.8(157.4)
MGI	32.8000	115.5000	06/18/1917	6 0 0.0	0.0	4.00	0.011	III	97.8(157.4)
MGI	32.8000	115.5000	08/18/1915	2240 0.0	0.0	4.00	0.011	III	97.8(157.4)
MGI	32.8000	115.5000	07/03/1915	2345 0.0	0.0	4.60	0.016	IV	97.8(157.4)
MGI	32.8000	115.5000	07/04/1915	045 0.0	0.0	4.60	0.016	IV	97.8(157.4)
MGI	32.8000	115.5000	07/04/1915	5 0 0.0	0.0	4.60	0.016	IV	97.8(157.4)
MGI	32.8000	115.5000	02/12/1927	858 0.0	0.0	4.60	0.016	IV	97.8(157.4)
MGI	32.8000	115.5000	08/19/1915	2240 0.0	0.0	4.00	0.011	III	97.8(157.4)
MGI	32.8000	115.5000	08/19/1915	4 0 0.0	0.0	4.00	0.011	III	97.8(157.4)
DMG	32.8000	115.5000	06/23/1915	456 0.0	0.0	6.25	0.037	V	97.8(157.4)
DMG	31.6250	116.2110	06/10/1969	34132.7	-2.0	5.00	0.019	IV	97.8(157.5)
GSP	34.1630	116.8270	06/28/1992	150451.5	12.0	4.40	0.014	IV	97.9(157.5)
GSP	34.1780	116.9220	06/28/1992	170131.9	13.0	4.70	0.017	IV	97.9(157.5)
DMG	33.8140	116.0280	05/28/1961	125946.7	18.5	4.40	0.014	IV	97.9(157.5)
DMG	32.7330	115.5000	05/19/1940	43640.9	0.0	6.70	0.048	VI	97.9(157.6)
DMG	34.1000	117.8000	03/31/1931	2033 0.0	0.0	4.00	0.011	III	97.9(157.6)
DMG	34.0500	116.4330	02/08/1938	739 0.0	0.0	4.00	0.011	III	98.0(157.7)
GSP	34.1300	117.7000	03/01/1990	003457.1	4.0	4.00	0.011	III	98.0(157.7)
DMG	32.3000	115.6000	01/07/1960	175130.0	0.0	4.10	0.012	III	98.0(157.7)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
GSP	32.8960	115.5020	06/14/2000	190020.4	5.0	4.20	0.013	III	98.0(157.7)
DMG	34.1670	117.5330	03/01/1948	81213.0	0.0	4.70	0.017	IV	98.0(157.7)
MGI	32.7000	115.5000	01/16/1927	19 5 0.0	0.0	4.60	0.016	IV	98.0(157.7)
MGI	32.7000	115.5000	06/08/1917	031 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	11/17/1921	1958 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	05/02/1918	1712 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	11/03/1916	555 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	01/02/1927	16 0 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	12/08/1917	945 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	12/09/1926	548 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	12/07/1916	2045 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	09/23/1928	1744 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	01/13/1927	1048 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	12/07/1916	1855 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	07/16/1927	155 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	01/01/1927	13 0 0.0	0.0	5.30	0.023	IV	98.0(157.7)
MGI	32.7000	115.5000	01/01/1927	9 5 0.0	0.0	4.60	0.016	IV	98.0(157.7)
MGI	32.7000	115.5000	01/01/1927	1010 0.0	0.0	4.60	0.016	IV	98.0(157.7)
MGI	32.7000	115.5000	10/01/1919	2350 0.0	0.0	4.00	0.011	III	98.0(157.7)
MGI	32.7000	115.5000	10/14/1918	12 5 0.0	0.0	4.00	0.011	III	98.0(157.7)
DMG	34.1800	116.9200	01/16/1930	034 3.6	0.0	5.10	0.020	IV	98.0(157.7)
DMG	34.1800	116.9200	01/16/1930	02433.9	0.0	5.20	0.022	IV	98.0(157.7)
PAS	32.9090	115.5020	10/22/1977	183042.7	5.0	4.00	0.011	III	98.1(157.8)
DMG	34.0000	116.3170	06/06/1940	222115.1	0.0	4.30	0.013	III	98.1(157.9)
PAS	33.0030	115.5140	10/16/1979	65522.9	8.7	4.60	0.016	IV	98.1(157.9)
GSP	34.0300	116.3790	06/28/1992	160115.2	1.0	4.10	0.012	III	98.2(158.0)
T-A	32.6700	115.5000	01/06/1927	1637 0.0	0.0	4.30	0.013	III	98.2(158.0)
T-A	32.6700	115.5000	01/02/1927	10 0 0.0	0.0	4.30	0.013	III	98.2(158.0)
DMG	32.6670	115.5000	10/10/1932	129 0.0	0.0	4.00	0.011	III	98.2(158.0)
DMG	32.6670	115.5000	10/09/1932	2251 0.0	0.0	4.50	0.015	IV	98.2(158.0)
DMG	32.6670	115.5000	10/09/1932	2345 0.0	0.0	4.00	0.011	III	98.2(158.0)
GSP	34.1900	117.3900	12/28/1989	094108.1	15.0	4.50	0.015	IV	98.2(158.1)
DMG	34.2000	117.1000	09/20/1907	154 0.0	0.0	6.00	0.033	V	98.3(158.2)
MGI	34.2000	117.3000	04/13/1913	1045 0.0	0.0	4.00	0.011	III	98.4(158.4)
GSP	33.9900	116.2870	05/02/1992	124641.4	4.0	4.10	0.012	III	98.4(158.4)
GSP	34.1400	117.6900	03/02/1990	172625.4	6.0	4.60	0.016	IV	98.5(158.4)
PAS	34.1360	117.7090	06/26/1988	15 458.5	7.9	4.60	0.016	IV	98.5(158.5)
GSP	33.9910	116.2840	04/23/1992	185603.0	3.0	4.40	0.014	IV	98.6(158.6)
GSG	34.0120	116.3250	04/23/1992	051009.4	3.0	4.60	0.016	IV	98.6(158.7)
GSP	34.1400	117.7000	02/28/1990	234336.6	5.0	5.20	0.021	IV	98.6(158.7)
PAS	32.9860	115.5000	01/25/1975	1431 1.0	6.0	4.30	0.013	III	98.8(158.9)
GSP	34.0120	116.3190	11/20/1994	043143.5	6.0	4.20	0.013	III	98.8(159.0)
GSG	33.9820	116.2600	05/12/1992	023111.0	6.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	63540.0	0.0	5.50	0.025	V	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	918 0.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	7 1 0.0	0.0	4.50	0.015	IV	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	12 927.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	05/21/1940	213047.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	06/07/1940	52058.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	855 0.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	55134.0	0.0	5.50	0.025	V	98.8(159.0)
DMG	32.7670	115.4830	06/01/1940	235936.0	0.0	4.50	0.015	IV	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	44847.0	0.0	4.50	0.015	IV	98.8(159.0)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	32.7670	115.4830	05/19/1940	61742.0	0.0	4.50	0.015	IV	98.8(159.0)
DMG	32.7670	115.4830	07/15/1940	23241.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	06/01/1940	235414.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	63320.0	0.0	5.00	0.019	IV	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	55717.0	0.0	4.50	0.015	IV	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	5 4 0.0	0.0	4.50	0.015	IV	98.8(159.0)
DMG	32.7670	115.4830	05/22/1940	105831.0	0.0	4.50	0.015	IV	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	134058.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	13 643.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	455 0.0	0.0	5.50	0.025	V	98.8(159.0)
DMG	32.7670	115.4830	10/17/1940	1018 7.0	0.0	4.00	0.011	III	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	153033.0	0.0	4.50	0.015	IV	98.8(159.0)
DMG	32.7670	115.4830	05/19/1940	54437.0	0.0	4.50	0.015	IV	98.8(159.0)
PAS	33.0190	115.5040	10/16/1979	231632.3	15.2	4.90	0.018	IV	98.9(159.1)
DMG	33.0000	115.5000	12/21/1920	1452 0.0	0.0	4.50	0.015	IV	98.9(159.2)
MGI	33.0000	115.5000	05/31/1917	210 0.0	0.0	4.60	0.016	IV	98.9(159.2)
DMG	33.0000	115.5000	12/17/1955	19 543.0	0.0	4.30	0.013	III	98.9(159.2)
MGI	33.0000	115.5000	12/20/1920	529 0.0	0.0	4.00	0.011	III	98.9(159.2)
DMG	33.0000	115.5000	12/20/1920	1447 0.0	0.0	4.50	0.015	IV	98.9(159.2)
MGI	33.0000	115.5000	10/24/1924	739 0.0	0.0	4.60	0.016	IV	98.9(159.2)
DMG	33.0000	115.5000	02/26/1930	230 0.0	0.0	5.00	0.019	IV	98.9(159.2)
DMG	33.0000	115.5000	03/02/1930	150 0.0	0.0	4.50	0.015	IV	98.9(159.2)
MGI	33.0000	115.5000	05/27/1917	930 0.0	0.0	4.00	0.011	III	98.9(159.2)
DMG	33.0000	115.5000	12/17/1955	6 729.0	0.0	5.40	0.024	IV	98.9(159.2)
DMG	33.0000	115.5000	12/20/1917	825 0.0	0.0	4.00	0.011	III	98.9(159.2)
DMG	33.0000	115.5000	03/01/1930	23 5 0.0	0.0	4.50	0.015	IV	98.9(159.2)
T-A	33.0000	115.5000	10/23/1924	739 0.0	0.0	4.30	0.013	III	98.9(159.2)
DMG	33.0000	115.5000	12/17/1955	652 3.0	0.0	4.60	0.016	IV	98.9(159.2)
DMG	33.0000	115.5000	12/17/1955	61736.0	0.0	4.10	0.012	III	98.9(159.2)
DMG	33.0000	115.5000	10/30/1933	1059 0.0	0.0	4.20	0.013	III	98.9(159.2)
MGI	33.0000	115.5000	04/30/1915	820 0.0	0.0	4.00	0.011	III	98.9(159.2)
MGI	33.0000	115.5000	03/23/1908	1357 0.0	0.0	4.60	0.016	IV	98.9(159.2)
DMG	33.0000	115.5000	03/01/1930	2344 0.0	0.0	4.50	0.015	IV	98.9(159.2)
DMG	33.0000	115.5000	12/17/1955	51721.0	0.0	4.30	0.013	III	98.9(159.2)
MGI	33.0000	115.5000	08/31/1925	1 7 0.0	0.0	4.00	0.011	III	98.9(159.2)
MGI	33.0000	115.5000	04/28/1915	310 0.0	0.0	4.00	0.011	III	98.9(159.2)
DMG	32.2620	115.6000	07/13/1967	94253.4	10.0	4.10	0.012	III	98.9(159.2)
GSP	34.0340	116.3600	05/14/1999	105235.2	1.0	4.20	0.013	III	98.9(159.2)
PAS	34.1980	116.9590	04/01/1978	105227.4	8.0	4.00	0.011	III	98.9(159.2)
GSP	33.9920	116.2740	08/07/1994	151026.0	7.0	4.00	0.011	III	98.9(159.2)
PAS	33.0260	115.5040	10/16/1979	15 0 2.7	6.8	4.00	0.011	III	99.0(159.3)
DMG	34.2000	117.4000	07/22/1899	046 0.0	0.0	5.50	0.025	V	99.0(159.3)
DMG	34.0670	116.4320	12/04/1957	25144.0	3.7	4.30	0.013	III	99.0(159.4)
PAS	32.9520	115.4900	01/23/1975	17 229.4	4.3	4.80	0.017	IV	99.0(159.4)
PAS	32.9900	115.4950	01/23/1975	232434.4	5.3	4.00	0.011	III	99.1(159.5)
DMG	34.0830	116.4670	01/26/1934	1844 0.0	0.0	4.00	0.011	III	99.2(159.6)
DMG	34.0830	116.4670	03/01/1942	104631.0	0.0	4.00	0.011	III	99.2(159.6)
DMG	34.1830	117.5480	09/01/1937	163533.5	10.0	4.50	0.015	IV	99.3(159.7)
PAS	32.9450	115.4850	01/23/1975	154539.6	4.4	4.30	0.013	III	99.3(159.8)
PAS	32.9450	115.4850	01/23/1975	134719.0	4.4	4.00	0.011	III	99.3(159.8)
DMG	33.7830	118.4170	10/12/1940	024 0.0	0.0	4.00	0.011	III	99.4(159.9)
DMG	33.7830	118.4170	11/02/1940	25826.0	0.0	4.00	0.011	III	99.4(159.9)
DMG	33.7830	118.4170	10/14/1940	205111.0	0.0	4.00	0.011	III	99.4(159.9)

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7830	118.4170	11/01/1940	725 3.0	0.0	4.00	0.011	III	99.4(159.9)
PAS	32.9290	115.4810	01/23/1975	125548.6	4.7	4.40	0.014	IV	99.4(160.0)
PAS	32.9330	115.4810	01/23/1975	123016.0	4.0	4.00	0.011	III	99.4(160.0)
DMG	33.9390	118.2050	01/11/1950	214135.0	0.4	4.10	0.012	III	99.4(160.0)
GSP	34.1830	116.8020	06/28/1992	192637.6	1.0	4.00	0.011	III	99.5(160.1)
MGI	34.2000	116.9000	10/10/1915	5 6 0.0	0.0	4.00	0.011	III	99.6(160.2)
PAS	32.8240	115.4700	11/14/1977	2 548.5	5.5	4.20	0.013	III	99.6(160.3)
GSP	34.1950	116.8620	08/17/1992	204152.1	11.0	5.30	0.022	IV	99.6(160.3)
GSP	34.1500	117.7200	03/01/1990	032303.0	11.0	4.70	0.016	IV	99.6(160.3)
PAS	32.8120	115.4690	11/14/1977	53655.9	5.1	4.10	0.012	III	99.6(160.3)
DMG	34.1830	117.5830	10/03/1948	24628.0	0.0	4.00	0.011	III	99.7(160.4)
GSP	34.0290	116.3210	08/21/1993	014638.4	9.0	5.00	0.019	IV	99.7(160.5)
GSP	34.1980	116.8620	08/18/1992	094640.7	12.0	4.20	0.013	III	99.8(160.6)
DMG	32.5000	115.5000	05/06/1961	14212.0	0.0	4.10	0.012	III	99.8(160.7)
MGI	32.5000	115.5000	04/16/1925	330 0.0	0.0	5.00	0.019	IV	99.8(160.7)
DMG	32.5000	115.5000	06/26/1930	22 9 0.0	0.0	4.50	0.015	IV	99.8(160.7)
DMG	32.5000	115.5000	01/01/1927	81645.0	0.0	5.75	0.028	V	99.8(160.7)
MGI	32.5000	115.5000	04/16/1925	520 0.0	0.0	5.30	0.022	IV	99.8(160.7)
DMG	32.5000	115.5000	11/07/1923	2357 0.0	0.0	5.50	0.025	V	99.8(160.7)
MGI	32.5000	115.5000	06/16/1922	21 0 0.0	0.0	4.00	0.011	III	99.8(160.7)
DMG	32.5000	115.5000	09/08/1921	1924 0.0	0.0	5.00	0.019	IV	99.8(160.7)
DMG	32.5000	115.5000	06/24/1930	2325 0.0	0.0	4.00	0.011	III	99.8(160.7)
DMG	32.5000	115.5000	05/06/1961	2 8 6.0	0.0	4.10	0.012	III	99.8(160.7)
DMG	32.5000	115.5000	05/01/1918	432 0.0	0.0	5.00	0.019	IV	99.8(160.7)
DMG	32.5000	115.5000	02/09/1961	175042.0	0.0	4.80	0.017	IV	99.8(160.7)
DMG	32.5000	115.5000	04/19/1906	030 0.0	0.0	6.00	0.032	V	99.8(160.7)
DMG	32.5000	115.5000	11/05/1923	22 7 0.0	0.0	5.00	0.019	IV	99.8(160.7)
DMG	32.5000	115.5000	01/01/1927	91330.0	0.0	5.50	0.025	V	99.8(160.7)
DMG	34.2000	117.5000	06/14/1892	1325 0.0	0.0	4.90	0.018	IV	99.9(160.7)
PAS	33.1980	115.5350	07/13/1983	211648.3	1.1	4.00	0.011	III	99.9(160.7)
DMG	33.7670	118.4500	10/11/1940	55712.3	0.0	4.70	0.016	IV	100.0(160.9)
PAS	32.8160	115.4630	11/14/1977	122020.1	10.1	4.30	0.013	III	100.0(160.9)
PAS	33.0460	115.4900	10/17/1979	224534.3	3.9	4.50	0.015	IV	100.0(160.9)

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-END OF SEARCH- 1146 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2000

LENGTH OF SEARCH TIME: 201 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 5.2 MILES (8.3 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.0

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.259 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 4.094
b-value= 0.843
beta-value= 1.941

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	1146	5.70149
4.5	395	1.96517
5.0	138	0.68657
5.5	55	0.27363
6.0	24	0.11940
6.5	7	0.03483
7.0	1	0.00498