PSOMAS

Initial Study/Mitigated Negative Declaration

Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project

City of Burbank

June 2014

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INITIAL STUDY/
MITIGATED NEGATIVE DECLARATION

BEACHWOOD-SPARKS FORCE MAIN REPLACEMENT AND PUMP STATION UPGRADE PROJECT

June 2014

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1.0 Introduction

The City of Burbank owns and operates its own sewer collection and water reclamation plant that serves approximately 105,000 people (Figure 1, *Regional Map*). The collection system includes approximately 230 miles of sewer pipelines ranging in diameter from 6 to 30 inches, the Beachwood Pump Station, the Mariposa Pump Station, and the Burbank Water Reclamation Plant (BWRP). Sewage generated in the northern half of the City reaches the BWRP under gravity conditions, while sewage generated in the southerly half flows into the Beachwood Pump Station, from which it is lifted to the BWRP using a force main sewer line routed under Beachwood Drive and Chandler Boulevard. Sewage along the extreme southeastern edge of the City discharges into the Mariposa Pump Station, where it is lifted to the Beachwood Pump Station before being lifted a final time to the BWRP. Figure 2, *Facility Layout Map,* depicts a general location of the BWRP, the Beachwood Pump Station, and the existing force main sewer from the Beachwood Pump Station to the BWRP.

The vast majority of sewage generated within the City ends up in the BWRP, except for a small 365-acre area at the southwesterly corner of the City. Sewage generated within this area is discharged to the Los Angeles 48-inch diameter North Outfall Sewer (NOS) that runs from west to east through the southern portion of the City (the NOS also handles excess from the Beachwood Pump Station during periods when the Station's capacity might be exceeded).

The BWRP currently treats approximately 8.5 million gallons per day (MGD) but has the design capacity to treat up to 12.5 MGD. The City desires to utilize the full 12.5 MGD capacity of the BWRP and reduce contribution to the NOS, and proposes to upgrade the Beachwood Pump Station in order to achieve this goal.

1.1 Background and Context

The Beachwood Pump Station is set below-grade with overhead access to each pump through a hatch on the ground surface. Above-ground vents pull air into the pump and motor room. The pump and motor room utilizes two Calgon Corporation carbon canisters for odor control. The existing pumps are equipped with 14-inch diameter impellers with a design capacity of 4.9 MGD (Psomas, 2013). In combination, each pump was designed to produce 3.6 MGD for a total pump station capacity of 7.2 MGD (two pumps in operation at any one time).

In practice, the Beachwood Pump Station only produces a maximum pumping rate of 5.9 MGD. This condition is primarily due to the age and condition of the Beachwood Force Main and the effective pumping capacity of the existing pumps. The City proposes to undertake the Beachwood Pump Station Upgrade Project which will include the following:

- Replacing three existing 150-horsepower (hp) closed-impeller pumps with new 150-hp open-impeller pumps
- Custom fabricating fittings to retrofit new pumps into piping designed for old pump dimensions
- Replacing suction and discharge isolation and check valves
- Re-coating wet well with polymer liner

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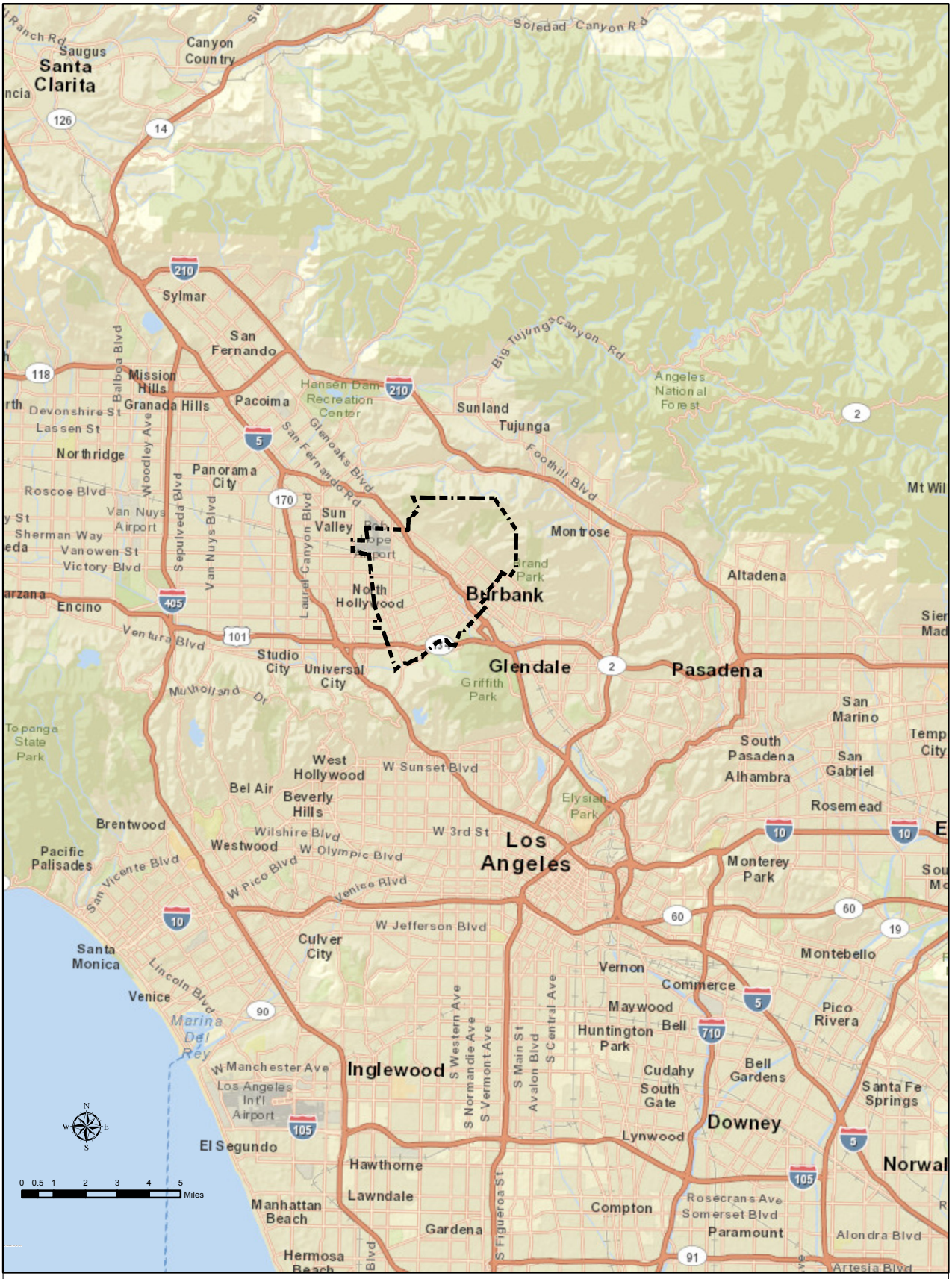

Legend

Burbank City Limits

Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project
City of Burbank

Regional Map

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Figure 1

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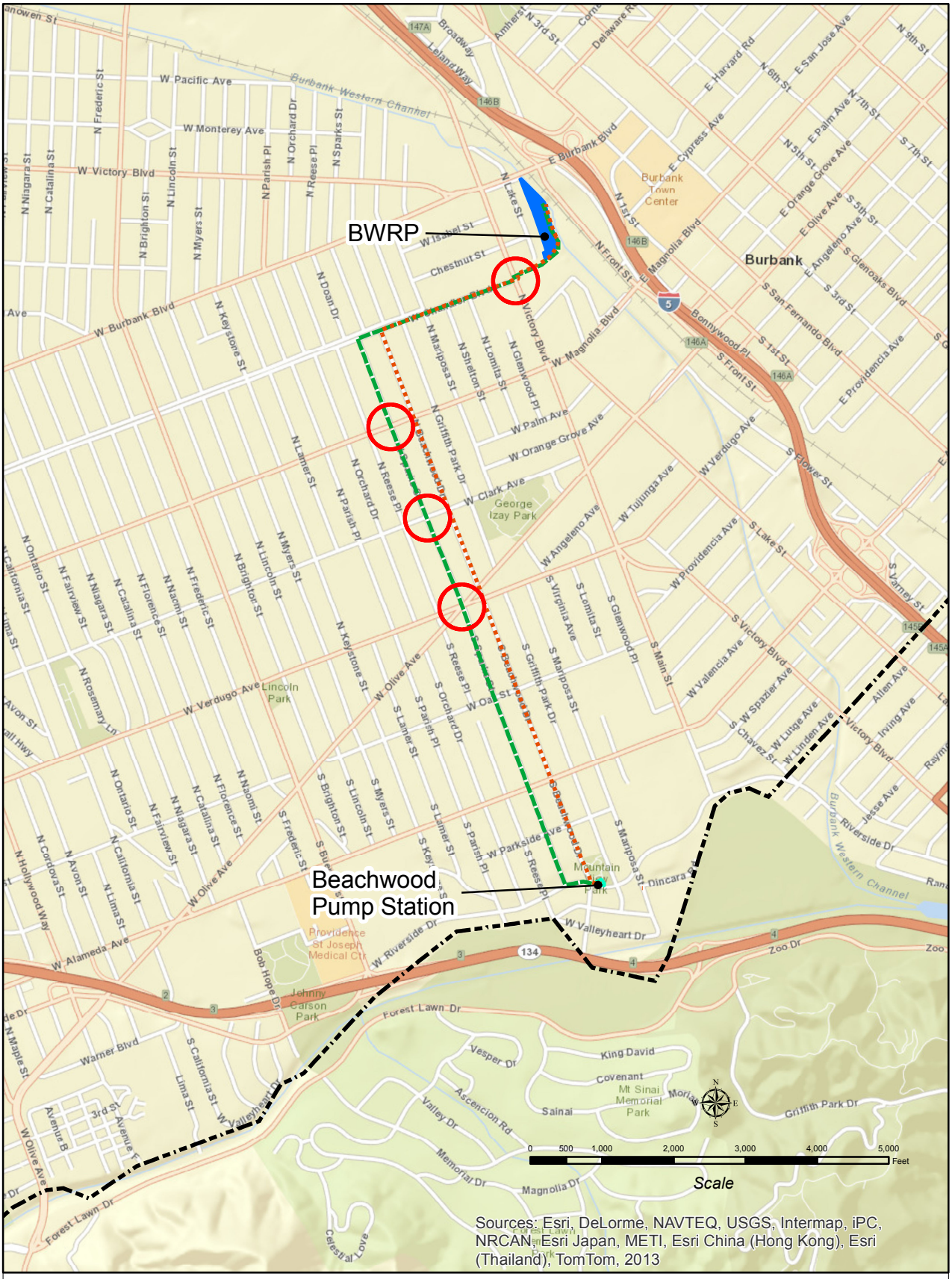

Legend

- Burbank City Limits
- Existing Force Main
- Burbank Water Reclamation Plant
- Beachwood Pump Station
- Proposed New Force Main
- Pipe Jacking Locations

Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project
City of Burbank

Facility Layout Map

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Figure 2

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- Improvements or modifications to odor control facilities
- Integrating new pumps with VFD's and controls.

The existing Beachwood Force Main is an 11,940-foot 18-inch diameter cement-mortar-lined-and-coated steel pipeline constructed in 1972. The pipeline runs from the Beachwood Pump Station, up Beachwood Drive to West Chandler Boulevard and then east on West Chandler Boulevard to the BWRP as depicted in Figure 2. The Beachwood Force Main has ruptured on three separate occasions, twice in 1996 and once in 2010. Considering the age of the pipeline, the entire length of the Beachwood Force Main is programmed for replacement.

The Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project (proposed project) includes a combination of cut-and-cover pipeline construction (generally less than 10 feet in depth) and jacking and boring across major arterial streets (10 to 20 feet deep) on North/South Sparks Street and Victory Boulevard (see Figure 2). The alignment begins at the Beachwood Pump Station and continues west on West Riverside Drive for approximately 500 feet, at which point the alignment turns north and continues 8,200 feet on South Sparks Street up to West Olive Avenue. The alignment continues north on North Sparks Street to West Chandler Boulevard, where it turns east and parallels the existing Beachwood Force Main on West Chandler Boulevard for approximately 4,000 feet. The parallel alignment continues into the BWRP until it discharges into the BWRP headworks located at the northeast side of the plant. A new magnetic flow meter will be installed in an existing underground vault at the BWRP site replacing the existing flow meter. The replacement force main will be 24-inches in diameter and constructed with high density polyethylene (HDPE) pipe with fused joints.

It is expected that pipe-jacking (a form of tunneling) will be performed at strategic street intersections (see Figure 2) and include the following locations:

- Victory Boulevard at West Chandler Boulevard
- West Magnolia Boulevard and North Sparks Street
- West Clark Avenue and North Sparks Street
- West Olive Avenue/West Verdugo Avenue and North/South Sparks Street

The pipe-jacking operations will generally consist of:

- Site preparation,
- Excavation and shoring of jacking and receiving pits,
- Jacking of steel casing,
- Installation of carrier pipe,
- End of casings will be plugged, and
- Work site restoration.

Design of the new force main will include all fittings, appurtenances, and hardware necessary for proper operation and maintenance. This includes, but is not limited to, combination air and vacuum release valves, blow-off assemblies, and access ways.

Topside equipment used to support the jacking and boring operation is listed in Table 1 and includes a crane, a hydraulic jacking machine, a boring machine, backhoe and front end loader for pit excavation and spoil handling, and truck transport for equipment movement.

Table 1
Major Equipment Used During Construction Activities for Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project

COMPONENT	ACTIVITY	MAJOR EQUIPMENT REQUIRED
New Force Main Sewer	Site Preparation	Concrete/industrial saw; pavement breaker/jackhammer
	Excavation and Shoring	Excavator; backhoe; haul trucks; trencher; generator; water truck
	Pipe Installation and Backfilling (including jacking and receiving pits)	Excavator; crane; rubber-tired loader; rubber-tired backhoe with compactor; pipe-jacking equipment; boring machine; compressors; generators; haul trucks; water truck; dump truck
	Work Site Restoration	Plate compactor; asphalt dump truck; asphalt paver; grader; roller; water truck
Beachwood Pump Station Upgrade	Pump and Mechanical Equipment Removal	Crane; welder; heavy duty truck
	Wet Well Rehabilitation	Vacuum truck; steam/jet sprayer; generator; compressor; crane
	Excavation and Shoring	Excavator; backhoe; haul trucks; trencher; generator; water truck
	Pump and Pipe Installation and Backfilling	Excavator; crane; rubber-tired loader; rubber-tired backhoe with compactor; water truck; dump truck; welder
	Work Site Restoration	Plate compactor; dump truck; grader; roller; water truck

1.2 Legal Authority

This Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared in accordance with the Guidelines and relevant provisions of the California Environmental Quality Act (CEQA) of 1970, as amended, in support of the City's proposed project.

In accordance with CEQA (Public Resources Code Sections 21000-21189) and pursuant to Title 14, Division 6, Chapter 3, Section 15063 of California Code of Regulations (CEQA Guidelines), the City of Burbank, as Lead Agency, has determined that the proposed project does not qualify for either a statutory or a categorical exemption. Consequently, the City is required to prepare an Initial Study to determine if the proposed project would have a significant environmental impact.

1.2.1 Initial Study

Section 15063(c) of the CEQA Guidelines states that the purposes of an Initial Study are to:

1. Provide the Lead Agency with information to use as the basis for deciding whether to prepare an EIR or a Negative Declaration.
2. Enable an applicant or Lead Agency to modify a project, mitigating adverse impacts before an EIR is prepared, thereby enabling the project to qualify for a Negative Declaration.
3. Assist in the preparation of an EIR, if one is required.
4. Facilitate environmental assessment early in the design of a project.
5. Provide documentation of the factual basis for the finding in a Negative Declaration that a project will not have a significant effect on the environment.
6. Eliminate unnecessary EIRs.
7. Determine whether a previously prepared EIR could be used with the project.

Section 15063 of the CEQA Guidelines states that:

> If the agency determines that there is substantial evidence that any aspect of the project, either individually or cumulatively, may cause a significant effect on the environment, regardless of whether the overall effect of the project is adverse or beneficial, the Lead Agency shall do one of the following:
>
> A. Prepare an EIR, or
> B. Use a previously prepared EIR which the Lead Agency determines would adequately analyze the project at hand, or
> C. Determine, pursuant to a program EIR, tiering, or another appropriate process, which of a project's effects were adequately examined by an earlier EIR or negative declaration.

1.2.2 Mitigated Negative Declaration

Section 15369.5 of the CEQA Guidelines defines a Mitigated Negative Declaration as:

> "Mitigated Negative Declaration" means a Negative Declaration prepared for a project when the Initial Study has identified potentially significant effects on the environment, but (1) revisions in the project plans or proposals made by, or agreed to by, the applicant before the proposed Negative Declaration and Initial Study are released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effect on the environment would occur, and (2) there is no substantial evidence in light of the whole record before the public agency that the project, as revised, may have a significant effect on the environment.

Section 15070 of the CEQA Guidelines states:

> A public agency shall prepare or have prepared a proposed Negative Declaration or Mitigated Negative Declaration for a project subject to CEQA when:

a. The Initial Study shows that there is no substantial evidence, in light of the whole record before the agency, that the project may have a significant effect on the environment, or
b. The Initial Study identifies potentially significant effects, but:
    1. Revisions in the project plans or proposals made by, or agreed to by the applicant before a proposed Mitigated Negative Declaration and initial study are released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur, and
    2. There is no substantial evidence, in light of the whole record before the agency, that the project as revised may have a significant effect on the environment.

A Mitigated Negative Declaration circulated for public review shall include (Section 15071 of the CEQA Guidelines):

1. A brief description of the project, including a commonly used name for the project, if any;
2. The location of the project, preferably shown on a map, and the name of the project proponent;
3. A proposed finding that the project will not have a significant effect on the environment;
4. An attached copy of the Initial Study documenting reasons to support the finding; and
5. Mitigation measures, if any, included in the project to avoid potentially significant effects.

The City has elected to prepare an IS/MND to evaluate the potential environmental effects of the proposed project based on the understanding that the scope of the proposed project, while large enough to qualify as a project pursuant to CEQA, is small enough to reasonably anticipate that any potential environmental effects resulting from the proposed project will be below the level of significance as defined by CEQA, or will be able to be brought below the level of significance through implementation of mitigation.

1.3 Summary of Findings

Section 3.0, Environmental Analysis, of this IS/MND contains the Environmental Checklist that identifies potential environmental impacts of the proposed project. Section 3.0 also provides an analysis of each environmental issue. The following technical studies were prepared to support the environmental analysis presented in Section 3.0:

- Air Quality and Greenhouse Gas Analysis
    - This report did not identify any potential impacts to air quality from the proposed project.
- Biological Resources Letter Report
    - This report identified two potential impacts associated to Biological Resources from the proposed project. Those mitigation measures are provided in Section 3.1.4, Biological Resources, and in Section 1.3.1, below.

- Cultural Resources Reconnaissance Survey
    - This report identified three potential impacts associated to Cultural Resources from the proposed project. Those mitigation measures are provided in Section 3.1.5, Cultural Resources, and in Section 1.3.1, below.
- Geotechnical Report
    - This report did not identify any potential impacts associated with geology and soils from the proposed project.
- Noise Analysis Report:
    - This report identified two potential impacts associated with Noise that would be brought below the level of significance with incorporation of mitigation. Those mitigation measures are provided in Section 3.1.12, Noise, and in Section 1.3.1, below.

Each of these technical studies is provided as an appendix to this IS/MND.

Based on the analysis provided in Section 3.0, the proposed project is not expected to result in any significant impacts for the following issue areas:

- Aesthetics
- Agricultural Resources
- Air Quality
- Geology and Soils
- Greenhouse Gas Emissions
- Land Use and Planning
- Mineral Resources
- Population and Housing
- Public Services
- Recreation
- Transportation/Traffic
- Utilities and Service Systems

Based on the analysis provided in Section 3.0, the proposed project is expected to result in less than significant impacts with incorporation of mitigation measures for the following issue areas:

- Biological Resources
- Cultural Resources
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise

Specific mitigation measures to bring the potential environmental impacts related to Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Hydrology and Water Quality, and Noise below the threshold for significance are included within the analysis of each issue area in Section 3.0, and are listed below.

1.3.1 Mitigation Measures

1.3.1.1 Biological Resources

MM BIO-1 The City shall schedule proposed project activities, to the extent practical, outside the recognized nesting season (February 15-August 31) so as to not affect breeding birds. However, should project activities need to be scheduled during the recognized nesting season, the City shall complete the following activities to avoid impacts to nesting birds:

- The City shall clearly define all work area limits and instruct all construction personnel and contractors to respect these defined limits.
- Pre-construction nesting bird surveys shall be performed to identify any nests that may be impacted by construction activities. The City of Burbank shall have a qualified biologist perform nesting bird surveys. Surveys should take place at least seven days prior to the onset of scheduled mobilization and staging activities. Should any active nests be found, the biologist will flag the nest area 50 feet on either side of the nest.
- Should active nests be found within 50 feet of scheduled active construction areas, a biologist will be assigned to monitor the nest during mobilization and staging activities to determine if the activities are detrimental to the nesting process. Should the biologist determine that the nesting activities are being disturbed or disrupted, the biologist will discuss with the City of Burbank and the construction contractor practical alternatives to activities at the nest site. If needed, the City of Burbank shall contact the USFWS and CDFW for further guidance.
- If the City of Burbank workers or subcontractors discover any nests, the City of Burbank shall follow protocols specified by the USFWS or CDFW.
- Under no circumstances shall the City of Burbank disturb, capture, handle or move birds or their nests.

MM BIO-2 Prior to any tree removal within any portion of the project, the Director of the City of Burbank Park, Recreation, and Community Services Department shall be contacted to ensure compliance with the City of Burbank Municipal Code, specifically Title 7 Chapters 1 and 4 (Section 7-1-222 and 7-4-102). Any impacted trees will be replaced in-kind with a nursery stock minimum of 5-10 gallon size container tree.

1.3.1.2 Cultural Resources

MM CUL-1 A qualified project archaeologist shall be retained by the City to prepare a mitigation monitoring plan. A qualified archaeologist is defined as an archaeologist meeting the Secretary of the Interior Professional Qualification Standards for Archaeology.

MM CUL-2 The project archaeologist shall review final construction plans and soils information and attend a pre-construction meeting. The archaeologist shall

prepare educational materials for construction crew indicating the types of buried artifacts and features that may be encountered along the route of the project. For those portions of the project for which it is clearly documented that all excavations will take place in fill or otherwise disturbed soil, no monitoring shall be required. For those portions of the project for which the nature of underlying soils is unknown, the archaeologist shall establish a monitoring schedule. If underlying soils in an unknown area are determined to have been previously disturbed once construction and monitoring begins, the archaeologist may reduce or terminate monitoring for that area with the disturbed soils.

MM CUL-3 An archaeological monitor, supervised by the project archaeologist, shall monitor ground-disturbing activities in previously undisturbed soils as designated by the project archaeologist. If archaeological materials are identified during monitoring or unexpectedly during other project activities, all ground-disturbing activity in the vicinity of the find shall cease until the project archaeologist has evaluated the find. If the project archaeologist determines that the find may be significant, the archaeologist will develop a treatment plan. If the find is prehistoric in nature, Native American groups affiliated with the project vicinity as indicated by the Native American Heritage Commission, shall be notified of the find and invited to provide input for the treatment plan within a specified time frame. The project archaeologist shall prepare a report presenting the methods and results of the monitoring. A report on a treatment plan, if any, may be prepared separately. Copies of the reports shall be submitted to the Applicant, the City, and CHRIS-SCCIC. Any artifacts recovered during the monitoring program or treatment plan shall be curated along with copies of the appropriate report at an accredited facility selected by the City. If prehistoric materials are recovered, affiliated Native American groups shall be consulted regarding curation location of these artifacts.

MM CUL-4 If construction takes place 10 or more feet below current grade, a qualified project paleontologist shall be retained by the Applicant and approved by the City to develop a paleontological monitoring plan. A qualified project paleontologist is here defined as a paleontologist meeting the qualifications established by the Society of Vertebrate Paleontologists.

MM CUL-5 The project paleontologist shall attend a pre-grade meeting in order to become familiar with the proposed depths and patterns of grading of the study area. The project paleontologist shall establish a curation agreement with an accredited facility prior to the initiation of ground-disturbing activities.

MM CUL-6 A paleontological monitor (the monitoring archaeologist and the monitoring paleontologist may be the same person), supervised by the project paleontologist, shall monitor ground-disturbing activities identified by the paleontologist as having potential to encounter paleontological resources. Disturbed soils are anticipated to not have potential to contain intact fossils. If soils in a given area are determined to have been previously disturbed once construction and

monitoring begins, the project paleontologist may reduce or terminate monitoring for that area with the disturbed soils. If fossils are found during monitoring or other project-related ground-disturbing activities, ground-disturbing shall be halted in order to allow evaluation of the find and determination of appropriate treatment.

MM CUL-7 The project paleontologist shall prepare a final report on the monitoring. If fossils are identified, the report shall contain an appropriate description of the fossils, treatment, and curation. A copy of the report shall be filed with the City of Burbank and shall accompany any curated fossils.

MM CUL-8 If human remains are encountered unexpectedly during construction excavation and grading activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the California Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains.

1.3.1.3 Hazards and Hazardous Materials

MM HAZ-1: Prior to start of construction, the construction contractor shall designate staging areas where fueling and oil-changing activities would take place. The staging area(s) shall be reviewed and approved by the City of Burbank's designated mitigation monitor and the Storm Water Pollution and Prevention Manager prior to the start of construction. No fueling and oil-changing activities shall be permitted outside the designated staging areas. The staging areas shall be located on level terrain and away from sensitive land uses such as residences, day care facilities, and schools to the maximum extent practicable. Staging areas shall not be located near any stream, channel, or wetlands. The proposed staging areas shall be identified in the Storm Water Pollution Prevention Plan (SWPPP).

1.3.1.4 Hydrology and Water Quality

MM HYDRO-1: Prior to construction, the contractor will be required to comply with the Construction General Permit and submit a Storm Water Pollution Prevention Program (SWPPP), including identifying Risk Level/Type, appropriate controls and if necessary a rain event action plan. The plan and accompanying elements shall be prepared by the contractor and submitted to the City for approval. The erosion control measures shall be designed to limit the effects of soil erosion and water degradation during construction. This plan shall be prepared and implemented in accordance with the requirements of the State Water Resources Control Board Construction General Permit, and shall include (but not be limited to) the following measures:

- Effluent standards for all discharges
- Receiving Water Limitations
- Training and Qualification Requirements
- Sampling, Monitoring, Reporting and Record Keeping Requirements
- Risk Determination
- Use of sediment control measures that utilize sediment traps, barriers, covers, or other methods approved by the SWRCB, County of Los Angeles, and the City of Burbank;
- Plans for appropriate deposition and storage of excavated material;
- Construction phasing; and
- Coverage methods for all stockpiles of fill material during extended periods of rain.

1.3.1.5 Noise

MM NOI-1 All construction equipment shall use available noise suppression devices and properly maintained mufflers. All internal combustion engines used in the project area shall be equipped with the type of muffler recommended by the vehicle manufacturer. In addition, all equipment shall be maintained in accordance with the manufacturer's specifications to minimize noise created by faulty or poorly maintained engine, drive train, and other components.

MM NOI-2 During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receptors and as far as possible from the boundary of sensitive receptors.

1.4 Impact Analysis and Significance Classification

A "significant effect" is defined by Section 15382 of the CEQA Guidelines of 2013 as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by a project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." According to the CEQA Guidelines, "an economic or social change by itself shall not be considered a significant effect on the environment, but may be considered in determining whether the physical change is significant."

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2.0 Initial Study/Mitigated Negative Declaration

2.1 Project Information

2.1.1 Project Title

Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project

2.1.2 Lead Agency Name and Address

City of Burbank
Public Works Department
150 North Third Street
Burbank, CA 91510

2.1.3 Project Sponsor's Name and Address

City of Burbank – Mr. Daniel J. Rynn, P.E. (Assistant Public Works Director-Wastewater)
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2.1.5 Project Location

The City of Burbank is located in the eastern part of the San Fernando Valley (see Figure 1), in Los Angeles County, 12 miles from downtown Los Angeles, and is 17.13 square miles in area. Burbank is a full-service city, with an elected Council/City Manager form of government. The City has more than 1,400 full time employees.

The Beachwood Pump Station is located in Mountain View Park, near the corner of Beachwood Drive and Riverside Drive (see Figure 2). The Beachwood Pump Station receives wastewater from the southern portion of the City. Raw sewage entering the Beachwood Pump Station wet well is pumped via Beachwood Force Main which heads north up Beachwood Drive to West Chandler Boulevard then east into the Burbank Water Reclamation Plant (BWRP).

The Beachwood Pump Station is a permanent facility with separate pump and motor room and wet well, as well as a remote control room on the pump station property. The facility is equipped with three Aurora 610 Series single stage wastewater pumps, dual sump pumps, and a de-watering pump. The wastewater pumps are driven by US Electric motors that operate on 3-phase power at a maximum of 480 volts, and produce a maximum of 150 hp. The motors are connected to a variable frequency drive (VFD) system that modulates the electrical power to the motors, thereby controlling the pumping power produced at any given time. The PLC controls pumping operations with a combination of the three pumps with their VFD's to keep water level in the wet well within a four foot operational range.

The project is located on the U.S. Geological Survey 7.5 minute series Burbank topographic quadrangle (Township 1 North; Range 14 West [San Bernardino Base & Meridian]) within sections 11, 14 and 2 (see Figure 2). The proposed project would take place at the following locations:

- Along a railroad spur east of the intersection of North Victory Boulevard and West Chandler Boulevard
- Along West Chandler Boulevard between North Victory Boulevard and North Beachwood Drive
- Along North/South Sparks Street between West Chandler Boulevard and West Riverside Drive
- Along Riverside Drive between Mountain view Park and South Sparks Street
- On the southern edge of Mountain View Park

The elevation of the proposed project study area varies from approximately 580 feet above mean sea level (MSL) at the BWRP to 500 feet above MSL at the Beachwood Pump Station at Mountain View Park.

2.1.6 General Plan Designation

The existing alignment of the proposed project is characterized by Urban Development as described in the Land Use Element of the City's General Plan (City of Burbank 2009). The City's General Plan Land Use Geographic Information System (GIS) – based map identifies the following land uses along the force main alignment and adjacent to the Beachwood Pump Station:

- Low Density Residential
- Medium Density Residential
- Corridor Commercial
- North Victory Commercial/Industrial
- Open Space

The Land Use Element of the City's General Plan, "supports the concept of balance in the community – the idea that small-town character, economic prosperity, and sustainability do not have to come at the expense of one another, but rather can coexist and complement each other. Achieving this balance will properly manage future growth, strengthen and diversify the

economy, and protect Burbank's neighborhoods and quality of life." In addition, the Land Use Element fulfills the requirement that "planning include housing, business, industry, open space, forest/timber, agriculture, natural resources, recreation, scenic beauty, education, public buildings and land, solid and liquid waste disposal facilities, and other public and private uses of land." Accordingly, the proposed project fulfills the requirement of maintaining liquid waste disposal facilities to support existing land uses.

2.1.7 Zoning

The City's General Plan Land Use map identifies the following zoning along the force main alignment and adjacent to the Beachwood Pump Station:

- Low Density Residential
- Medium Density Residential
- Corridor Commercial
- North Victory Commercial/Industrial
- Open Space

2.1.8 Surrounding Land Uses and Setting

Land uses along the North/South Sparks Street between Chandler Boulevard and West Riverside Drive, include primarily residential neighborhoods with some occasional commercial businesses. Six schools are located within 1 mile of the proposed Force Main alignment (see Figure 3) and include:

- Walt Disney Elementary School
- St. Finbar Catholic School
- William McKinley Elementary
- David Starr Jordan Middle School
- John Burroughs High School
- Thomas Edison Elementary
- Monterey High School

Most of the schools are equal to or greater than 0.25 miles from the proposed alignment. In addition, George Izay Park is located adjacent to North Griffith Park Drive between West Magnolia Boulevard and West Olive Avenue is approximately 750 feet east of North Sparks Street. Mountain View Park is located at the termination of the proposed Force Main where the Beachwood Pump Station is located. To the west is more residential development and to the east more residential development.

2.1.9 Project Description

The proposed project consists of an upgrade of an existing Beachwood Pump Station and replacement of the Force Main between the Beachwood Pump Station and the BWRP. The major features of the project are described below:

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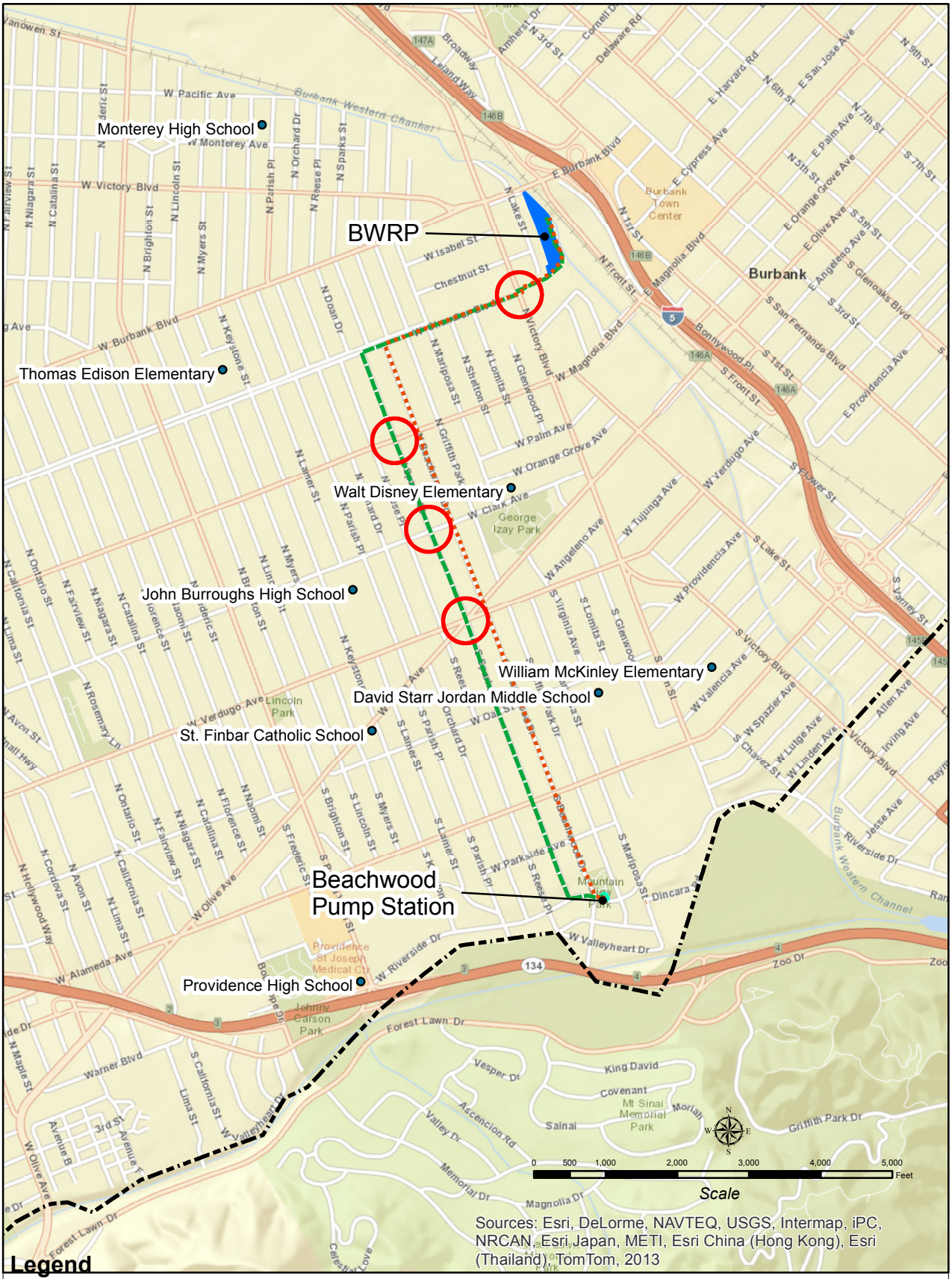

Legend

- Schools
- Burbank City Limits
- Existing Force Main
- Burbank Water Reclamation Plant
- Beachwood Pump Station
- Proposed New Force Main
- Pipe Jacking Locations

Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project
City of Burbank

Schools in Proximity to Proposed Pipeline and Pump Station

PSOMAS

Figure 3

2BUR080200

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- Replace three existing 150-hp closed-impeller pumps with new 150-hp open-impeller pumps
- Custom-fabricate fittings to retrofit new pumps into piping designed for old pump dimensions
- Replace suction and discharge isolation and check valves
- Re-coat wet well with polymer liner
- Improve or modify odor control facilities
- Integrate new pumps with variable frequency drives (VFDs) and controls.

Topside equipment used to support the Beachwood Pump Station upgrade is summarized in Table 1, above. The proposed project includes a combination of cut-and-cover pipeline construction and jacking and boring across major arterial streets on North/South Sparks Street (see Figure 2, above).

The proposed project includes a combination of cut-and-cover pipeline construction and jacking and boring across major arterial streets on North/South Sparks Street (see Figure 2, above). The alignment begins at the Beachwood Pump Station and continues west on West Riverside Drive for approximately 500 feet, at which point the alignment turns north and continues 8,200 feet on South Sparks Street up to West Olive Avenue. The alignment continues north on North Sparks Street to West Chandler Boulevard, where it turns east and parallels the existing Beachwood Force Main on West Chandler Boulevard for approximately 4,000 feet. The parallel alignment continues into the BWRP until it discharges into the BWRP headworks located at the northeast side of the plant. A new magnetic flow meter will be installed in an existing underground vault at the BWRP site replacing the existing flow meter. The replacement force main will be 24-inches in diameter and constructed with high density polyethylene (HDPE) pipe with fused joints.

It is expected that pipe-jacking (a form of tunneling) will be performed at strategic street intersections (see Figure 2) and include the following locations:

- Victory Boulevard at West Chandler Boulevard
- West Magnolia Boulevard and North Sparks Street
- West Clark Avenue and North Sparks Street
- West Olive Avenue/West Verdugo Avenue and North/South Sparks Street
-

The pipe-jacking operations will generally consist of:

- Site preparation,
- Excavation and shoring of jacking and receiving pits,
- Jacking of steel casing,
- Installation of carrier pipe,
- End of casings will be plugged, and
- Work site restoration.

Topside equipment used to support the jacking and boring operation is listed in Table 1 and includes a crane, a hydraulic jacking machine, a boring machine, backhoe and front end loader for pit excavation and spoil handling, and truck transport for equipment movement and spoils removal and backfill hauling.

2.1.10 Existing Site Features

North/South Sparks Street is a residential street that extends north/south from just north of West Chandler Boulevard in the north to West Riverside Drive at the southern edge of the City. North/South Sparks Street is a two-lane roadway over its entire length and is approximately 36 feet wide that generally includes parking on both sides of the residential street. Major intersections along North/South Sparks Street includes: West Olive Avenue/West Verdugo Avenue, West Clark Avenue, and West Magnolia Boulevard. Land uses along the west and east side of North Sparks Street includes single family residential with some corridor commercial and multi-family residential along major streets (West Alameda Avenue).

West Chandler Boulevard is a residential street that extends from North Clybourn Avenue in the west to North Victory Boulevard in the east. West Chandler Boulevard is a two-lane roadway over its entire length and is approximately 30 feet wide that generally includes parking on the south side of the residential street and a bike path (Chandler Bikeway) to the north in a median area that separates West Chandler Boulevard from Chandler Boulevard. Land uses along the north and south sides of West Chandler Boulevard includes single family residential, multi-family residential, commercial, industrial, and mixed commercial/industrial.

2.1.11 Other Public Agencies Whose Approval is Required

The City shall provide the following agencies with copies of this IS/MND for review and approval.

- State of California Regional Water Quality Control Board – Los Angeles Region
- California Department of Fish and Wildlife
- U.S. Fish and Wildlife Service

3.0 Environmental Analysis

This section of the IS/MND contains a copy of the Environmental Checklist prepared for the proposed project. This analysis is undertaken to determine if the proposed project may have a significant impact to the environmental issue areas that would require the consideration of mitigation measures or alternatives in accordance with Section 15063 of the State of California Environmental Quality Act (CEQA) Guidelines (California Code of Regulations). A summary of the substantial evidence that was used to support the responses in the Environmental Checklist follows for each environmental issue area. The answers contained in this Environmental Checklist are based on reviews of relevant literature, available data, technical reports, and field reconnaissance undertaken in the spring and summer of 2012. The environmental analysis provided in this section describes the information that was considered in evaluating the questions in the Environmental Checklist.

The environmental factors checked below would be potentially affected by the proposed project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Geology / Soils
☐ Greenhouse Gas Emissions	☒ Hazards & Hazardous Materials	☒ Hydrology/Water Quality
☐ Land Use / Planning	☐ Mineral Resources	☒ Noise
☐ Population / Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Utilities / Service Systems	☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the applicant. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Daniel J. Rynn, P.E., City of Burbank – Asst. Public Works Director - Wastewater	June 5, 2014 Date
Michael P. Donovan, Psomas Senior Hydrogeologist	June 5, 2014 Date

3.1 Evaluation of Environmental Impacts

3.1.1 Aesthetics

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

3.1.1.1 Explanation

Aesthetics at the proposed project alignment were evaluated with regard to the Burbank 2035 General Plan (City of Burbank 2013), California Department of Transportation's (Caltrans) Scenic Highway System (California Department of Transportation 2014) designations, previously published information regarding the visual character of the proposed project alignment, including light and glare, site reconnaissance, and a review of conceptual elevations and proposed project alignment plans.

3.1.1.2 Responses to Impact Questions

a) Would the project have a substantial adverse effect on a scenic vista?

Less Than Significant Impact. The proposed project would involve temporary construction activities within public street right-of-ways and would not result in any long-term impacts on views or scenic vistas. Although construction activities would temporarily place construction equipment, barriers, signs, materials, and workers in public view, the majority of the pipeline alignments are located at relatively low elevations and therefore are not visible from locations outside the immediate vicinity. The construction area along pipeline alignments would generally be limited to 500 linear feet or less, which would include equipment staging and trenching in the active construction area. Construction is expected to progress at approximately 100 to 120 linear feet per day, and therefore the temporary visual impacts of the construction activities would only affect any given location along a pipeline alignment for up to a few days. Beyond these temporary effects, the pipeline would be placed underground, and therefore the proposed project would have no permanent impacts on scenic vistas. Thus, impacts on scenic vistas due to construction and operation of the project would be less than significant.

b) Would the project damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. The proposed project would not result in damage to scenic resources within a State Scenic Highway. According to the California Scenic Highway Program, the nearest eligible, but not officially designated, State Scenic Highway is Interstate 210 (California Scenic Highway Mapping System 2014). The eligible State Scenic Highway portion of Interstate 210 is approximately 2.5 miles northeast of the proposed project alignment. According to the California Scenic Highway Program, the nearest officially designated State Scenic Highway is State Highway, approximately 4.5 miles to the northeast of the proposed project alignment at its nearest point (California Department of Transportation 2014). Therefore, there would be no eligible or officially designated State Scenic Highways traversing within or adjacent to the proposed project area. The proposed project alignment cannot be viewed from the above-mentioned highways due to distance or topography. Therefore, implementation of the proposed project would not result in any substantial impacts to scenic resources located within a state scenic highway.

c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

Less Than Significant Impact. The proposed project would construct a 24-inch diameter pipeline within public street right-of-ways and within the property boundaries of an associated existing pump station. Construction activities would be temporary, only occurring at any one location for a few days. As such, there would be a negligible effect on the visual environment.

d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. Aside from possible temporary construction-related lighting, no new lighting would occur within the project area, and no permanent lighting is proposed as part of the project. In addition, construction activities would be limited to daytime hours, occurring six days per week between 7:00 AM and 6:00 PM, which limits the need for construction-related lighting. There are no project elements that would create additional glare over existing conditions. Therefore, no significant impacts would occur.

3.1.2 Agriculture Resources	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:[1]				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

3.1.2.1 Explanation

Agriculture resources at the proposed project alignment were evaluated with regard to the California Department of Conservation (CDC) Farmland Mapping and Monitoring Program (FMMP) (California Department of Conservation 2004 and 2002) and the Burbank 2035 General Plan (City of Burbank, 2013).

3.1.2.2 Responses to Impact Questions

a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?

[1] In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

No Impact. The City does not contain farmland resources or any land zoned for an agricultural use. As such, the project would not occur on any lands designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland). Project activities would not result in the conversion of farmland or conflict with a Williamson Act Contract. Thus, no impacts to agricultural resources would occur.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The City does not contain farmland resources or any land zoned for an agricultural use. As such, the project would not occur on any lands designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland). Project activities would not result in the conversion of farmland or conflict with a Williamson Act Contract. Thus, no impacts to agricultural resources would occur.

c) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No Impact. The City does not contain farmland resources or any land zoned for an agricultural use. As such, the project would not occur on any lands designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland). Project activities would not result in the conversion of farmland or conflict with a Williamson Act Contract. Thus, no impacts to agricultural resources would occur.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. Implementation of the proposed project would not result in the loss of forest land or conversion of forest land to non-forest use. There are no forest lands within or near the proposed project area (California Department of Conservation 2010).

e) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

No Impact. Implementation of the proposed project would not result other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use. The proposed project is located in an urban setting with no Farmland or Forest land within several miles (California Department of Conservation 2010).

3.1.3 Air Quality	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project:[2]				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

[2]Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

3.1.3.1 Explanation

Regional Air Quality

The proposed project alignment is located in central Los Angeles County in the City of Burbank, an area within the South Coast Air Basin (Basin), which includes Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. Air quality conditions in the Basin are under the jurisdiction of the South Coast Air Quality Management District (SCAQMD), a regional agency that regulates stationary sources of pollution throughout the Basin. In addition, the SCAQMD has authority under the California Clean Air Act (CCAA) to manage transportation activities at indirect sources. Indirect sources are facilities that do not have equipment that directly emits substantial amounts of pollution, but that attract large numbers of mobile sources of pollution. Direct emissions from motor vehicles are regulated by the California Air Resources Board (ARB).

Both the State and federal governments have established health based Ambient Air Quality Standards (AAQS) for six air pollutants: carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, lead, and suspended particulate matter. The Basin does not attain State and federal AAQS for four of the six criteria air pollutants. The Basin is in compliance with federal sulfur dioxide and lead standards; however, the Basin is a nonattainment area for ambient carbon monoxide, ozone, and particulate levels (PM_{10}). In addition, the Basin has been the only area in the United States that does not attain the federal nitrogen dioxide standard. However, because nitrogen dioxide levels have met the federal standard within the past few years, the SCAQMD is in the process of requesting redesignation. The State AAQS are more stringent than the federal AAQS and, therefore, are exceeded by the same criteria pollutants by an even higher margin.

Therefore, projects that may have significant emissions of these criteria pollutants will delay the air quality attainment goals of the region.

Climate and Meteorology

The climate of the Basin is determined by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern border, and high mountains surround the rest of the Basin. The region lies in the semi-permanent high pressure zone of the eastern Pacific. The resulting climate is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted. However, periods of extremely hot weather, winter storms, or Santa Ana wind conditions do exist.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s, measured in degrees Fahrenheit. With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas.

The majority of annual rainfall in the Basin occurs between October and March. Summer rainfall is minimal and generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the Basin and along the coastal side of the mountains. Moreover, monthly and yearly rainfall totals are extremely variable.

Even though the Basin has a semi-arid climate, air near the surface is generally moist because of the presence of a shallow marine layer. With very low average wind speeds, there is a limited capacity to disperse air contaminants horizontally. The dominant daily wind pattern is an onshore 8 to 12 mile per hour (mph) daytime breeze and an offshore 3 to 5 mph nighttime breeze. The typical wind-flow pattern fluctuates only with occasional winter storms or strong northeasterly Santa Ana winds from the mountains and deserts northeast of the Basin. Summer wind-flow patterns represent worst-case conditions, as this is the period of higher temperatures and more sunlight, which results in ozone formation.

During spring and early summer, pollution produced during any one day is typically blown out of the Basin through mountain passes or lifted by warm, vertical currents adjacent to mountain slopes. Air contaminants can be transported 60 miles or more from the Basin by ocean air during the afternoon. From early fall to winter, the transport is less pronounced because of slower average wind speed and the appearance of winds earlier in the day. During stagnant air conditions, offshore winds may begin by late afternoon. Pollutants remaining in the Basin are trapped and begin to accumulate during the night and the following morning. A low morning wind speed in pollutant source areas is an important indicator of air stagnation and the buildup potential for primary air contaminants.

With persistent low inversions and cool coastal air, morning fog and low stratus clouds are common. Sunshine is recorded in central Los Angeles area on more than 70 percent of days per year. This is an extremely important climatological factor, considering the role of sunshine in the photochemical smog production process. Cloudy days are less likely in the eastern portions of the Basin and about 25 percent greater along the coast.

The vertical dispersion of air pollutants in the Basin is limited by temperature inversions in the atmosphere close to the earth's surface. Temperature normally decreases with altitude, and a reversal of this atmospheric state, where temperature increases with altitude, is called an inversion. The height from the earth to the inversion base is known as the mixing height.

3.1.3.2 Responses to Impact Questions

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant Impact. The SCAQMD has established the Air Quality Management Plan (AQMP) for the Basin to achieve state and federal air quality standards. The AQMP is the primary planning document by which air quality standards and objectives are monitored. Projects that are in compliance with their area's general plan are also considered to be consistent with the air quality plan, as set forth by SCAQMD.

The project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment which begins at the Beachwood Pump Station and continues west on West Riverside Drive for approximately 500 feet, and then turns north and continues 8,200 feet on North Sparks Street to West Chandler Boulevard. From there, the alignment turns east and parallels the existing Beachwood Force Main on West Chandler Boulevard for approximately 4,000 feet. The parallel alignment continues into the Burbank Water Reclamation Plant (BRWP) until it discharges into the BWRP headworks located at the northeast side of the plant. The majority of the project will occur underground and is part of the City's planned upgrade in order the for the pump station to achieve its full design capability. The project will not affect or alter land use and complies with the General Plan.

Furthermore, according to the SCAQMD, the project is consistent with the AQMP if the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP. As shown in the response to b) below, the implementation of the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations.

Therefore, as the project will not conflict with or obstruct implementation of the air quality plan established for this region, impacts are considered less than significant.

b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less Than Significant Impact. This impact relates to localized criteria pollutant impacts, also known as "hotspots". Hotspots can be generated by project construction or operation. Regional construction and operational impacts are not addressed in this section, but they are discussed in c), below.

Potential localized impacts would occur if a project exceeds state or federal standards for nitrogen dioxide (NO_2), $PM_{2.5}$, PM_{10} or carbon monoxide (CO). Emissions of NO_2, $PM_{2.5}$, PM_{10}

and CO could be emitted during project construction from construction equipment, construction employee trips, and vendor trips. CO emissions are generally of concern during project operation because operational CO hotspots are related to increases in on-road vehicle congestion. However, the project consists of installation of a new force main and pump station upgrades. The project would not result in an increase in operational vehicular trips. The potential to generate an operational CO hotspot is not a concern for the project, and no further analysis is required. Therefore, the criterion used to assess the significance of this impact is the Localized Significance Threshold (LST) methodology recommended by SCAQMD.

Localized Construction Analysis

The SCAQMD's Governing Board adopted a methodology for calculating localized air quality impacts through LSTs, which represent the maximum emissions from a project that would not cause or contribute to an exceedance of the most stringent applicable state or federal ambient air quality standard. LSTs were developed in recognition that the criteria pollutants CO, PM_{10}, $PM_{2.5}$, and nitrogen oxides (NO_X), an ozone precursor, can have local impacts at nearby sensitive receptors. As previously stated, the SCAQMD has divided the Basin into 36 SRAs. These SRAs were designated to provide a general representation of the local meteorological, terrain, and air quality conditions within the particular geographical area. The SCAQMD has developed LSTs for each SRA for NO_X, CO, PM_{10}, and $PM_{2.5}$.

To facilitate the localized assessment process, the SCAQMD provides a series of look-up tables that contain LSTs for each SRA within the Basin (SCAQMD 2009). If onsite construction emissions exceed the localized significance thresholds, then the project would be considered to have a significant air quality impact. The look-up tables are only applicable for projects 5 acres or smaller. Specifically, the look-up tables contain LSTs for 1-acre, 2-acre, and 5-acre project scenarios for each SRA.

The new force main would disturb approximately 0.02 acre per day. The Beachwood Pump Station upgrades would disturb an estimated 80 square feet. Because the smallest project-size for the lookup tables is a 1-acre site, the LSTs appropriate to the project area were obtained from the look-up tables in the SCAQMD Final Localized Significance Threshold Methodology for a 1-acre project in SRA 7. In addition to their dependence on geographic location within the SCAQMD (e.g., the SRA), localized thresholds also depend on the distance to the impacted receptor from the source of emissions. The distance to the nearest sensitive receptor is within 25 meters from the boundary of the project; the shortest distance available in the look-up tables is 25 meters.

The results of the localized significance analysis are provided in Table 2 and Table 3. Onsite construction emissions are from exhaust off-road diesel equipment and fugitive dust during earth-disturbing activities. As provided in Table 2 and Table 3, unmitigated emissions during construction would not exceed the localized significance thresholds.

Table 2
Onsite Construction Emissions (2014)

Activity/Year	Emissions (lbs/day)			
	NO_x	CO	PM_{10}	$PM_{2.5}$
New Force Main				
Site Preparation	11.78	8.39	0.99	0.99
Excavation/Shoring/Pipe Install	37.23	21.58	2.24	2.08
Maximum Daily Emissions[1]	37.23	21.58	2.24	2.08
Localized Significance Thresholds	80	498	4	3
Exceeds Threshold?	**No**	**No**	**No**	**No**

Notes:
[1] The above activities do not necessary occur at the same time or at the same location; therefore, the maximum daily emissions represent the maximum emissions that would occur in one day at any one location.

lbs = pounds; VOC = volatile organic compounds; NO_X = nitrogen oxides; CO = carbon monoxide; SOx = sulfur oxides; PM_{10} and $PM_{2.5}$ = particulate matter

Source of emissions: Attachment B: CalEEMod Output.

Source of thresholds: South Coast Air Quality Management District 2009, for SRA 7, at a distance of 25 meters.

Table 3
Onsite Construction Emissions (2015)

Activity/Year	Emissions (lbs/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
New Force Main				
Excavation/Shoring/Pipe Install	36.14	21.53	2.17	2.01
Paving and Work Site Restoration	15.71	8.30	1.01	0.93
Beachwood Pump Station Upgrade				
Pump and equipment removal	9.28	3.84	0.45	0.42
Wet well rehabilitation	22.31	14.21	1.51	1.45
Excavation and shoring	17.01	11.52	1.17	1.10
Pipe installation and backfilling	17.43	9.47	1.12	1.03
Work site restoration	12.12	6.09	1.20	0.73
Maximum Emissions for 2015[1]	51.84	29.83	3.18	2.94
SCAQMD Daily Thresholds	80	498	4	3
Exceeds Threshold?	**No**	**No**	**No**	**No**

Notes:
[1] The above activities does not necessary occur at the same time or at the same location; therefore, the maximum daily emissions represent the maximum emissions that would occur in one day at any one location. Maximum emissions would occur during the overlap of New Force Main construction, Excavation/Shoring/Pipe Install and Paving and Work Site Restoration.

lbs = pounds; VOC = volatile organic compounds; NO_X = nitrogen oxides; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} and $PM_{2.5}$ = particulate matter

Source of emissions: Attachment B: CalEEMod Output.

Source of thresholds: South Coast Air Quality Management District 2009, for SRA 7, at a distance of 25 meters.

The localized construction analysis demonstrates that the proposed project would not exceed the localized significance thresholds for NO_x, CO, PM_{10}, and $PM_{2.5}$. Therefore, the project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation during construction. This impact is less than significant.

Localized Operational Analysis

This proposed project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a new force main. According to SCAQMD LST methodology, LSTs would apply to the operational phase of a project, if the project includes stationary sources or attracts mobile sources that may spend long periods queuing and idling at the site (e.g., warehouse or transfer facilities). The proposed project does not include such uses and, thus, no operational LST analysis is needed. Therefore, the project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation during operation. This impact is less than significant.

c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Less Than Significant Impact. This impact is related to regional criteria pollutant impacts. The Basin is in non-attainment for ozone, PM_{10}, $PM_{2.5}$, and NO_2, which means that concentrations of those pollutants currently exceed the ambient air quality standards for those pollutants. Ozone is not emitted directly into the air, but is a regional pollutant formed by a photochemical reaction in the atmosphere. Ozone precursors, volatile organic gases (VOC) and NO_x, react in the atmosphere in the presence of sunlight to form ozone. Therefore, the SCAQMD does not have a recommended ozone threshold, but it does have thresholds of significance for VOC and NO_x. This impact section includes analysis of, and significance determinations for, those pollutants.

The SCAQMD's significance thresholds for project construction and operation are provided within the respective analyses below.

Regional Construction Analysis

Construction activities associated with the proposed development could temporarily increase NO_X, VOC, PM_{10}, $PM_{2.5}$, and sulfur oxides (SOx) concentrations in the project vicinity. The primary source of construction-related VOC and NO_x emission is gasoline- and diesel-powered, heavy-duty mobile construction equipment. Primary sources of PM_{10} and $PM_{2.5}$ emissions are generally earthmoving activity and wind blowing over exposed surfaces. Table 4 and Table 5 show the maximum daily construction emissions anticipated during construction. As shown in Table 4 and Table 5, the proposed project's construction emissions would be less than the SCAQMD's regional significance thresholds. Therefore, impacts from construction emissions would be less than significant.

Table 4
Maximum Daily Construction Emissions (2014)

Activity/Year	Emissions (lbs/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
New Force Main						
Site Preparation	1.84	11.81	8.79	0.01	1.05	1.01
Excavation/Shoring/Pipe Install	4.12	39.89	26.10	0.04	2.92	2.29
Maximum Daily Emissions	5.96	51.70	34.89	0.06	3.97	3.29
SCAQMD Daily Thresholds	75	100	550	150	150	55
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Notes:
lbs = pounds; VOC = volatile organic compounds; NOx = nitrogen oxides; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} and $PM_{2.5}$ = particulate matter

Source of emissions: Attachment B: CalEEMod Output.

Source of thresholds: South Coast Air Quality Management District 2011a

Table 5
Maximum Daily Construction Emissions (2015)

Activity/Year	Emissions (lbs/day)					
	VOC	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
New Force Main						
Excavation/Shoring/Pipe Install	4.00	38.48	25.64	0.04	2.76	2.19
Paving and Work Site Restoration	1.72	15.77	9.02	0.01	1.13	0.96
Beachwood Pump Station Upgrade						
Pump and equipment removal	1.03	9.33	4.50	0.01	0.54	0.44
Wet well rehabilitation	2.59	22.31	14.21	0.02	1.51	1.45
Excavation and shoring	1.95	17.07	12.28	0.02	1.28	1.13
Pipe installation and backfilling	1.27	12.17	6.71	0.01	1.29	0.75
Work site restoration	1.27	12.17	6.71	0.01	1.29	0.75
Maximum Emissions for 2015[1]	8.31	76.57	48.87	0.07	5.40	4.60
SCAQMD Daily Thresholds	75	100	550	150	150	55
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Notes:
[1] The above activities does not necessary occur at the same time; therefore, the maximum daily emissions represent the maximum emissions that would occur in one day. Maximum emissions reflect the overlapping phases of New Force Main Excavation/Shoring/Installation, Paving and work Site Restoration, and the maximum emissions from the Beachwood Pump Station Upgrade, which would be during Wet Well Rehab.

lbs = pounds; VOC = volatile organic compounds; NO_x = nitrogen oxides; CO = carbon monoxide; SOx = sulfur oxides; PM_{10} and $PM_{2.5}$ = particulate matter

Source of emissions: Attachment B: CalEEMod Output.

Source of thresholds: South Coast Air Quality Management District 2011a.

Regional Operational Analysis
As the project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment, the operational emissions would be from infrequent visits by maintenance personnel's vehicles. The wastewater pumps are driven by electric motors and will not emit criteria pollutants. The existing, 150-hp pumps will be replaced with new, 150-hp pumps. Therefore, project operational emissions are less than significant.

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact. This discussion addresses whether the project would expose sensitive receptors to substantial concentrations from localized construction emissions, construction-generated diesel particulate matter (DPM), or localized operational emissions.

Construction: Localized Emissions
Air pollutant emissions from project construction could create localized health impacts if the ambient air quality standards are exceeded. As shown in Impact AIR b) above, the proposed project would not exceed the SCAQMD's localized significance thresholds for construction-generated emissions. Therefore, the proposed project would not expose receptors to substantial air pollutant concentrations from construction activities.

Construction: Diesel Particulate Matter
Equipment used during construction of the project would emit DPM, which is a carcinogen. However, the DPM emissions are short-term in nature. Determination of risk from DPM is considered over a 70-year exposure time. Guidance published by the California Air Pollution Control Officers Association (CAPCOA), Health Risk Assessments for Proposed Land Use Projects, does not currently include guidance for health risks from construction projects addressed in CEQA documents; standards for receptors near construction projects are expected to be included later when the toxic emissions from construction activities are better understood. However, given the brief duration of the construction period and the 70-year exposure time recommended for health risk assessment of DPM health impacts, and considering the dispersion of the emissions, exposure to DPM, potential health impacts would be considered less than significant.

Operation: Localized Emissions
As shown in b) above, the proposed project would not create a localized impact. Therefore, the proposed project would not expose receptors to substantial air pollutant concentrations from operational activities.

e) Would the project create objectionable odors affecting a substantial number of people?

Less Than Significant Impact. The SCAQMD recommends that odor impacts be addressed in a qualitative manner. Such an analysis shall determine whether the proposed project would result in excessive nuisance odors, as defined under the California Code of Regulations and Section 41700 of the California Health and Safety Code, and thus would constitute a public nuisance related to air quality.

Land uses typically associated with odors include wastewater treatment facilities, waste-disposal facilities, or agricultural operations. The proposed project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment. The upgrades include improvements to the odor control facilities. Therefore, the improvements will reduce the potential for odors from the facility and will improve odor-control compared to the existing condition.

Exhaust and volatile organic compounds (VOCs) would be emitted during construction of the proposed project, which are objectionable to some. These emissions would be short-term in duration and disperse rapidly from the proposed project alignment. As such, odors should not reach an objectionable level at the nearest sensitive receptors. Therefore, impacts associated with objectionable odors would be less than significant.

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3.1.4 Biological Resources

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

3.1.4.1 Explanation

Land uses within the proposed project area include low-density residential along West Chandler Boulevard, and commercial/industrial along North Victory Boulevard. Land uses along North Sparks Street includes low density residential with some corridor commercial and medium residential along major streets (West Alameda Avenue, West Olive Avenue, and West Magnolia Boulevard).

West Chandler Boulevard is a residential street that extends from North Clybourn Avenue in the west to North Victory Boulevard in the east. West Chandler Boulevard is a two-lane roadway over its entire length and is approximately 30 feet wide that generally includes parking on the south side of the residential street and a bike path (Chandler Bikeway) to the north in a median area that separates West Chandler Boulevard from Chandler Boulevard.

North Sparks Street is a residential street that extends from just north of West Victory Boulevard in the north to West Riverside Drive at the southern edge of the City of Burbank. North/South Sparks Street is a two-lane roadway over its entire length and is approximately 36 feet wide that generally includes parking on both sides of the residential street. Major intersections along North/South Sparks Street includes: West Alameda Avenue, West Olive Avenue/West Verdugo Avenue, and West Magnolia Boulevard.

An inventory of listed, candidate and sensitive plant and wildlife species was derived from the literature review. Additionally, the life history, habitat requirements, and survey requirements for listed and sensitive plant and wildlife species identified by the literature review were reviewed.

As a result of the literature review, three (3) plant species and three (3) wildlife species listed as endangered, threatened, candidate or state rare pursuant to the federal or state Endangered Species Acts were identified as having the potential to occur within the proposed project area. Eight (8) sensitive plant species and eleven (11) sensitive wildlife species were identified by the literature review as potentially occurring within the proposed project area or in the vicinity of the proposed project area. These plant and wildlife species were assessed for their potential to occur within the proposed project area based on habitat requirements, availability and quality of suitable habitat, and distribution. Species determined to have the potential to occur within the Project area are presented in Appendix B. A number of plant and wildlife species were identified as having no potential to occur within the proposed project area because the project area does not contain suitable habitat, or is located out of the species' known geographic range, or is located out of the species' known elevational range limits. Appendix B also summarizes conclusions from analysis regarding the potential occurrence of listed and sensitive plant and wildlife species within the proposed project area. Appendix B provides the taxonomic and common names of each potentially occurring species, describes each species' status, describes each species' preferred habitat and distribution, and analyzes the species' potential to occur within the proposed project area.

Four sensitive plant communities were identified during the literature review, including California Walnut Woodland, Southern Coast Live Oak Riparian Forest, Southern Cottonwood Willow Riparian Forest, and Southern Sycamore Alder Riparian Forest (CNDDB 2013). None of these plant communities were observed within or adjacent to the proposed project area.

During the two site visits, Psomas biologist Dr. Brad Blood and Project Manager Mr. Michael Donovan, visited the proposed project area and assessed the proposed project area for the presence of special status species, U.S. Army Corps of Engineers (USACOE) and California Department of Fish and Wildlife (CDFW) jurisdictional boundaries, suitable habitats for endangered and threatened, and candidate plant and wildlife species, and the presence of protected plant communities.

As a result of the field surveys, no federally or state endangered, -threatened , rare, or candidate plant or wildlife species were determined to have the potential to occur within the proposed project area (Appendix B). No special status plant or wildlife species were observed within or adjacent to the proposed project area during the surveys. Therefore, no federally or state listed endangered, threatened, rare, or candidate plant or wildlife species would be impacted.

In addition it was determined that the proposed project was found to be outside USACOE and CDFW jurisdiction; and so no impacts to jurisdictional waters would occur.

No riparian or sensitive plant communities were found within or near the proposed project alignment, and therefore, no impacts to these resources would occur. There are no HCPs, or NCCPS plan areas within the proposed project Alignment, and therefore, no impacts to existing NCCPs or HCPs would occur with implementation of the proposed project.

Due to the presence of mature trees and the potential need for trimming, the proposed project has the potential to impact nesting migratory birds and raptors. Nesting migratory birds and raptors are protected by the federal Migratory Bird Treaty Act of 1918, and state Fish and Game Code 3700 to 3705. The recognized nesting season for migratory birds and raptors is February 15 to August 31, depending in weather conditions for any particular year. To reduce any potential impact to nesting birds and raptors, Psomas recommends that any trimming of trees be performed outside of the nesting season. If trimming of trees cannot be performed outside the nesting season, the City shall have a qualified biologist survey the proposed project alignment for the presence of nesting migratory birds and raptors. Surveys should take place within 7 days of the proposed Projects start-date for construction. Should any nest of a protected species be observed within 50 feet of the proposed Project's construction alignment, then the biologist will consult with the City on the timing of disturbance and then the biologist will make a determination on the need for monitoring. Fifty feet is deemed a sufficient buffer given the proposed project's urban surroundings.

3.1.4.2 Responses to Impact Questions

a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

No Impact. The proposed project would have no substantial adverse impact, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS because no federally endangered, -threatened, rare, candidate, or state endangered, threatened, candidate, or otherwise sensitive plant or wildlife species have the potential to occur within the proposed project area (Appendix B). No listed or otherwise sensitive plant or wildlife species were observed within or adjacent to the proposed project area during the surveys.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?

No Impact. The proposed project would not result in impacts to biological resources in relation to riparian habitat or other sensitive natural communities identified in local or regional plans, policies, regulations or by the CDFW or USFWS because no riparian habitats or sensitive plant communities are present within or near the proposed project area.

c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. The proposed project would not impact any federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means because no federally protected wetlands or waters regulated by the federal clean water act are present within or near the proposed project.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant With Mitigation Incorporation. The proposed project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors. No migratory fish or wildlife or habitat to support migratory fish or wildlife is present within or near the proposed project.

The proposed project has the potential to impact the use of native wildlife nursery sites because the proposed project may require the trimming of trees, which provide nesting habitat for migratory birds and raptors protected by the federal Migratory Bird Treaty Act (MBTA) and by state Fish and Game Code 3503 and 3700-3705.

Nesting birds are protected under the MBTA. The MBTA protects all common wild birds found in the United States except the house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), and resident game birds such as pheasant, grouse, quail, and wild turkey (*Meleagris gallopavo*). Resident game birds are managed separately by each state. The MBTA makes it unlawful for anyone to kill, capture, collect, posses, buy, sell, trade, ship, import or export any migratory bird including feathers, parts, nests, or eggs. State Fish and Game Code 3503 and 3700 to 3705 makes it illegal to destroy any birds' nest or any birds' eggs that are protected under the MBTA during the breeding season. Code 3503.5 further protects all birds of prey, such as hawks and owls, and their eggs and nests from any form of take during the breeding season.

Implementation of the following mitigation measure will lessen potential impacts below the level of significance.

MM BIO-1 The City shall schedule proposed project activities, to the extent practical, outside the recognized nesting season (February 15-August 31) so as to not affect breeding birds. However, should project activities need to be scheduled during the recognized nesting season, the City shall complete the following activities to avoid impacts to nesting birds:

- The City shall clearly define all work area limits and instruct all construction personnel and contractors to respect these defined limits.
- Pre-construction nesting bird surveys shall be performed to identify any nests that may be impacted by construction activities. The City of Burbank shall have a qualified biologist perform nesting bird surveys. Surveys should take place at least seven days prior to the onset of scheduled mobilization and staging activities. Should any active nests be found, the biologist will flag the nest area 50 feet on either side of the nest.
- Should active nests be found within 50 feet of scheduled active construction areas, a biologist will be assigned to monitor the nest during mobilization and staging activities to determine if the activities are detrimental to the nesting process. Should the biologist determine that the nesting activities are being disturbed or disrupted, the biologist will discuss with the City of Burbank and the construction contractor practical alternatives to activities at the nest site. If needed, the City of Burbank shall contact the USFWS and CDFW for further guidance.
- If the City of Burbank workers or subcontractors discover any nests, the City of Burbank shall follow protocols specified by the USFWS or CDFW.
- Under no circumstances shall the City of Burbank disturb, capture, handle or move birds or their nests.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less Than Significant With Mitigation Incorporation. The proposed project does not conflict with local policies protecting biological resources. The City of Burbank Municipal Code, Title 7 Chapters 1 and 4, regulate the removal of trees within the City of Burbank. Section 7-1-222 states that "Every person making an excavation, tunnel or bore in or under the surface of any street shall exercise due care in performing such work in order that damage to any trees growing therein shall be avoided. It shall be the duty of the person making the excavation, tunnel, or bore to notify the Park, Recreation, and Community Services Department whenever there is danger of such damage occurring." In addition, Section 7-4-102 states that the Park, Recreation, and Community Services Department "shall have exclusive jurisdiction and control over the planting, care and removal of trees, shrubs, and plants in the streets and on other property under the control of the City, and any work incidental thereto..." At this time it is unknown if any trees will need to be removed to implement the proposed project. Therefore, mitigation is provided below to ensure the project does not conflict with the established tree protection ordinance, and impacts would be less than significant. Minimal trimming of tree branches would occur with the implementation of the proposed project. No trees are anticipated to be removed with the proposed project.

Potential impacts to trees may come from impacts to the root systems with the tunneling proposed with the proposed project.

Implementation of the following mitigation measure will lessen potential impacts below the level of significance.

MM BIO-2 Prior to any tree removal within any portion of the proposed project, the Director of the City of Burbank Park, Recreation, and Community Services Department shall be contacted to ensure compliance with the City of Burbank Municipal Code, specifically Title 7 Chapters 1 and 4 (Section 7-1-222 and 7-4-102). Any impacted trees will be replaced in-kind with a nursery stock minimum of 5-10 gallon size container tree.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The proposed project would not impact biological resources in relation to conflicts with the provisions of any adopted Habitat Conservation Plan (HCP) or Natural Community Conservation Plans (NCCPs) or other approved local, regional, or state habitat conservation plan. The proposed project would not conflict with any local HCP or NCCP because the proposed project area is not within any HCP or NCCPs planning area or other approved local, regional, or state habitat conservation plan.

As a result of a review of the conservation planning program administered by the CDFW, it was determined that there are no NCCPs within the vicinity of the proposed project (CDFW/NCCP 2010). As a result of a review of the conservation planning program administered by the Ventura Field Office of the USFWS, it was determined that there are no permitted HCPs or draft HCPs within the vicinity of the proposed project (USFWS 2010). Therefore, there are no expected impacts to biological resources related to conflicts with the provisions of any adopted HCPs or NCCPs.

3.1.5 Cultural Resources Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

3.1.5.1 Explanation

A Cultural Resources Survey Report has been prepared for the proposed project by Michael Brandman Associates (MBA, 2013) and is included as Appendix C to this document. The proposed project and the analyzed Area of Potential Effect (APE) is located in the City of Burbank. Galvin and Taniguchi (GPA 2009) have provided the most recent history of Burbank city development and historical background specifics and can be accessed online (http://www.burbankca.gov). GPA does not recognize any potential historical district in or near the proposed project alignment, but they do list ten recommended historic districts elsewhere in the City. Because historic architectural significance is subject to reinterpretation as time passes and neighborhoods get older, the potential for more historic districts elsewhere in Burbank is inevitable. A second aspect of the GPA report is that common architectural styles of residential and commercial development are found within the proposed Burbank historical districts: some of these styles can be found in and near the proposed project alignment.

During the Depression, manufacturing (aviation) and Hollywood (studio development) brought the comfort of prosperity to a lower to middle-class suburban City that was rare elsewhere on the West Coast. Construction of hundreds of single family homes took place between 1930 and 1938 and the number of residents gained was substantial. Incorporated in 1911 and annexing County land tracts each year, City population stood at 2,913 in 1920 rising to 78,577 in 1950. Within the Project APE alone, over 275 structures were built between 1924 and 1959. Much of the land in the proposed project alignment was located on the old Rancho Providencia property, with some land from the Scott Tract near the north end. Residential development of these areas began in the early 1920's and was essentially complete by 1959.

The old sheep ranching lands of the San Fernando Valley, like all properties in Los Angeles County before about 1910, were divided into pieces bearing the names of their owners and/or locally famous Mexican landholders. In the 1900's, Los Angeles County's Tract and Lot system began to appear with Tract numbers being assigned to subdivisions of land recorded at the

Assessor's Office. Lots within those Tracts were assigned a series of numbers beginning with Lot 1. This visual method of subdivision left its mark on the official records because each official parcel number (the Assessors Information Number, or AIN) now recorded with the Los Angeles County Assessor bears an official location description based on the older system. A discussion by Tract is included in Appendix C.

GPA lists a series of main structural design styles in their report. Some of the styles observed during the survey included Bungalows, Tudor Revival, Spanish Colonial, Minimal Traditional, and Mid-Century Commercial. Structures lacking distinctive styles were also observed. Ranch homes were nonexistent because the lot sizes along Sparks Street ranged between 45 and 50 feet wide and 130 to 135 feet long. Most of the structures were between 800 and 1300 square feet with detached garages in the rear. The Tracts in this area appear to have been developed by plotting the lots, paving the streets, grading the lots flat. Two or three homes would be built on opposite sides of the street, then the developer would sell the remainder of the lots and new homes would be built one by one, much like a modern in-fill development. This led to a certain amount of stylistic mixing. A few places exhibited a small row of identical homes (see 1511, 1515 and 1519 West Alameda Avenue (all Minimalist multi-family structures built in 1944) but this type of structure homogeneity is quite rare in this area. Details of the survey and analysis are included in Appendix C.

Prehistoric and Historic Cultural Setting

Four general, but distinctive cultural periods have been identified for the prehistoric occupation of southern California (Early Hunter; Milling Stone; Intermediate; Late).

Early Hunter Period (before 6500 B.C.)

Early Hunter period sites are characterized by large projectile points, and other stone implements adapted to chase big game animals. The large size and weight of the points suggest that the primary weapon for hunting was the dart, propelled by a spear thrower. Lack of grinding tools, suggest that the inhabitants were not exploiting the plant foods to the extent that later cultures were. They were nomadic in hunters, following the game throughout the seasons. Archaeological sites representing this early period are not common.

Milling Stone Period (about 6500 B.C. to 1000 B.C.)

The Milling Stone Period (about 6500 B.C. to 1000 B.C.) represents a long period of time characterized by small, highly mobile groups of Native Americans. These groups probably had a seasonal round of settlement that included both inland and coastal residential bases. They relied primarily on grasses and seeds for food. Characteristic inland sites include numerous manos, metates, and hammerstones. Shell middens are more common at coastal sites.

Intermediate Period (about 1000 B.C. to A.D. 750)

Mortars and pestles first appear in the Intermediate Period (about 1000 B.C. to A.D. 750), indicating knowledge of acorn leaching. Use of the acorn probably permitted greater sedentism,

especially at inland locations. Large projectile points suggest use of spear throwers rather than the bow and arrow. Settlement patterns during this period are not well understood.

Late Period (A.D. 750 to Historic Contact or 1542)

The Late Period (A.D. 750 to Historic Contact or >1542) saw a more semi-sedentary settlement pattern. Smaller project points suggest introduction of the bow and arrow and less or no reliance on the spear thrower. The end of the Late Period is defined by the incursion of the Spanish military and Missionaries into California. Historical documents prove that the Toluca and Lankershim area was part of the territory occupied by the Gabrielio Native American group (Bean and Smith 1978). Their settlement pattern and subsistence were likely an extension of those practiced during the Late Period. Important food resources would have been acorns, agave and mesquite for interior dwellers, and fish for coastal dwellers. Protein would have been provided by hunting game and fishing. Gabrielino villages would have been located near reliable fresh water sources such as the Los Angeles River. Temporary camps would have been utilized during hunting and gathering trips away from the main village.

3.1.5.2 Responses to Impact Questions

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Less Than Significant Impact. The proposed project alignment is fully urbanized and no direct impacts to any recorded or unrecorded potential historic-era cultural resource will take place during this project. All older structures that might be considered potentially historic structures, which could be affected by vibrations associated with construction, are too far away to be directly affected by construction-related vibrations. As such, no less than significant impacts to historical resources are expected. Further analysis of potential impacts associated with historic-era resources is not necessary, and construction-related mitigation measures are not recommended.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less than Significant with Mitigation Incorporation. The proposed project alignment is fully urbanized; no direct impacts to any known recorded or archaeological cultural resource would occur. However, it is always possible that buried archaeological resources will be uncovered during excavation-related project impacts. To reduce the potential for impacts to unknown archaeological resources, the following mitigation measures are required.

MM CUL-1 A qualified project archaeologist shall be retained by the Applicant and approved by the City to prepare a mitigation monitoring plan. A qualified archaeologist is defined as an archaeologist meeting the Secretary of the Interior Professional Qualification Standards for Archaeology.

MM CUL-2 The project archaeologist shall review final construction plans and soils information and attend a pre-construction meeting. The archaeologist shall

prepare education materials for construction crew indicating the types of buried artifacts and features that may be encountered along the route of the project. For those portions of the project for which it is clearly documented that all excavations will take place in fill or otherwise disturbed soil, no monitoring shall be required. For those portions of the project for which the nature of underlying soils is unknown, the archaeologist shall establish a monitoring schedule. If underlying soils in an unknown area are determined to have been previously disturbed once construction and monitoring begins, the archaeologist may reduce or terminate monitoring for that area with the disturbed soils.

MM CUL-3 An archaeological monitor, supervised by the project archaeologist, shall monitor ground-disturbing activities in previously undisturbed soils as designated by the project archaeologist. If archaeological materials are identified during monitoring or unexpectedly during other project activities, all ground-disturbing activity in the vicinity of the find shall cease until the project archaeologist has evaluated the find. If the project archaeologist determines that the find may be significant, the archaeologist will develop a treatment plan. If the find is prehistoric in nature, Native American groups affiliated with the project vicinity as indicated by the Native American Heritage Commission, shall be notified of the find and invited to provide input for the treatment plan within a specified time frame. The project archaeologist shall prepare a report presenting the methods and results of the monitoring. A report on a treatment plan, if any, may be prepared separately. Copies of the reports shall be submitted to the Applicant, the City, and CHRIS-SCCIC. Any artifacts recovered during the monitoring program or treatment plan shall be curated along with copies of the appropriate report at an accredited facility selected by the City. If prehistoric materials are recovered, affiliated Native American groups shall be consulted regarding curation location of these artifacts.

Implementation of the above mitigation measures, would reduce potential impacts to unknown archaeological resources to less than significant.

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant Impact with Mitigation Incorporation. Fossil-bearing geologic formations are known to exist in the foothills surrounding the San Fernando Valley, and it is possible that such resources will be encountered if construction takes place 10 or more feet below current grade. Once a depth of 10 feet is reached during project-related excavations, a qualified paleontologist must monitor all excavations until the paleontologist determines the potential impact to fossil resources has been reduced to “low.” To reduce the potential impacts to paleontological resources, the following mitigation measure is required.

MM CUL-4 If construction takes place 10 or more feet below current grade, a qualified project paleontologist shall be retained by the by the City to develop a paleontological monitoring plan. A qualified project paleontologist is here defined as a

paleontologist meeting the qualifications established by the Society of Vertebrate Paleontologists.

MM CUL-5 The project paleontologist shall attend a pre-grade meeting in order to become familiar with the proposed depths and patterns of grading of the study area. The project paleontologist shall establish a curation agreement with an accredited facility prior to the initiation of ground-disturbing activities.

MM CUL-6 A paleontological monitor (the monitoring archaeologist and the monitoring paleontologist may be the same person), supervised by the project paleontologist, shall monitor ground-disturbing activities identified by the paleontologist as having potential to encounter paleontological resources. Disturbed soils are anticipated to not have potential to contain intact fossils. If soils in a given area are determined to have been previously disturbed once construction and monitoring begins, the project paleontologist may reduce or terminate monitoring for that area with the disturbed soils. If fossils are found during monitoring or other project-related ground-disturbing activities, ground-disturbing shall be halted in order to allow evaluation of the find and determination of appropriate treatment.

MM CUL-7 The project paleontologist shall prepare a final report on the monitoring. If fossils are identified, the report shall contain an appropriate description of the fossils, treatment, and curation. A copy of the report shall be filed with the City of Burbank and shall accompany any curated fossils.

Implementation of the above mitigation measures, would reduce potential impacts to potential paleontological resources to less than significant.

d) Would the project disturb any human remains, including those interred outside of formal cemeteries?

Less than Significant Impact with Mitigation Incorporation. There are no existing or known formal cemeteries within or near the boundary of the Project. Therefore, implementation of the Project is not expected to impact known human remains associated with either a formal or informal cemetery. Notwithstanding, in the event that any human remains or related resources are discovered, such resources would be treated in accordance with Federal, State, and local regulations and guidelines for disclosure, recovery, relocation, and preservation, as appropriate, including CEQA Guidelines Section 15064.5(e). The following mitigation measure is required to reduce potential impacts to unknown human remains.

MM CUL-8 If human remains are encountered unexpectedly during construction excavation and grading activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the California Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most

Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains.

Implementation of the above mitigation measure would reduce potential impacts to unknown human remains to less than significant.

3.1.6 Geology and Soils Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☒	☐
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

3.1.6.1 Explanation

Soils

The U.S. Department of Agriculture (USDA) conducted a soil survey of the San Fernando Valley in 1915 and is documented in the "Soil Survey of San Fernando Valley Area, California" (USDA, 1917). The report describes the San Fernando Valley as oval in shape, tipping to the southeast and surrounded by ridges with a sharp change in topography that separates the ridge areas from the basin slopes. The City is located at the southeastern end of the San Fernando Valley and is predominantly located in the basin slope area with the exception of the northeast area of Burbank that includes a portion of the Verdugo Mountains.

Two types of soil series occur within the City's limits, the Tujunga and Hanford series. The Tujunga series soils generally occupy recent alluvial fans, stream bottoms, and low terraces and

were deposited by streams. The Hanford series generally occupy recent alluvial deposits and can be either alluvial-stream-bottom deposits or low recent terrace materials.

Geology

The San Fernando Valley is typical of the Transverse Ranges province. North-south compression created an elongated trough-shaped basin in an east-west configuration. The rapid uplift of the adjacent mountain ranges relative to the basin created sediment sources (the mountains) that allowed erosion from the upland areas and deposition of the derived sediments in large alluvial fans (cone-shaped deposits of alluvium made by streams issuing from the surrounding mountains into the adjacent lowlands) within the San Fernando Valley.

The Tujunga alluvial fan begins at the northeast corner of the San Fernando Valley where the Little and Big Tujunga drainages (washes) emanate from the San Gabriel Mountains. The numerous braided channels that fan out southward for over eight miles to the Los Angeles River define the Tujunga alluvial fan.

Based on a subsurface investigation conducted by Associated Soils Engineering Inc. (ASE) native soils immediately beneath the surface pavement at fourteen (14) exploratory boring locations along the proposed project alignment were found to consist mainly of younger alluvial fan and wash deposits (Qyf2, Qw) up to the maximum explored depth of 20 feet (ASE, 2014).

Soils within the unit of young alluvial fan and wash deposits are of Holocene age, formed by "alluvial" and "wash" deposits associated with the river systems that culminate in the Tujunga and Pacoima Washes (California Geological Survey [CGS], 1998). Soils within the unit were found to predominantly consist of unconsolidated sand, silt, and gravel-bearing alluvial/wash materials. In specific, on-site alluvial/wash soils contain interbedded sand, silty sand, silty sand with clay, sand with silt, sand with gravel, sandy silt, sandy silt with clay, silt, clayey silt, and clayey silt with sand (ASE, 2014).

The alluvial valley fill of the eastern portion of the San Fernando Valley (SFV) has been subdivided into four lithologic zones. The zones have been distinguished and correlated in the subsurface to characterize the geology, thereby providing a physical basis for subsequent hydrogeologic interpretations and a conceptual geologic foundation.

The four individual zones from youngest to oldest are:

- The Upper Zone, which occurs between the present ground surface and 200 to 250 feet below ground surface (bgs), is 200 to 350 feet in thickness and is composed of variable alluvium.
- The Middle Zone, which occurs between 200 to 250 feet bgs, averages 50 feet thick and is characterized by relatively abundant fine-grained sand and silt.
- The overlying Lower Zone, which occurs between approximately 250 and 550 feet bgs is approximately 250 to 300 feet in thickness and is characterized by coarse sand and gravel horizons.

- The Deep Zone, which occurs to a depth of at least 1,200 feet bgs with an unknown thickness and is composed of fine to coarse alluvium, some of which may be correlative with the Saugus Formation.

Table 6 presents a synopsis of the stratigraphic column.

Table 6
Summary of Stratigraphic Column – Eastern San Fernando Valley

Epoch	Stratigraphic Unit	Characteristic Lithology	Average Depth to Top of Unit (feet bgs)	Average Unit Thickness (feet)
Holocene (Recent)	Upper Zone (includes Recent alluvium)	Variable (sand, gravel, and silt)	0	200-250
Late Pleistocene	Middle Zone	Silt and fine sand	200-250	50
	Lower Zone	Coarse sand and gravel	250-300	200-250
	Deep Zone	Variable (gravel, sand, silt, and clay)	450-550 (Approximately)	Unknown
Early Pleistocene				

Source: JMM, 1992.

Groundwater Occurrence and Movement

Groundwater generally moves from the edges of the valley fill, into the valley and southeast across the SFV, towards the Los Angeles River Narrows. Through the Los Angeles River Narrows, groundwater flows southward towards the Central Groundwater Basin of the Los Angeles Coastal Plain. Historically, the eastern portion of the SFV has been heavily pumped for export and consumptive use, significantly influencing the groundwater gradients and seasonal flow patterns. Regional horizontal groundwater gradients, however, have remained fairly consistent since the implementation of safe yield operation in 1968.

In the eastern half of the SFV, where the major wellfields exist, the groundwater is deeper (varies from 70 feet below ground surface [bgs] to greater than 100 feet in depth) and responds primarily to pumping patterns of supply wells. Water-level observations in certain wells east of the Pacoima Wash, however, indicate some areas that are not affected by pumping patterns. These observations are from wells that are screened only at the water table. Both unconfined and semi-confined aquifer conditions are evident in this portion of the SFV; however, the areas and the circumstances under which these conditions occur are less clear. ASE (2014) investigation did not encounter groundwater to the maximum explored depth of 20 feet bgs.

The General Plan 2035 (City of Burbank, 2014) has identified the southern portion of the City as having the potential to have a liquefaction zone. This zone is based on the historical known depth to groundwater at less than 40 feet below ground surface. However, except in some areas along the Ventura Freeway (SR 134) in the southwestern portion of the city, most groundwater underlying Burbank is deeper than 100 feet below the ground surface. Groundwater levels have been dropping because of pumping in water wells. As long as groundwater continues to be

extracted in the upper Los Angeles River area and annual rainfall remains at normal levels, groundwater levels in Burbank can be expected to remain deeper than 50 feet, resulting in a low risk of liquefaction for most of the city (City of Burbank, 2014).

Faulting and Seismicity

Burbank, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional faults such as the San Andreas, San Jacinto, Newport-Inglewood and Whittier-Elsinore fault zones (ASE, 2014).

By the definition of the CGS, an active fault is one which has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). The CGS has defined a potentially active fault as any fault which has been active during the Quaternary Period (approximately the last 1,600,000 years). These definitions are used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazard Zones Act of 1972 and as subsequently revised in 1997 as Alquist-Priolo Earthquake Fault Zoning Act (that includes Earthquake Fault Zones). The intent of the act is to require fault investigations on sites located within Special Studies Zones to preclude new construction of certain inhabited structures across the trace of active faults. The proposed alignment is not located within a Alquist-Priolo Earthquake Fault Zone. No evidence of active or potentially active faulting was observed during ASE's investigation (ASE, 2014).

ASE (2014) researched information pertaining to proposed project alignment seismicity. The majority of data was obtained from the program, EQFAULT, by Blake (2000) that allows for an estimation of peak horizontal ground acceleration (PGA) using a data file of approximately 150 digitized California faults. This program compiles information including the dominant type of faulting within a particular region, the maximum earthquake magnitude each fault is capable of generating, the estimated slip-rate for each fault, and the approximate location of the fault trace (ASE, 2014). Printouts of the results of the fault search for the project are included in Appendix D.

The proposed project is likely to be subject to strong seismic ground shaking in the event of seismic activity. The Verdugo Fault, located approximately 1.6 to 3.0 miles (2.5 to 4.9 km) away is closest to the proposed project alignment. Other nearby active faults include the Hollywood Fault and the Upper Elysian Park Blind Thrust Fault, located approximately 3.0 to 4.7 miles (4.9 to 7.5 km) and 3.8 to 5.4 miles (6.1 to 8.7 km) away, respectively. Approximately 48 active or potentially active faults have been found within a radius of 62 miles (100 km) from the proposed project alignment (ASE, 2014).

Based on the referenced literature and deterministic analysis performed with the EQFAULT software, the Verdugo Fault, approximately 1.6 to 3.0 miles (2.5 to 4.9 km) from the proposed project alignment, would probably generate the most severe site ground motions (ASE, 2014). A Maximum Probable Earthquake (MPE), i.e. the maximum earthquake that is considered likely to occur during a 100-year time interval, of 6.9 Mw (moment magnitude as per USGS) has been assessed along the Verdugo Fault. As shown in Appendix D, estimated PGA resulting from a

MPE event on the Verdugo Fault is on the order of 0.626g to 0.535g should this event occur at the fault's closest and furthest approaches to the proposed project alignment, respectively. In sum, approximately 48 active or potentially active faults have been found within 62 miles (100 km) of the proposed project alignment (ASE, 2014).

The seismicity of the proposed project alignment was evaluated utilizing probabilistic analysis available from CGS. The Maximum Probable Earthquake (MPE) and the Maximum Considered Earthquake (MCE) that carry 10 percent and 2 percent exceedance probabilities, respectively, in 50 years have been considered (ASE, 2014) and are included in Appendix D.

3.1.6.2 Responses to Impact Questions

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

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

Less than Significant Impact. The proposed project alignment is located in a seismically active area, as is the case throughout the Southern California region. Major faults and fault zones characterize the region. The proposed project alignment is not located within a designated Alquist-Priolo Earthquake Fault Zone, thus fault rupture hazards are considered less than significant. Furthermore, the project does not involve the construction of habitable structures that would expose people or structures to substantial adverse effects associated with seismic hazards. Thus, despite the seismically active area, less than significant impacts would occur relative to rupture of a known earthquake fault.

ii) Strong seismic ground shaking?

Less than Significant Impact. As stated above, the proposed project alignment is located within the seismically-active southern California region. There are numerous regional zones of faulting in the proximity to the alignment capable of producing substantial ground shaking including: the southern frontal fault system of the province, which consists of the Malibu Coast, Santa Monica, Hollywood, Raymond, and Sierra Madre faults along the southern edge of the province, and the San Cayetano, Santa Susana, and Sierra Madre fault system along the southerly side of the Santa Susana and San Gabriel Mountains and northern side of the San Fernando Mountain. A local fault of importance is the Verdugo Fault along the southwest margin the Verdugo Mountains. The location and configuration of the Verdugo Fault is poorly known, but is generally believed to be located near the abrupt change in slope from the valley floor to the mountain slope. The proposed project involves construction of pipelines and upgrade of an existing pump station, none of which would be habitable structures. All improvements would be constructed in accordance with the seismic design parameters based on the fault parameters and methods provided in the 2013 Uniform Building Code (UBC) and other relevant standards to reduce the effects of seismic activities. Implementation of required standards in the UBC and adherence to relevant pipeline engineering standards would ensure that impacts regarding strong seismic ground shaking are less than significant.

iii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Depending on the levels of ground shaking, groundwater conditions, the relative density of soils, and the age of the geologic units in the area, the potential for liquefaction may vary in the City. Seismic-related ground failure, including liquefaction, occurs when a saturated, granular deposit of low relative density is subject to extreme shaking and loses strength or stiffness due to increased pore water pressure. The consequences of liquefaction are expected to be predominantly characterized by settlement or uplift of structures, and increase in the lateral pressure on buried structures. The proposed pipeline alignment is located in an area that is designated as a potential liquefaction zone during a seismic event. However, the proposed pipelines and appurtenances would be constructed to meet applicable seismic safety standards, as previously indicated. Furthermore, trenches and other excavations would be backfilled with engineered fill, which meets compaction and shear strength requirements, and has little liquefiable potential. The majority of the proposed improvements would operate as underground structures. Due to the fact that the proposed project would be constructed to meet applicable seismic safety standards, and backfilled material would be engineered to meet adequate compaction and shear strength requirements, no substantial effects from increased lateral pressure are anticipated to occur. As such, impacts related to seismic-related ground failure, including liquefaction, would be less than significant.

iv) Landslides?

No Impact. The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving Landslides. The proposed project is located along an area of flat lands without nearby hill or other areas of high elevation. The risk of exposure of persons and structures to risk of landslides resulting from implementation of the proposed project would be no different than base-line current conditions.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less Than Significant Impact. The construction and operation of the proposed project would occur along previously disturbed areas, which consist of sections of paved streets and City-owned properties. During construction, short-term erosion impacts could occur as a result of excavation of trenches and other excavations. These exposed soils could potentially cause erosion impacts during windy conditions and from construction vehicles traveling through the proposed project alignment. Heavy rains could cause the exposed soils to run off into public or private right-of-ways and/or storm drainage systems. The contractor will develop and implement a plan to control erosion of soil from the proposed project alignment during construction activities. Because the majority of the proposed project alignment has been previously graded and urbanized, and measures would be incorporated in non-paved areas to minimize soil erosion, significant losses of topsoil are not anticipated to occur. The development and implementation of an erosion control plan would keep the temporary erosion impacts resulting from the construction of proposed improvements at a less than significant level. Operation of proposed improvements would be passive; therefore, no operational impacts would occur.

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

Less Than Significant Impact. No unusual water extractions or other practices would occur with the project that is typically associated with subsidence effects. The majority of the project area is flat and not located on a geologic unit that is unstable. Lateral spreading, subsidence, and collapse are not anticipated to occur because the area has been previously graded and developed when streets and surrounding development were originally constructed. As indicated in question 3.1.6.2 (a) above, there is a limited liquefaction hazard in the project area, but application of engineered backfill materials and adherence to applicable construction specifications would reduce this hazard to acceptable levels. Therefore, construction and operation of the proposed project would not be expected to cause the local geologic units or soil to become unstable, or result in on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse. Impacts would be less than significant in this regard.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

No Impact. Expansive soils are defined as fine-grained clayey soils that have the potential to shrink and swell with repeated cycles of wetting and drying. As previously indicated, pipeline trenches would be backfilled with engineered fill, which does not exhibit shrink-swell potential or associated hazards. Furthermore, no habitable structures are proposed as part of the project, and therefore there would be no risk to life or property associated with expansive soils. No impacts would occur in this regard.

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

No Impact. The project does not include the use or development of septic tanks or alternative wastewater disposal systems. Thus, no impacts would occur in this regard.

3.1.7 Greenhouse Gas Emissions

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

3.1.7.1 Explanation

According to the City's Air Quality and Climate Change Element, Burbank's biggest challenge (as a prominent city in the most populous county in California) is how best to accommodate growth and encourage economic development, while protecting air quality and taking action to curb GHG emissions. Looking ahead to 2035, Burbank will transition to clean, efficient energy and transportation choices. With high-speed rail, electric trains, and zero-emission vehicles, people and goods will move more efficiently to, from, and through the community. Buildings and infrastructure will be energy efficient and comfortable. Natural resources will be preserved, and all of this will be accomplished without the costly health and environmental effects of air pollution.

3.1.7.2 Responses to Impact Questions

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact. Greenhouse gases (GHG) are not presented in lbs/day like criteria pollutants; they are typically evaluated on an annual basis using the metric system. The SCAQMD is in the process of preparing recommended significance thresholds for greenhouse gases for local lead agency consideration (SCAQMD Draft Local Agency Threshold); however, the SCAQMD Board has not approved the thresholds as of the date of this IS-MND. The current draft thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a greenhouse gas reduction plan. If a project is consistent with a qualifying local greenhouse gas reduction plan, it does not have significant greenhouse gas emissions.
- Tier 3 consists of screening values, which the lead agency can choose but must be consistent. A project's construction emissions are averaged over 30 years and are added to a project's operational emissions. Where SCAQMD is the lead agency on industrial projects, a threshold of 10,000 metric tons of carbon dioxide equivalents ($MTCO_2e$) per

year applies. SCAQMD is also encouraging other lead agencies to use the 10,000 $MTCO_2e$ per year for industrial projects. If a project's commercial/residential emissions are under one of the following screening thresholds, then the project is less than significant:
    - All land use types: 3,000 $MTCO_2e$ per year
    - Based on land use type: residential: 3,500 $MTCO_2e$ per year; commercial: 1,400 $MTCO_2e$ per year; or mixed use: 3,000 $MTCO_2e$ per year
- Tier 4 has the following options:
    - Option 1: Reduce emissions from business as usual by a certain percentage
    - Option 2: Early implementation of applicable AB 32 Scoping Plan measures
    - Option 3, 2020 efficiency target: 4.8 $MTCO_2e$ /SP/year for projects and 6.6 $MTCO_2e$/SP/year for plans;
    - Option 3, 2035 target: 3.0 $MTCO_2e$ /SP/year for projects and 4.1 $MTCO_2e$ /SP/year for plans
- Tier 5 would allow the purchase of mitigation offsets to achieve target significance threshold.

There is currently no draft threshold for construction-related GHG emissions. However, SCAQMD recommends amortizing construction over 30 years. As the project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment. Operational emissions would be from infrequent visits by maintenance personnel's vehicles, and as such, would not be a significant source of operational GHG emissions. The project's construction-related GHG emissions are reported in Table 1.

Construction

The proposed project would emit greenhouse gases from upstream emission sources and direct sources (combustion of fuels from worker vehicles and construction equipment). Table 7 summarizes the output results.

Table 7
Construction Greenhouse Gas Emissions

Phase	Greenhouse Gas Emissions ($MTCO_2e$)
New Force Main	432.77
Beachwood Pump Station Upgrades	67.36
Total Construction Emissions	500.13
Total Amortized over 30 years	16.67
SCAQMD Draft Threshold	3,000
Exceed Threshold	No
$MTCO_2e$ = metric tons of carbon dioxide equivalents (includes carbon dioxide, methane, and/or nitrous oxide). Source: CalEEMod output (Appendix B).	

As shown by the results in Table 7, the construction of the project would produce approximately 500.13 $MTCO_2e$. Amortized construction emissions are 16.67 MTCO2e GHG per year. Both the total and amortized values are well under the draft SCAQMD threshold of 3,000 $MTCO_2e$ per

year (threshold considered for all land use types as described above). Impacts are considered to be less than significant.

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less Than Significant Impact. The City of Burbank has a Sustainability Action Plan that details a number of "Accords": a series of goals (called "action items") that can be adopted at the local level to achieve urban sustainability, promote healthy economies, advance social equity and protect the world's ecosystem. The action items can be used as reference points for setting achievable goals and standards that can be tailored to fit the specific structures of individual communities. The Accords include 21 specific actions organized into seven Urban Themes designed to collectively address urban sustainability concerns. The Urban Themes focus on the areas of: energy, waste reduction, urban design, urban nature, transportation, environmental health, and water.

As the project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment, many of the Goals and Policies within the Air Quality and Climate Change Element chapter of the General Plan are not applicable. However, the project will be consistent with applicable actions of the Sustainability Action Plan, such as GHG reduction development through use of current technology, since the existing 150-hp electric pumps will be replaced with new, more efficient and effective, 150-hp electric pumps.

The proposed project's emissions are substantially less than those described in the SCAQMD draft thresholds, and the level of GHG emissions generated by the project would not conflict with the goals of the State's Scoping Plan, adopted pursuant to AB 32. Therefore, impacts associated with an applicable GHG reduction plan, policy, or regulation would be less than significant.

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3.1.8 Hazards and Hazardous Materials

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

3.1.8.1 Explanation

Hazards and Hazardous Materials associated with the proposed project was evaluated with regard to the current EnviroStor and Cortese databases maintained by the State of California. In addition, the preliminary plans and project plans were reviewed and compared with expected equipment and operations associated with construction and operation of the Force Main Sewer and Beachwood Pump Station.

3.1.8.2 Responses to Impact Questions

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less Than Significant Impact. Although construction of the proposed project would involve the excavation and transport of paving materials (e.g., asphalt, concrete, road bed fill materials) that could possibly be contaminated by vehicle-related pollution (e.g., oil, gasoline, diesel, other automotive chemicals), the project does not involve the routine transport, use, or disposal of hazardous materials. All such materials would be transported and disposed of in accordance with applicable codes and regulations. Such transport and disposal is not expected to create a significant hazard to workers or the community. Operation of the proposed project would not require the use, storage, or disposal of hazardous substances. Therefore, the proposed project would not create impacts related to the routine transport, use, or disposal of hazardous materials, and no mitigation is required.

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?

Less Than Significant With Mitigation Incorporation. Implementation of the proposed project would not involve the use, storage, or disposal of explosive or hazardous substances that could result in an upset and accident condition. Before commencing any excavation, the construction contractor would be required to obtain an "Underground Service Alert Identification Number". To minimize potential damage to any existing utilities, the contractor would not be allowed to excavate until all utility owners are notified, and all substructures are clearly identified. As the proposed project would carry wastewater, operation would not create a significant hazard to the public or environment involving the release of hazardous materials. The pipeline will be designed with safety features to monitor significant change in pressure which could indicate a leak or break in the pipeline during operations. The system will be designed to divert flow to the NOS in the event of a major break or rupture of the pipeline. No reasonably foreseeable upset or accident conditions that could involve the release of hazardous materials into the environment are anticipated during construction or operation. However, should any fuel and/or oil spills occur in areas near sensitive receptors including waterways, incorporation of Mitigation Measure HAZ-1 would reduce the potential impacts related to hazards and hazardous materials to a less than significant level.

MM-HAZ-1: Prior to start of construction, the construction contractor shall designate staging areas where fueling and oil-changing activities would take place. The staging area(s) shall be reviewed and approved by the City of Burbank's designated mitigation monitor and the Storm Water Pollution and Prevention Manager prior to the start of construction. No fueling and oil-changing activities shall be permitted outside the designated staging areas. The staging areas shall be located on level terrain and away from sensitive land uses such as residences, day care facilities, and schools to the maximum extent practicable. Staging areas shall not be located near any stream, channel, or wetlands. The proposed staging areas shall be identified in the Storm Water Pollution Prevention Plan (SWPPP).

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less Than Significant With Mitigation Incorporation. As discussed in the Air Quality section above, operation of construction equipment creates air contaminant emissions. None of these emissions would be generated at levels that are considered hazardous. Construction of the proposed project would also involve the excavation and transport of paving materials (e.g., asphalt, concrete, road bed fill materials) that could possibly be contaminated by vehicle-related pollution (e.g., oil, gasoline, diesel, other automotive chemicals). All such materials would be transported and disposed of in accordance with applicable codes and regulations. Such transport and disposal is not expected to involve acutely hazardous materials, substances, or waste.

One school, Walt Disney Elementary School (1220 West Orange Grove Avenue) is located within 0.25 miles of the proposed project. With implementation of applicable codes and regulations and implementation of Mitigation Measure HAZ-1, above, would reduce any impacts related to hazardous materials to below the level of significance. Operation of the proposed project would not involve hazardous emissions or materials. The proposed project would transport wastewater under pressure under existing street right-of-ways and under private property. If there were any emergency condition involving the proposed project, the result would involve the release of waste water that would be directed to gravity fed sewer system; therefore, no significant impacts to schools are anticipated and no mitigation is required.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. The proposed project is not included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 (EnviroStor Database or "Cortese List"). The area surrounding the proposed project are residential streets and therefore it is unlikely that any new undiscovered hazardous materials would be discovered and disturbed by construction of the proposed project. Preliminary results from soil borings placed at proposed jack and receiving pits and along the proposed project line did not identify the presence of hazardous materials in subsurface soils. No further analysis is warranted.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

No Impact. A portion of the proposed project alignment is within two miles of the Burbank's Bob Hope Airport, which operates commercial and private aircraft. Although the airport is host to a relatively high level of aircraft traffic, the proposed improvements would be constructed below grade along public streets, and would operate passively once installed, with no habitable structures involved. As such, because the proposed project does not involve placing people in proximity to aircraft operations, no risks to life or property from airport operations could occur as a result of the proposed project. Therefore, no impacts would occur in this regard.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The project is not located within two miles of a private airstrip. The construction and operation of the proposed force main sewer and pump station upgrade would not result in any impacts related to private aircraft or airstrip operations in the area.

g) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. The proposed project would not impair or physically interfere with an adopted emergency response plan or a local, state, or federal agency's emergency evacuation plan, except possibly for short-term periods during construction of the proposed project. The on-street construction activities would conform to all City of Burbank, Caltrans, Burbank Police Department (BPD), and Burbank Fire Department (BFD) access standards to allow adequate emergency access. Once operational, the proposed project would be underground or within public right-of-ways and under private property, and its operation would not interfere with emergency response or evacuation plans. No impacts are expected and no mitigation is required.

h) Would the project expose people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

No Impact. The proposed project would not be adjacent to or in close proximity to wildland areas. The area surrounding the proposed project is primarily residential and commercial/ industrial space. The construction contractor would be required by the City to comply with all federal, state, and local laws with regard to construction near vacant and open lands (including a fire prevention plan), and to have all necessary fire prevention equipment on site. Additionally, the City of Burbank Fire Department would provide fire and emergency services at the proposed project alignment in the event of an emergency.

Operation of the pipeline would occur passively below ground with little, if any, potential to cause or exacerbate any wildland fires or their impacts to people or structures in the vicinity of the proposed project alignments. As such, construction and operation of the proposed project would not expose any people or structures to a significant risk of loss, injury or death involving wildland fires. Therefore, no impacts are expected.

3.1.9 Hydrology and Water Quality

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

3.1.9.1 Explanation

Hydrology and water quality associated with the proposed project was evaluated with regard to the Burbank 2035 General Plan (City of Burbank, 2013), State of California Regional Water

Quality Control Board Basin Plan for the Los Angeles Region (RWQCB 1995), and National Flood Insurance Program Flood Insurance Rate Maps for Los Angeles County (FEMA 1980).

a) Would the project violate any water quality standards or waste discharge requirements?

Less Than Significant Impact With Mitigation Incorporation. Construction activities associated with the force main sewer pipeline and upgrade of the Beachwood pump station have a limited potential to affect water quality of downstream drainages. The proposed project alignment is within, and subject to, the water quality regulations of the Los Angeles Regional Water Quality Control Board (RWQCB). The Los Angeles RWQCB is authorized to implement a municipal storm water permitting program as part of the National Pollutant Discharge Elimination System (NPDES) authority granted it under the federal Clean Water Act. The general permit applicable to this project is the "Statewide General Construction Stormwater Permit" which addresses waste discharge requirements for discharges of storm water runoff associated with construction activities.

As a co-permittee to Municipal Storm Water NPDES Permit No. CAS004001 issued by the RWQCB, the City is required to implement a Storm Water Pollution Prevention Plan (SWPPP) to minimize the incidence of construction-related pollutants entering the storm water system. Several items are required in an SWPPP, including site maps showing drainage and discharge locations and the location of control measures, a description of the pollution prevention best management practices (BMPs) to be implemented on the proposed project alignment, BMP inspection procedures, and the requirements for storm water monitoring. The preparation and implementation of the SWPPP would effectively address control of pollutants from the construction activities. The SWPPP would establish effective BMPs that would control pollutants during all stages of construction. Typical BMPs that would be considered in the project SWPPP to address construction activities would include, but not necessarily limited to, stabilized construction entry, designated wash area, conveyance controls, and filters. Compliance with these requirements would prevent violation of water quality standards and waste discharge requirements during project construction.

During operation, the proposed pipeline and pump station would operate passively, and would not result in or contribute to water quality violations. The wastewater that would be conveyed in the proposed pipeline will be directed to the Burbank Water Reclamation Plant for treatment. While accidental leaks or spills could occur, they are not part of the operational plans of the pipeline and the pipeline is replacing a 40-year old line that is subject to accidental spills, leaks, or discharges of wastewater. Consequently, the installation and operation of the new force main sewer would reduce the likelihood of accidental spills, leaks, or discharges of wastewater. Overall, the construction and operation of the proposed project would result in less than significant water quality impacts.

Implementation of Mitigation Measure HYDRO-1 would reduce the potential impacts related to hazards and hazardous materials to a less than significant level.

MM HYDRO-1: Prior to construction, the contractor will be required to comply with the Construction General Permit and submit a SWPPP, including identifying

Risk Level/Type, appropriate controls and if necessary a rain event action plan. The plan and accompanying elements shall be prepared by the contractor and submitted to the City for approval. The erosion control measures shall be designed to limit the effects of soil erosion and water degradation during construction. This plan shall be prepared and implemented in accordance with the requirements of the State Water Resources Control Board Construction General Permit, and shall include (but not be limited to) the following measures:

- Effluent standards for all discharges
- Receiving Water Limitations
- Training and Qualification Requirements
- Sampling, Monitoring, Reporting and Record Keeping Requirements
- Risk Determination
- Use of sediment control measures that utilize sediment traps, barriers, covers, or other methods approved by the SWRCB, County of Los Angeles, and the City of Burbank
- Plans for appropriate deposition and storage of excavated material;
- Construction phasing; and
- Coverage methods for all stockpiles of fill material during extended periods of rain.

b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Less Than Significant Impact. During construction, the only groundwater that the proposed project has the potential to deplete would be from dewatering activities. The regional groundwater table is located at a depth of approximately 100 feet below ground surface, perched groundwater could be encountered. Although groundwater is not likely to be encountered during construction, if any groundwater were to be encountered, dewatering would occur in quantities that would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge. As such, no significant adverse impacts to groundwater supply or recharge are expected and no mitigation is required.

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

Less Than Significant Impact. The proposed project would be constructed under/within public right-of-ways and City property, and, as such, is not expected to alter the existing grade or drainage pattern of the area. Construction of the proposed project components would not alter the course of a stream or river, permanently or temporarily, since the pipelines would be constructed

within street right-of-ways and would not notably affect any streams or require any substantial grading activities. Neither open-trench or tunneling construction methods are expected to substantially increase the rate or amount of surface runoff, or result in flooding on- or off-site. Operation of the proposed project would occur below grade within public right-of-ways and City property. Once construction is completed, no impacts to drainage patterns or the existing stream are anticipated to occur. Therefore, impacts would be less than significant and no mitigation is required.

d) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Less Than Significant Impact. The proposed project would be constructed under/within public right-of-ways and City property, and, as such, is not expected to alter the existing grade or drainage pattern of the area. Construction of the proposed project components would not alter the course of a stream or river, permanently or temporarily, since the pipelines would be constructed within street right-of-ways and would not notably affect any streams or require any substantial grading activities. Neither open-trench or tunneling construction methods are expected to substantially increase the rate or amount of surface runoff, or result in flooding on- or off-site. Operation of the proposed project would occur below grade within public right-of-ways and City property. Once construction is completed, no impacts to drainage patterns or the existing stream are anticipated to occur. Therefore, impacts would be less than significant and no mitigation is required.

e) Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less Than Significant Impact. Dewatering that may be required for trenching would contribute minimal amounts of discharge water that is not expected to be released in substantial quantities, and is not expected to exceed the existing or planned capacity of the local stormwater drainage system. Furthermore, as mentioned above, the discharge water is not anticipated to contain significant quantities of contaminants. The contractor would be required to file a Notice of Intent under the Los Angeles Regional Water Quality Control Board General Permit R4-2008-0032 (or subsequent orders) for Waste Discharge Requirements for Discharges of Groundwater from Construction and Project Dewatering to Surface Waters and comply with the requirements set forth in the order. Once the construction of the proposed project has been completed, the pipelines would be hydrostatically tested. Test water would be discharged into the municipal waste water system. Operation of the proposed project would be a closed system that would not create or contribute to runoff water. Consequently, impacts to stormwater systems from increased runoff volumes or polluted runoff due to construction or operation of the proposed project would be less than significant.

f) Would the project otherwise substantially degrade water quality?

Less Than Significant Impact. Potential short-term erosion effects could occur during site excavation and construction activities that could affect surface water quality with runoff. However, due to the linear nature of the proposed project and limited area of ground disturbance, this effect is expected to be minimal. If dewatering is necessary during construction, the water would be treated, as necessary, and discharged into the nearby storm drain system. The contractor would be required to file a Notice of Intent under the Los Angeles Regional Water Quality Control Board General Permit R4-2008-0032 (or subsequent orders) for Waste Discharge Requirements for Discharges of Groundwater from Construction and Project Dewatering to Surface Waters and comply with the requirements set forth in the order. Operation of the proposed pipeline would be a closed system and therefore not substantially degrade or affect water quality. A less than significant impact is anticipated relative to water quality and no mitigation is required.

g) Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

No Impact. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) and the U.S. Army Corps of Engineers (ACOE) reservoir inundation maps, the proposed project is located outside of the FEMA 100-year flood hazard area. Implementation of the proposed project would not result in changes to the 100-year flood hazard area, nor introduce housing into a 100-year flood hazard area, nor change existing flood threats to nearby housing.

h) Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

No Impact. The proposed project area is outside of the FEMA 100-year flood hazard area. Implementation of the proposed project would not result in changes to the 100-year flood hazard area, nor introduce housing into a 100-year flood hazard area. Therefore, the proposed project would have no impact on impeding or redirecting flood flows within a 100-year flood hazard area.

i) Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Less Than Significant Impact. The project would not include the development of new housing or building structures that would be exposed to flooding impacts. Project implementation would provide recycled water to additional areas of the City in a closed system that would not result in flooding. As such, the impact regarding exposing people or structures to flooding would be less than significant.

j) Would the project be exposed to inundation by seiche, tsunami, or mudflow?

No Impact. The proposed project area is not located near any large water bodies such as lake or reservoir that would generate a seiche wave during earthquakes. The proposed project is not

located along the coast of the Pacific Ocean and therefore is not located in an area in danger of a tsunami. The proposed project area is located on a relatively flat landscape and is not located on or near mountain foothill where erosion or heavy rains can cause mudflows into the proposed project area. Therefore, there is no impact associated with the proposed project with regard to seiche, tsunami, or mudflow.

3.1.10 Land Use and Planning

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural communities' conservation plan?	☐	☐	☐	☒

3.1.10.1 Explanation

Land use and planning at the proposed project alignment was evaluated in light of the adopted published maps, as well as applicable proposed or adopted land use plans and regulations (City of Burbank, 2013). The proposed project is the replacement of a force main sewer line and rehabilitation of the Beachwood Pump station in an already developed area of the City of Burbank.

3.1.10.2 Responses to Impact

a) Would the project physically divide an established community?

No Impact. Construction impacts from the proposed project would be short-term and would be confined to public right-of-ways and City property. Though the construction would traverse established communities, the proposed project would not physically divide the communities because access during construction would be maintained, and any limitations to access would be temporary in nature. Since the proposed project would operate underground, it would not physically divide the community. No impacts are expected and no mitigation is required.

b) Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. According to the City's General Plan Land Use Map, the land uses adjacent to the proposed alignment are designated with a multitude of residential, commercial, manufacturing, public facility, recreational, and airport-related land use types. Likewise, the zoning designations for the proposed project alignment vary greatly from one alignment to another. The proposed project does not propose changes to the existing land use or zoning designations. Further, the project would not involve development of substantial new structures or land uses that could conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project. Therefore, no impacts would occur in this regard.

c) Would the project conflict with any applicable habitat conservation plan or natural communities' conservation plan?

No Impact. The proposed project is not located within a habitat conservation plan or natural community conservation plan area. Thus, no impacts would occur in this regard.

3.1.11 Mineral Resources Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

3.1.11.1 Explanation

Mineral resources at the proposed project alignment were evaluated with regard to California Division of Mines and Geology publications (California Department of Conservation 1966 and 1990) and the adopted Burbank 2035 General Plan (City of Burbank 2013) for the proposed project alignment.

3.1.11.2 Responses to Impact Questions

a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impact. Based on a review of California Division of Mines and Geology publications (California Division of Mines 1966), there are known mineral resources of statewide or regional importance located within the proposed project alignment. The proposed project alignment is located in an area classified as a Mineral Resource Zone-2 (MRZ-2). MRZ-2 is defined as "areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence (California Division of Mines 1966)." Past land use changes to accommodate planned urbanization now preclude mining activities in Burbank. Future mining activities could not occur without destroying large areas of the city. Although there is a possibility that significant mineral resources could be located within the project area, mining would not be feasible. Therefore, the project area is not considered to be a potential future source for mineral resources. No further analysis is warranted.

b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. The proposed project alignment is not located in or near a Mineral Resource Extraction (MRE) area as identified in related mines and geologic publications or in the City of Burbank 2035 General Plan. As discussed above, the proposed project alignment is currently developed and is not located within a mineral resource zone. No further analysis is warranted.

3.1.12 Noise

Would the project result in:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.1.12.1 Explanation

The following discussion evaluates the potential noise impacts from construction and operation of the proposed project as compared to applicable noise standards. The scope of the project would be limited to construction of various pipeline segments within public right-of-ways and upgrade of an existing pump station on City property. Therefore, the proposed project would temporarily generate noise during the construction period in the immediate vicinity of the particular construction site, but would not result in notable noise generation following construction.

City of Burbank General Plan (City of Burbank, 2014) recognizes that construction noise is a necessary part of community development. In the City of Burbank Municipal Code, construction noise that occurs between the hours of 7 a.m. and 7 p.m. Monday through Friday and 8 a.m. to 5 p.m. on Saturday is exempt from applicable noise standards. With this regulatory exemption, the City acknowledges that construction noise is an acceptable public nuisance when conducted during the least noise-sensitive hours of the day. The City also acknowledges that construction noise could cause a substantial temporary increase in the ambient noise environment at nearby noise-sensitive receptors if construction occurs during the more noise-sensitive hours (i.e., evening, nighttime, early morning), or if construction equipment is not properly equipped with noise control devices. Residential uses are located in proximity to several of the proposed

pipeline alignment; however, construction activities would occur in proximity to any one residence for only a few days. Typical construction equipment would generate noise up to 85 dBA at 50 feet from the equipment. However, with implementation of applicable mitigation measures, it is expected that construction noise levels at the nearest residential receptors would be below the City's base daytime ambient noise standard of 55 dBA for residential uses (City's General Plan Table N-4). As such, with mitigation, construction activities in residential areas or in proximity to other sensitive receptors would not result in significant noise impacts.

Haul trucks would be used to remove limited soil materials and/or construction-related debris from the proposed project alignment. All removed materials would be delivered to the Burbank Landfill, which serves the project area. Haul trucks can generate noise of up to 76 dBA at a 50 feet distance; however, given the size of proposed pipeline diameter (24 inches), the number of haul trucks required to dispose of excavated soil would not be substantial. The estimated noise from haul trucks at residential uses adjacent to affected roadways is expected to be below the City's daytime ambient noise standard of 55 dBA. As such, the construction haul trucks would not result in significant noise impacts at the nearest residential receptors.

Noise monitoring was performed using an Extech Model 407780 Type 2 integrating sound level meter. The Extech meter was programmed in "slow" mode to record the sound pressure level at 1 second intervals for in A-weighted form. The sound level meter and microphone was mounted approximately five feet above the ground and equipped with a windscreen during all measurements. The sound level meter was calibrated before monitoring using an Extech calibrator, Model 407766. The noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

The noise monitoring locations were selected in order to obtain noise measurements of the current noise sources impacting the proposed project alignment and the project vicinity, and to provide a baseline for any potential noise impacts that may be created by development of the proposed project alignment. The noise monitoring locations are shown in Appendix E, Exhibit 1: The appendix includes a photographic index of the study area and noise level measurement locations.

The noise measurements were recorded between 11:57 hours and 12:41 hours on Monday, July 16, 2012. At the start of the noise monitoring, the sky was partly cloudy with calm wind conditions (3-5 mph).

The noise measurements were taken at two (2) locations adjacent to the alignment. The results of the noise level measurements are provided below in Table 8.

Table 8
Existing Noise Level Measurements

Site Location	Description	L_{eq}	L_{MAX}	L_{MIN}
Site 1	Center of E Chandler Boulevard adjacent to the Chandler Bikeway. Between N Sparks Street and N Beachwood Drive.	63.3	76.1	46.9
Site 2	East side of N Sparks Street adjacent to 212 N Sparks Street.	60.4	82.6	44.2

Source: Michael Brandman Associates, July 2012 (Appendix E)

A Noise Study was prepared in support of the proposed project (MBA 2012) and is attached as Appendix E of this document. Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is carried from the source by sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit, which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies that are audible to the human ear.

Noise Equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The Lmax and Lmin are the highest and lowest values measured by the sound level meter over a given period of time. They are based on the time-weighted sound level in dB.

3.1.12.2 Responses to Impact Questions

a) Would the project exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant. The City of Burbank understands that construction is a necessary part of community development. Construction noise typically occurs intermittently; the amount of noise depends on the nature or phase of construction (e.g., demolition/land clearing, grading and excavation, erecting structures). Activities such as site preparation, hauling of materials by trucks, pouring of concrete, and use of power tools can temporarily generate noise. Construction equipment, such as earthmovers, material handlers, and portable generators, also creates noise that reaches high levels for brief periods.

In the City of Burbank Municipal Code, construction noise that occurs between the hours of 7 a.m. and 7 p.m. Monday through Friday and 8 a.m. to 5 p.m. on Saturday is exempt from applicable noise standards. With this regulatory exemption, the City acknowledges that construction noise is an acceptable public nuisance when conducted during the least noise-sensitive hours of the day. The proposed project would abide by the time restrictions on construction activities as stated above. Therefore, the proposed project would be in accordance with the existing standards and noise ordinance, and the impact would be less than significant.

b) Would the project exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact. The City of Burbank Municipal Code contains requirements regarding operational vibration levels. Section 10-1-1704: Vibration states that “Every use shall be so operated that the ground vibration inherently and recurrently generated does not cause a

displacement of the earth greater than three thousandths (.003) of one (1) inch as measured at any point along the line of determination as set forth in the specific zone."

The human response to vibration greatly depends on whether the source is continuous or transient. Continuous sources of vibration include certain construction activities, while transient sources include large vehicle movements. Generally, thresholds of perception and agitation are higher for continuous sources. Table 9 illustrates the human response to both continuous and transient sources of groundborne vibration.

Table 9
Human Response to Groundborne Vibration

Peak Particle Velocity (inches/second)		Human Response
Continuous	Transient	
0.40	2.00	Severe
0.10	0.90	Strongly perceptible
0.04	0.25	Distinctly perceptible
0.01	0.04	Barely perceptible

Source: California Department of Transportation, 2004

Construction equipment causes different peak particle velocities at 25 feet as shown in Table 10. The peak particle velocities have a corresponding vibration velocity that is commonly abbreviated as VdB.

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Offsite sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible groundborne noise or vibration (Table 10).

Table 10
Vibration Levels Generated by Construction Equipment

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level (LV) at 25 feet
Pile driver (impact)	1.518 (upper range) 0.644 (typical)	112 104
Pile driver (sonic)	0.734 upper range 0.170 typical	105 93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall)	0.008 in soil 0.017 in rock	66 75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006

While long-term operations of the proposed project would not generate excessive groundborne vibration or groundborne noise levels, short-term construction could potentially introduce groundborne vibration to the proposed project alignment and the surrounding area.

Construction activities such as trenching and jacking and boring can produce vibration that may be felt by adjacent uses. Jacking and boring has a greater potential to produce vibration compared to trenching. The construction of the proposed project would involve jacking and boring at the intersections of West Chandler Boulevard and Victory Boulevard, West Magnolia Boulevard and North Sparks Street, West Clark Avenue and North Sparks Street, and West Verdugo Avenue and North Sparks Street. Jacking and boring would have a similar vibration impact as drilling, 0.089 inch per second PPV at 25 feet, with an approximate vibration level of 87 VdB. Jacking and boring would occur only at locations where it is necessary to tunnel under main roads. These locations are mostly adjacent to commercial/industrial receptors. Although the vibration from the jacking and boring could be perceptible at residential boundaries, it would be intermittent, overshadowed by roadway activities, and cease once the pipeline has been installed under the road. According to the FTA, the construction damage criteria for non-engineered timber and masonry buildings is 0.2 PPV (in/sec). As shown above, the drilling (jacking and boring) vibration impact would be approximately 0.089 PPV. Drilling would need to occur within approximately 14 feet of homes in order to reach the 0.2 PPV construction damage criteria threshold. Therefore, no damage to homes is anticipated from construction activities. Vibration impacts from other construction-related equipment along the alignment are anticipated to be similar or less than those from jacking and boring.

As construction-related vibration is short-term and will not cause damage to homes, potential impacts associated with the vibration from construction equipment are considered to be less than significant.

c) Would the project cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

No Impact. The project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment which begins at the Beachwood Pump Station and continues west on West Riverside Drive for approximately 500 feet, the alignment turns north and continues 8,200 feet on North Sparks Street up to West Chandler Boulevard. From there, the alignment turns east and parallels the existing Beachwood Force Main on West Chandler Boulevard for approximately 4,000 feet. The parallel alignment continues into the Burbank Water Reclamation Plant (BRWP) until it discharges into the BWRP headworks located at the northeast side of the plant. The majority of the project will occur underground and is part of the city's planned upgrade in order for the pump station to achieve its full design capability. Operational activities would consist of maintenance visits by BRWP maintenance personnel, which would occur at a similar frequency as the existing facilities. No permanent increase in ambient noise levels will occur as a result of project implementation.

d) Would the project cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant With Mitigation Incorporation. The noisiest phase of construction would be during the jacking and boring at major intersections along Sparks Street and excavation of the trench. Jacking and boring would occur mostly adjacent to commercial/industrial receptors. The jacking and boring equipment was modeled, together will other equipment that will be used along portions of the alignment. Modeling for construction-related noise was performed using the U.S. Department of Transportation Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM). The RCNM is the FHWA national model used for the prediction of construction-related noise and to determine compliance with noise limits for a variety of types of construction projects of varying complexity. The RCNM includes an extensive compilation of built-in reference noise levels for dozens of types of construction-related equipment based on manufacturer and actual monitored sources. Results from RCNM analysis are shown in Table 11 below.

Table 11
Construction Equipment Noise Levels

Equipment Description	Noise Level (L_{max} dBA) at 50 feet	Distance to Receptor[1] (feet)	Maximum Noise Level (L_{max} dBA) at Receptor	Average Noise Level (L_{eq} dBA) at Receptor
Horizontal Boring Hydraulic Jack	82	25	88	82
Dump Truck	76.5	25	82.5	78.5
Crane	80.6	25	86.6	78.6
Excavator	80.7	25	86.7	82.8
Generator	72.8	25	78.8	75.8
Backhoe	77.6	25	83.6	79.6
Front End Loader	79.1	25	85.1	81.2

Notes:
[1] The nearest noise receptor is approximately 30 feet from the proposed construction activities; however, for the purpose of this noise analysis, a receptor distance of 25 feet from the proposed construction activities is used as a worst-case evaluation.

Source: FHWA Roadway Construction Noise Model.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Although there would be a relatively high single event noise exposure potential, resulting in potential short-term intermittent annoyances, the effect in long-term ambient noise levels would be small when averaged over longer time (24 hours for CNEL). As shown by the ambient noise level measurements in Table 8, the maximum noise level in the project vicinity is already up to 82.6 dBA. The results in the Table 11 show that the construction equipment for the pipeline and pump station would generate maximum noise levels of 88 dBA (L_{max}) at a distance of 25 feet (distance of equipment use from sensitive receptors along the eastern side of Sparks Street). The noise from construction equipment for the pipeline would be transitory, intermittent, and not a source of continuous noise. The installation and construction of the pipeline along the alignment will proceed at a speed of approximately 100 to 120 feet per day. Therefore, the disturbances will not be located directly adjacent to any one residence for the entire duration of construction, and the impacts will be transitory. The construction activities at the pump station will include various pieces of equipment such as an excavator, backhoe, generator, rubber tire loader, crane, dump

truck, air compressor, plate compactors, forklifts, and crane. These pieces of equipment would be used during various stages of the construction activities at the pump station. The maximum construction noise levels at the pump station would be similar to the maximum noise levels during pipeline construction.

As stated previously, the City of Burbank Municipal Code, construction noise that occurs between the hours of 7 a.m. and 7 p.m. Monday through Friday and 8 a.m. to 5 p.m. on Saturday is exempt from applicable noise standards. With this regulatory exemption, the City acknowledges that construction noise is an acceptable public nuisance when conducted during the least noise-sensitive hours of the day. The City also acknowledges that construction noise could cause a substantial temporary increase in the ambient noise environment at nearby noise-sensitive receptors if construction occurs during the more noise-sensitive hours (i.e., evening, nighttime, early morning), or if construction equipment is not properly equipped with noise control devices. Therefore, in order to minimize the potential for construction noise impacts, the following mitigation measures are required.

MM NOI-1 All construction equipment shall use available noise suppression devices and properly maintained mufflers. All internal combustion engines used in the project area shall be equipped with the type of muffler recommended by the vehicle manufacturer. In addition, all equipment shall be maintained in accordance with the manufacturer's specifications to minimize noise created by faulty or poorly maintained engine, drive train, and other components.

MM NOI-2 During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receptors and as far as possible from the boundary of sensitive receptors.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? and

f) For a project within the vicinity of a private airstrip would the project expose people residing or working in the project area to excessive noise levels?

No impact. The proposed project alignment is located approximately 1.9 miles southeast of Burbank airport. The proposed project alignment occurs well outside of the designated 65 dBA, noise contours[2] (2003). Therefore, impacts associated with excessive noise levels associated with airport noise are not anticipated.

No private airstrip occurs within 10 miles of the proposed project alignment. As such, the proposed project would not expose workers to excessive noise levels. Therefore, excessive noise impacts associated with private airstrips are not anticipated.

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[2] Coffman Associates, Inc. 2003. Draft Revision to Noise Compatibility Program for Burbank-Glendale-Pasadena. October. http://www.burbankairport.com/dmdocuments/11-06-03_Burbank-Glendale-PasadenaAirportNC.pdf

3.1.13 Population and Housing

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

3.1.13.1 Explanation

Population and housing was evaluated with regard to state, regional and local data and forecasts for population and housing, and the proximity of the County to existing and future planned utility infrastructure.

a) Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact. Construction and operation of the proposed project is replacement of an aging existing force main sewer and upgrade of an existing pump station. As such, the project would not induce population growth in the area, either directly or indirectly. No growth-inducing impacts are anticipated to result from the proposed project, as the project would merely accommodate existing BWRP wastewater customers; therefore, no mitigation is required.

b) Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Impact. The construction and operation of the proposed project would occur within public streets and staging areas would be located at existing City of Burbank facilities or vacant lots/unoccupied parcels. No housing is to be removed as part of the proposed project. Therefore, construction and operation of the proposed project would not have any impacts on the number or availability of existing housing in the area and would not necessitate the construction of replacement housing elsewhere; therefore, no mitigation is required.

c) Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. As mentioned in question XII.b above, the construction and operation of the proposed project would not displace any housing, and therefore would not result in the displacement of people. Therefore, no impact is expected and no mitigation is required.

3.1.14 Public Services

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?	☐	☐	☒	☐
b) Police protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☒	☐
e) Other public facilities?	☐	☐	☐	☒

3.1.14.1 Explanation

The proposed project area is serviced by the City of Burbank Police Department. The Burbank Fire Department (BFD) provides fire protection, prevention, and emergency medical services. Educational services are provided through the Burbank School District. The City provides maintenance of public facilities, including the project area roadways.

3.1.14.2 Responses to Impact Questions

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

i. Fire protection?

Less Than Significant Impact. Construction of the proposed project could have the potential to reduce access for emergency vehicles near construction activities. However, all construction activities would be carried out in accordance with all applicable City, Caltrans, and Burbank Fire Department (BFD) emergency access standards, and access would be maintained during construction. Operation of the proposed project would be passive and largely underground, and therefore would not require additional fire protection. No significant adverse physical impacts would occur to fire services and no mitigation is required.

ii. Police protection?

No Impact. Construction of the proposed project could have the potential to reduce access for emergency vehicles near construction areas. However, all construction activities would be carried out in accordance with all applicable City, Caltrans, and Burbank Police Department (BPD) emergency access standards, and access will be maintained during construction. Operation of the proposed project would be passive and would not require additional police protection. No significant adverse physical impacts would occur relative to police services and no mitigation is required.

iii. Schools?

No Impact. Project implementation would not result in and the creation of land uses that would generate additional students for local schools. Therefore, no impacts regarding school facilities would occur with project implementation.

iv. Parks?

Less Than Significant Impact. The project would not introduce any new population that would create additional demands on existing or planned park facilities. During construction, a portion of Mountain View Park will have restricted access for approximately 30 days. In addition, a portion of George Izay Park parking lot will be used for staging equipment and materials. However, the impact to the park will not prevent park usage and the impact will be temporary. During operations, the force main sewer and pump station will be underground and passive and will not impact park facilities. Thus, impacts to park facilities would be less than significant.

v. Other public facilities?

No Impact. The project would involve periodic inspection and/or maintenance of facilities along the affected alignment and at the below-ground Beachwood pump station. No substantial increase in City services would be required above and beyond those already provided for by the City. Thus, no impacts regarding other public facilities would occur.

3.1.15 Recreation	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☒	☐

3.1.15.1 Explanation

Recreation issues associated for the proposed project was evaluated using Burbank 2035 General Plan (City of Burbank, 2013). In addition, the preliminary plans and project plans were reviewed and compared with potential recreation impacts that may occur as a result of construction and operation of the Force Main Sewer and Beachwood Pump Station.

3.1.15.2 Responses to Impact Questions

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. The construction and operation of the proposed project would not generate any additional population that would increase demand for neighborhood or regional parks or other recreational facilities. Accordingly, no adverse physical impact to parks would result, and no mitigation is required.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

Less Than Significant Impact. The proposed project would not require the construction or expansion of recreational facilities; therefore no impacts to the environment would result that would require result construction or expansion of recreational facilities. During construction of the southern portion of the force main and during upgrade of the Beachwood Pump Station, a portion of Mountain View Park will have restricted access for approximately 30 days. In addition, a portion of George Izay Park parking lot will be used for staging equipment and materials during construction of the force main along North Sparks Street. However, the impact to the park will not prevent park usage and the impact will be temporary.

3.1.16 Transportation/ Traffic

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐

3.1.16.1 Explanation

Transportation/traffic issues for the proposed project was evaluated using the Mobility Element of Burbank 2035 General Plan (City of Burbank, 2013). In addition, the preliminary plans and project plans were reviewed and compared with transportation/traffic encumbrances that may occur as a result of construction and operation of the Force Main Sewer and Beachwood Pump Station.

3.1.16.2 Responses to Impact Questions

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit? and/or b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

Less Than Significant Impact. There would be a short-term increase in traffic generated during the construction period between the proposed project alignment and the Burbank Landfill where excavated materials and construction debris would be transported to and disposed of. Construction-worker trips would be short-term in nature, limited in number, and would not typically occur during peak hours. The addition of these trips to the existing circulation network would not create a significant traffic impact. In addition, only temporary lane closures are expected to occur that would result in a change in traffic patterns or capacity, but lane closures would only affect sections of roadway up to 500 feet in length at any one time and would not be substantial in relation to the existing traffic load and capacity of the street system during construction activities.

Maintenance of the proposed relocated force main sewer and upgraded pump station would not generate a long-term source of traffic. Traffic generated by the maintenance activities would be similar to current operations. Thus, less than significant traffic impacts would occur in this regard.

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

No Impact. The proposed project would not result in a change in air traffic patterns or increase traffic levels that would result in a substantial safety risk. The proposed project does not include any features or structures that would impede a height limitation in close proximity to an airport; therefore, no impacts on air traffic patterns would occur as a result of the proposed project. No further analysis is warranted.

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. The project would not involve the construction or modification of traffic-related improvements. Additionally, the project would not involve the construction of any uses that would be considered incompatible with existing roadways. Thus, no impact would occur in this regard.

e) Would the project result in inadequate emergency access?

Less Than Significant Impact. The proposed project would not hinder emergency access in the area, except for short-term periods during construction of the pipeline. As mentioned above, all construction activities would be carried out in accordance with all City of Burbank, BFD, and BPD emergency access requirements and access would be maintained during construction activities. No significant emergency access impacts are expected and no mitigation is required.

f) Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Less Than Significant Impact. The proposed project would not conflict with adopted policies supporting alternative transportation. Construction activities are not expected to disrupt alternative transportation facilities (e.g., bus stops, bike lanes). Access to public transportation and bike lanes would be maintained throughout construction, as required by the City and MTA. As a result, no significant impacts would result from the proposed project and no mitigation is required.

3.1.17 Utilities and Service Systems

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

3.1.17.1 Explanation

Utility and service systems issues for the proposed project was evaluated using the Utilities and Community facilities Element of Burbank 2035 General Plan (City of Burbank, 2013) In addition, the preliminary plans and project plans were reviewed and compared with utility requirements and system services associated with construction and operation of the Force Main Sewer and Beachwood Pump Station.

3.1.17.2 Responses to Impact Questions

a) Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

No Impact. The proposed project would not result in changes to facilities or operations at existing wastewater treatment facilities, as the proposed project is replacement of an aging force main sewer and upgrade of an existing pump station. No impact to wastewater treatment requirements of the applicable Regional Water Quality Control Board would occur.

b) Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

No Impact. As stated above, the proposed project would not result in changes to facilities or operations at existing wastewater treatment facilities, as the proposed project is replacement of an aging force main sewer and upgrade of an existing pump station. Therefore, there are no expected impacts to population and housing related to inducing substantial direct or indirect population growth. The project would have no impact on water or wastewater treatment facilities; therefore, there would be no impact. No further analysis is warranted.

c) Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant Impact. Stormwater drainage facilities are provided throughout the project area. Construction of the proposed project would not be expected to increase stormwater runoff in the project area, since the pipeline would be placed beneath previously developed surfaces. Although construction dewatering may be required during construction under a Notice of Intent filed under Los Angeles Regional Water Quality Order R4-2008-0032, the activity would be temporary in nature and the amount of dewatering discharge would not exceed the capacity of the existing stormwater drainage facilities, nor require new or expanded facilities of this type. The proposed project, once operational, would be a closed system, and therefore would not impact stormwater drainage facilities. The construction and operation of the proposed project would not be anticipated to require, or indirectly result in, the construction of new stormwater drainage facilities or the expansion of existing facilities. Therefore, no impacts are expected and no mitigation is required.

d) Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

Less Than Significant Impact. The proposed project may temporarily require minimal amounts of water to supply irrigation to replacement vegetation that would be installed after construction of the proposed project, which existing water supplies would be capable of supplying. The amounts required for vegetation establishment irrigation would not be substantial and would not require the procurement of additional entitlements or resources. Because the proposed project does not have any components that would regularly demand substantial amounts of water, it is not anticipated that the proposed project would result in insufficient water supplies in the area. No further analysis is warranted.

e) Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

No Impact. As stated above, the proposed project does not include residential housing and is located in a developed area of the City. Therefore, there are no expected impacts to population and housing related to inducing substantial direct or indirect population growth. The proposed project would produce additional wastewater to the BWRP. However, the amount will be within the original design capacity of the BWRP and no additional capacity will be required; therefore, there would be no impact**.** No further analysis is warranted.

f) Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Less Than Significant Impact. Excavation and construction debris would be recycled or transported to Burbank Landfill No. 3 and disposed of appropriately. It is anticipated that the construction contractor will work with the City of Burbank's Recycling Coordinator to ensure that source reduction techniques and recycling measures are incorporated into project construction. The amount of debris generated during project construction is not expected to significantly impact landfill capacities. Operation of the force main sewer and upgraded pump station would not generate any solid waste. No significant impacts to landfill capacity are anticipated.

g) Would the project comply with federal, state, and local statutes and regulations related to solid waste?

Less Than Significant Impact. As stated above, construction debris would be recycled or disposed of according to local and regional standards, and operation of the proposed project would not generate any solid waste. As such, no significant impacts related to compliance with solid waste statutes and regulations are expected to occur. No further analysis is warranted.

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3.1.18 Mandatory Findings of Significance	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☒
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

Note: Authority cited: Sections 21083 and 21083.05, Public Resources Code. Reference: Section 65088.4, Gov. Code; Sections 21080(c), 21080.1, 21080.3, 21083, 21083.05, 21083.3, 21093, 21094, 21095, and 21151, Public Resources Code; *Sundstrom v. County of Mendocino*,(1988) 202 Cal.App.3d 296; *Leonoff v. Monterey Board of Supervisors*, (1990) 222 Cal.App.3d 1337; *Eureka Citizens for Responsible Govt. v. City of Eureka* (2007) 147 Cal.App.4th 357; *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th at 1109; *San Franciscans Upholding the Downtown Plan v. City and County of San Francisco* (2002) 102 Cal.App.4th 656.
Revised 2009

3.1.18.1 Explanation

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

No Impact. Based on the analysis contained in Section 3.1.4, Biological Resources, and Section 3.1.5, Cultural Resources, the proposed project has no potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Less Than Significant Impact. Due to the nature of the project, the project would not involve significant cumulative impacts, since the replacement of the force main sewer and upgrade of an existing pump station is a replacement/upgrade of existing facilities and would serve existing customers within the City. The proposed project would only result in environmental impacts during construction activities associated with each of the project components, which would generally be constructed sequentially in distinct phases and would not overlap. Other effects are isolated to the project alignments and have been determined to be less than significant, either with or without mitigation. Although the project may incrementally affect other resources that have been determined to be less than significant, the project's contribution to these effects is not considered to be "cumulatively considerable."

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less Than Significant Impact. Based on the analysis provided herein, six impacts were identified: two impacts associated with Biological Resources, three impacts with Cultural Resources, two impacts with Hazards and Hazardous Materials; one impact associated with Hydrology and Water Quality; and one impact associated with Noise. All of these impacts can be brought below the level of significance with incorporation of the mitigation measures provided.

4.0 References

Associated Soils Engineering Inc., 2014. *Report of Geotechnical Investigation – Beachwood Pump Station Upgrade and Force Main Replacement Project, City of Burbank, California.* Dated March 24, 2014.

California Code of Regulations. Title 14, Division 6, Chapter 3, Sections 15000–15387, Appendix G.

California Department of Conservation. 2010. *Los Angeles County Important Farmland 2010 Map*. Division of Land Resource Protection, Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation, Division of Mines and Geology. 1966. *Minerals of California Volume (1866–1966)*. Bulletin 189. Los Angeles, CA.

California Department of Fish and Game. Accessed November 2012. *RareFind 3: California Natural Diversity Database*. Sacramento, CA.

California Department of Fish and Game/NCCP. 2012. *Natural Community Conservation Planning (NCCP), Summary of table of NCCPs and associated map*. Available at: http://www.dfg.ca.gov/habcon/nccp/status/index.html

California Department of General Services, 2013. *Uniform Building Code*. California Building Standards Commission.

California Department of Transportation. 10 March 2014. *The California Scenic Highway System: A List of Eligible (E) and Officially Designated (OD) Routes (by Route).* Available at: http://www.dot.ca.gov/hq/LandArch/scenic/schwy.htm.

California Division of Mines and Geology, 1979. *Mineral Land and Classification Map*, May 25, 1979.

California Native Plant Society. Accessed November 2012. *Inventory of Rare and Endangered Plants*. Sacramento, CA. Available at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi

California Scenic Highway Mapping System. Accessed 12 March 2014. County of Los Angeles. Available at: http://www.dot.ca.gov/hq/LandArch/scenic_highways/

City of Burbank, "Burbank Municipal Code," Chapter 31, Zoning, Burbank, California City of Burbank "Zoning Map," Burbank, California

City of Burbank, Community Development Department, 2013. *Burbank 2035 General Plan*, Burbank, California, February 2013.

City of Burbank, Community Development Department, "Noise Element of the City of Burbank General Plan," Burbank, California, adopted by Burbank City Council on December 8, 1992, Resolution No. 23,777

City of Burbank, Community Development Department, "Open Space/Conservation Element of the City of Burbank General Plan," Burbank, California, adopted by Burbank City Council on December 19, 1972, Resolution No. 16,280

City of Burbank, Community Development Department, "Safety Element of the City of Burbank General Plan," Burbank, California, adopted by Burbank City Council on July 1, 1997, Resolution No. 25,087

City of Burbank, Department of Water and Power. *Recycled Water Master Plan.* October 2007.

James M. Montgomery, Inc., 1992. *Remedial Investigation of Groundwater Contamination in the San Fernando Valley*. December 1992.

Hickman, J.C. (ed.). 1993. *The Jepson Manual: Higher Plants of California*. Berkeley, CA: University of California Press.

Holland, Robert F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Sacramento, CA: California Department of Fish and Game.

Michael Brandman and Associates. 2013. *Air Quality and Greenhouse Gas Analysis for the City of Burbank Pump Station and Force Main Project*, City of Burbank, California

Michael Brandman and Associates. 2013. *Cultural Resource Reconnaissance Survey for the City of Burbank Pump Station and Force Main Project*, City of Burbank, California

Michael Brandman and Associates. 2013. *Noise Analysis Report for the City of Burbank Pump Station and Force Main Project*, City of Burbank, California

Munz, P. 1974. *A Flora of Southern California*. Berkeley, CA: University of California Press.

Psomas, 2013. *Preliminary Design Report – Beachwood Sewer Upgrades Project*.

Sawyer, J.O., and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. Sacramento, CA: California Native Plant Society.

U.S. Department of Agriculture, 1917. *Soil Survey of the San Fernando Valley Area, California*. Washington: Government Printing Office.

Appendix A
Air Quality and Greenhouse Gas Emissions Analysis

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April 30, 2014
Michael P. Donovan, PG, CHg
P S O M A S
Associate/Senior Hydrogeologist, Natural Resources
3 Hutton Centre Drive, #200
Santa Ana, CA 92707

Subject: **Air Quality and Greenhouse Gas Emissions Analysis for the City of Burbank Pump Station and Force Main Project City of Burbank, California**

Dear Mr. Donovan:

Attached is the Air Quality and Greenhouse Gas Emissions Analysis report for the Burbank Pump Station and Force Main project. The analyses were provided in CEQA checklist format. The modeling output is provided as an attachment to the document.

Please let me know if you have any questions. You can reach me at 916.447.1100, or email me at cmeier@brandman.com.

Sincerely,

Chryss Meier, Air Quality Analyst
FirstCarbon Solutions
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DRAFT
Air Quality and Greenhouse Gas Emissions Analysis
Pump Station and Force Main Project
City of Burbank, California

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SECTION 1: INTRODUCTION

FirstCarbon Solutions (FCS) air quality analysts have undertaken an air quality and greenhouse gas emissions analyses of the Burbank Force Main and Pump Station Project, which is located in the south-central portion of the City of Burbank, California (City). The purpose of this document is to determine if criteria air pollutant and greenhouse gas emissions generated from the project would cause significant impacts to air resources or on climate change. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.). The methodology follows South Coast Air Quality Management District (SCAQMD) recommendations for quantification of emissions and evaluation of potential impacts to air resources.

SECTION 2: PROPOSED PROJECT

The City proposes to improve the existing Beachwood Pump Station located in Mountain View Park, and construct a new 24-inch force main line from the Beachwood Pump Station to the Burbank Water Reclamation Plant (BWRP). The project alignment map is provided as Attachment A to this document. Each project component is discussed separately below.

Beachwood Pump Station Upgrade

The Beachwood Pump Station receives wastewater from the southern portion of the City and pumps the sewage to the BWRP via the Beachwood Force Main. Improvements to the Beachwood Pump Station consist of:

- Replacing three existing 150-horsepower (hp) pumps with three new 150-hp pumps,
- Installing custom fabricated fittings to retrofit new pumps into pipes designed for the old pump dimensions,
- Replacing suction and discharge isolation and check valves,
- Re-coating the existing wet well with a polymer liner,
- Improvements or modifications to existing odor control facilities, and
- Integrating the new pumps with the existing variable frequency drive system.

Beachwood Force Main Replacement

The existing Beachwood Force Main currently runs mostly beneath the pavement of Beachwood Drive between Mountain View Park and the BWRP. The Beachwood Force Main Replacement would construct a new force main mostly placed beneath Sparks Street. The new force main alignment would begin at the Beachwood Pump Station and continue west on West Riverside Drive to North Sparks Street. The new force main would then travel north in North Sparks Street to West Chandler Boulevard. From the intersection of North Sparks Street and West Chandler, the new force main would turn east and parallel the existing Beachwood Force Main on West Chandler Boulevard. The parallel alignment would continue into the BWRP until it discharges into the BWRP headworks located at the northeast side of the plant. A new magnetic flow meter in an underground vault will be constructed inside the BWRP site similar to the existing Beachwood Force Main discharge.

The construction of the proposed project would involve jacking and boring at the following intersections: Chandler Boulevard/Victory Boulevard, West Magnolia Boulevard/Sparks Street, West Clark Avenue/Sparks Street, and Verdugo Avenue/Sparks Street. Excavation during the jackpit excavation phase could be at a maximum of 20 feet below grade. Boring will occur 10 to 15 feet below grade.

SECTION 3: EMISSIONS ANALYSIS PARAMETERS AND METHODOLOGY

Construction emissions were evaluated using the CalEEMod version 2013.2.2 computer program. The model evaluated emissions resulting from fugitive dust as well as exhaust emissions generated construction equipment use, construction worker trips, and vendor trips. The construction is anticipated to begin in September 2014 and to be completed within approximately 12 months. Site restoration and pump station upgrades will complete the construction period between August and September 2015.

The force main construction and pump station upgrades will occur at different locations (see Attachment A for alignment map); however, the work period will overlap. A maximum of 10,000 cubic yards (cy) of earth could be excavated and hauled offsite, or used as fill elsewhere within the force main alignment. Table 1 and Table 2 contain the activity parameters for the proposed project's construction.

Table 1: Construction Equipment Assumptions for New Force Main

Phase	Number of workdays	Construction Equipment	Number	Hours/ day	Horse-power
Site Preparation	10	Concrete/industrial saws	1	8	81
		Crushing/proc. equipment	1	8	85
Excavation / shoring / pipe install	195	Bore/drill rig	1	8	82
		Crane	1	8	208
		Dumpers/tenders	6	8	16
		Excavators	2	8	157
		Generator set	1	3	84
		Rubber tired loader	1	8	87
		Tractor/loader/backhoe	1	8	75
		Trencher	1	8	69
Paving and work site restoration	70	Grader	1	7	162
		Paver	1	7	89
		Plate compactor	1	7	8
		Roller	1	7	84
Source: Psomas, 2014					

Table 2: Construction Equipment Assumptions for Beachwood Pump Station Upgrade

Phase	Number of workdays	Construction Equipment	Number	Hours/ day	Horse-power
Pump and equipment removal	5	Crane	1	8	208
		Dumper/tender	1	8	16
		Welder	1	3	46
Wet well rehab	15	Air compressor	1	8	78
		Crane	1	3	208
		Dumper/tender	1	8	16
		Forklifts	2	6	149
		Generator set	1	8	84
		Tractor/loader/backhoes	2	8	75
Excavation and shoring	30	Excavator	1	8	157
		Generator set	1	8	84
		Tractor/loader/backhoe	1	8	75
		Trencher	1	8	69
Pipe Installation and backfilling	30	Crane	1	8	208
		Excavator	1	8	87
		Rubber tired loader	1	8	69
		Tractor/loader/backhoe	1	8	75
		Welder	1	3	46
Work site restoration	10	Graders	1	7	162
		Plate compactors	1	7	8
		Rollers	1	7	84
Source: Psomas, 2014.					

The project will be required to comply with existing SCAQMD rules for the reduction of fugitive dust emissions. SCAQMD Rule 403 establishes these procedures. Compliance with this rule is achieved through application of standard best management practices in construction and operation activities, such as (1) application of water or chemical stabilizers to disturbed soils; (2) managing haul road dust by application of water; (3) covering haul vehicles; (4) restricting vehicle speeds on unpaved roads to 15 miles per hour (mph); (5) sweeping loose dirt from paved site access roadways; (6) ceasing construction activity when winds exceed 25 mph; and (7) establishing a permanent, stabilizing ground cover on finished sites.

SECTION 4: INITIAL STUDY QUESTIONS

The following are responses to the CEQA Guidelines environmental checklist questions for air quality and greenhouse gas emissions.

4.1 - Air Quality

Would the Project[1]	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

Note:
[1] Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the significance determinations.

4.1.1 - Discussion

Regional Air Quality

The project site is located in central Los Angeles County in the City of Burbank, an area within the South Coast Air Basin (Basin) that includes Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. Air quality conditions in the Basin are under the jurisdiction of the South Coast Air Quality Management District (SCAQMD), a regional agency that regulates stationary sources of pollution throughout the Basin. In addition, the SCAQMD has authority under the California Clean Air Act (CCAA) to manage transportation activities at indirect

sources. Indirect sources are facilities that do not have equipment that directly emits substantial amounts of pollution but that attract large numbers of mobile sources of pollution. Direct emissions from motor vehicles are regulated by the California Air Resources Board (ARB).

Both the state and federal governments have established health based Ambient Air Quality Standards (AAQS) for six air pollutants: carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, lead, and suspended particulate matter. The Basin does not attain state and federal AAQS for multiple criteria air pollutants. The Basin is in compliance with federal sulfur dioxide standards; however, the Los Angeles County portion of the Basin is a nonattainment area for ambient lead, carbon monoxide, ozone, and particulate matter (both PM_{10} and $PM_{2.5}$). In addition, the Basin has been the only area in the country that does not attain the federal nitrogen dioxide standard. However, because nitrogen dioxide levels have met the federal standard within the past few years, the SCAQMD is in the process of requesting redesignation. The state AAQS are more stringent than the federal AAQS and, therefore, are exceeded by the same criteria pollutants by an even higher margin. Therefore, projects that may have significant emissions of these criteria pollutants will delay the air quality attainment goals of the region.

Climate and Meteorology

The climate of the Basin is determined by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern border, and high mountains surround the rest of the Basin. The region lies in the semi-permanent high-pressure zone of the eastern Pacific. The resulting climate is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted. However, periods of extremely hot weather, winter storms, or Santa Ana wind conditions do exist.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s, measured in degrees Fahrenheit. With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas.

The majority of annual rainfall in the Basin occurs between October and March. Summer rainfall is minimal and generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the Basin and along the coastal side of the mountains. Moreover, monthly and yearly rainfall totals are extremely variable.

Even though the Basin has a semi-arid climate, air near the surface is generally moist because of the presence of a shallow marine layer. With very low average wind speeds, there is a limited capacity to disperse air contaminants horizontally. The dominant daily wind pattern is an onshore 8 to 12 mph daytime breeze and an offshore 3 to 5 mph nighttime breeze. The typical wind-flow pattern fluctuates only with occasional winter storms or strong northeasterly Santa Ana winds from the mountains and deserts northeast of the Basin. Summer wind-flow patterns represent worst-case conditions, as this is the period of higher temperatures and more sunlight during which ozone formation occurs.

During spring and early summer, pollution produced during any one day is typically blown out of the Basin through mountain passes or lifted by warm, vertical currents adjacent to mountain slopes. Air contaminants can be transported 60 miles or more from the Basin by ocean air during the afternoon. From early fall to winter, the transport is less pronounced because of slower average wind speed and the appearance of winds earlier in the day. During stagnant air conditions, offshore winds may begin by late afternoon. Pollutants remaining in the Basin are trapped and begin to accumulate during the night and the following morning. A low morning wind speed in pollutant source areas is an important indicator of air stagnation and the buildup potential for primary air contaminants.

With persistent low inversions and cool coastal air, morning fog and low stratus clouds are common. Sunshine is recorded in central Los Angeles area on more than 70 percent of days per year. This is an extremely important climatological factor, considering the role of sunshine in the photochemical smog production process. Cloudy days are less likely in the eastern portions of the Basin and about 25 percent greater along the coast.

The vertical dispersion of air pollutants in the Basin is limited by temperature inversions in the atmosphere close to the earth's surface. Temperature normally decreases with altitude, and a reversal of this atmospheric state, where temperature increases with altitude, is called an inversion. The height from the earth to the inversion base is known as the mixing height.

Local Air Quality

For evaluation purposes, the SCAQMD has divided the Basin into 36 Source Receptor Areas (SRAs). These SRAs are designated to provide a general representation of the local meteorological, terrain, and air quality conditions within the particular geographical area. The project is within SRA 7, East San Fernando Valley.

Those who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. For purposes of CEQA, the SCAQMD considers a sensitive receptor a location where a sensitive individual could remain for 24 hours, such as residences, hospitals, or convalescent facilities (SCAQMD 2008). Commercial and industrial facilities are not included in the definition because employees do not typically remain onsite for 24 hours. However, when assessing the impact of pollutants with 1-hour or 8-hour standards (such as nitrogen dioxide and carbon monoxide), commercial and/or industrial facilities would be considered sensitive receptors for those purposes.

The closest sensitive receptors are existing residences located along the new force main alignment. Existing residences are as close as 30 feet to portions of the alignment.

Responses to Impact Questions

AIR a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant Impact. The SCAQMD has established the Air Quality Management Plan (AQMP) for the Basin to achieve state and federal air quality standards. The AQMP is the primary planning document by which air quality standards and objectives are monitored. Projects that are in

compliance with their area's general plan are also considered to be consistent with the air quality plan, as set forth by SCAQMD.

The project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment that begins at the Beachwood Pump Station and continues west on West Riverside Drive for approximately 500 feet, and then turns north and continues 8,200 feet on North/South Sparks Street to West Chandler Boulevard. From there, the alignment turns east and parallels the existing Beachwood Force Main on West Chandler Boulevard for approximately 4,000 feet. The parallel alignment continues into the BRWP until it discharges into the BWRP headworks located at the northeast side of the plant. The majority of the project will be located underground and is part of the City's planned upgrade in order for the pump station to achieve its full design capability. The project will not affect or alter land use and complies with the General Plan.

Furthermore, according to the SCAQMD, the project is consistent with the AQMP if the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP. As shown in the response to Impact AIR b) below, the implementation of the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations.

Therefore, as the project will not conflict with or obstruct implementation of the air quality plan established for this region, impacts are considered less than significant.

AIR b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less Than Significant Impact. This impact relates to localized criteria pollutant impacts, also known as "hotspots". Hotspots can be generated by project construction or operation. Regional construction and operational impacts are not addressed in this section, but they are discussed in Impact AIR c), below.

Potential localized impacts would occur if a project exceeds state or federal standards for nitrogen dioxide (NO_2), $PM_{2.5}$, PM_{10} or carbon monoxide (CO). Emissions of NO_2, $PM_{2.5}$, PM_{10} and CO could be emitted during project construction from construction equipment, construction employee trips, and vendor trips. CO emissions are generally of concern during project operation because operational CO hotspots are related to increases in on-road vehicle congestion. However, the project consists of installation of a new force main and pump station upgrades. The project would not result in an increase in operational vehicular trips. The potential to generate an operational CO hotspot is not a concern for the project, and no further analysis is required. Therefore, the criterion used to assess the significance of this impact is the Localized Significance Threshold (LST) methodology recommended by SCAQMD.

Localized Construction Analysis

The SCAQMD's Governing Board adopted a methodology for calculating localized air quality impacts through LSTs, which represent the maximum emissions from a project that would not cause or contribute to an exceedance of the most stringent applicable state or federal ambient air quality standard. LSTs were developed in recognition that the criteria pollutants CO, PM_{10}, $PM_{2.5}$, and nitrogen oxides (NO_X), an ozone precursor, can have local impacts at nearby sensitive receptors. As previously stated, the SCAQMD has divided the Basin into 36 SRAs. These SRAs were designated to provide a general representation of the local meteorological, terrain, and air quality conditions within the particular geographical area. The SCAQMD has developed LSTs for each SRA for NO_X, CO, PM_{10}, and $PM_{2.5}$.

To facilitate the localized assessment process, the SCAQMD provides a series of look-up tables that contain LSTs for each SRA within the Basin (SCAQMD 2009). If onsite construction emissions exceed the localized significance thresholds, then the project would be considered to have a significant air quality impact. The look-up tables are only applicable for projects 5 acres or smaller. Specifically, the look-up tables contain LSTs for 1-acre, 2-acre, and 5-acre project scenarios for each SRA.

The new force main would disturb approximately 0.02 acre per day. The Beachwood Pump Station upgrades would disturb an estimated 80 square feet. Because the smallest project-size for the look-up tables is a 1-acre site, the LSTs appropriate to the project area were obtained from the look-up tables in the SCAQMD Final Localized Significance Threshold Methodology for a 1-acre project in SRA 7. In addition to their dependence on geographic location within the SCAQMD (e.g., the SRA), localized thresholds also depend on the distance to the impacted receptor from the source of emissions. The distance to the nearest sensitive receptor is within 25 meters from the boundary of the project; the shortest distance available in the look-up tables is 25 meters.

The results of the localized significance analysis are provided in Table 3 and Table 4. Onsite construction emissions are from exhaust off-road diesel equipment and fugitive dust during earth-disturbing activities. As provided in Table 3 and Table 4, unmitigated emissions during construction would not exceed the localized significance thresholds.

Table 3: Onsite Construction Emissions (2014)

Activity	Onsite Emissions (lbs/day)			
	NO_x	CO	PM_{10}	$PM_{2.5}$
New Force Main				
Site Preparation	11.78	8.39	0.99	0.99
Excavation/Shoring/Pipe Install	37.23	21.58	2.24	2.08
Maximum Daily Emissions[1]	37.23	21.58	2.24	2.08
Localized Significance Threshold	80	498	4	3

Activity	Onsite Emissions (lbs/day)			
	NO_x	CO	PM_{10}	$PM_{2.5}$
Exceeds Threshold?	**No**	**No**	**No**	**No**

Notes:
[1.] The above activities does not necessary occur at the same time or at the same location; therefore, the maximum daily emissions represent the maximum emissions that would occur in one day at any one location.
lbs = pounds NO_x = nitrogen oxides CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter
Source of emissions: Attachment B: CalEEMod Output.
Source of thresholds: South Coast Air Quality Management District 2009, for SRA 7, at a distance of 25 meters.

Table 4: Onsite Construction Emissions (2015)

Activity	Onsite Emissions (lbs/day)			
	NO_x	CO	PM_{10}	$PM_{2.5}$
New Force Main				
Excavation/Shoring/Pipe Install	36.14	21.53	2.17	2.01
Paving and Work Site Restoration	15.71	8.30	1.01	0.93
Beachwood Pump Station Upgrade				
Pump and Equipment Removal	9.28	3.84	0.45	0.42
Wet Well Rehabilitation	22.31	14.21	1.51	1.45
Excavation and Shoring	17.01	11.52	1.17	1.10
Pipe Installation and Backfilling	17.43	9.47	1.12	1.03
Work Site Restoration	12.12	6.09	1.20	0.73
Maximum Daily Emissions[1]	51.84	29.83	3.18	2.94
Localized Significance Threshold	80	498	4	3
Exceeds Threshold?	**No**	**No**	**No**	**No**

Notes:
[1] The above activities does not necessary occur at the same time or at the same location; therefore, the maximum daily emissions represent the maximum emissions that would occur in one day at any one location. Maximum emissions would occur during the overlap of New Force Main construction, Excavation/Shoring/Pipe Install and Paving and Work Site Restoration.
lbs = pounds NO_x = nitrogen oxides CO = carbon monoxide
PM_{10} and $PM_{2.5}$ = particulate matter
Source of emissions: Attachment B: CalEEMod Output.
Source of thresholds: South Coast Air Quality Management District 2009, for SRA 7, at a distance of 25 meters.

The localized construction analysis demonstrates that the proposed project would not exceed the localized significance thresholds for NO_X, CO, PM_{10}, and $PM_{2.5}$. Therefore, the project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation during construction. This impact is less than significant.

Localized Operational Analysis

This proposed project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a new force main. According to SCAQMD LST methodology, LSTs would apply to the operational phase of a project, if the project includes stationary sources or attracts mobile sources that may spend long periods queuing and idling at the site (e.g., warehouse or transfer facilities). The proposed project does not include such uses and, thus, no operational LST analysis is needed. Therefore, the project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation during operation. This impact is less than significant.

AIR c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Less Than Significant Impact. This impact is related to regional criteria pollutant impacts. The Basin is in non-attainment for ozone, $PM_{10,}$ $PM_{2.5}$, and NO_2, which means that concentrations of those pollutants currently exceed the ambient air quality standards for those pollutants. Ozone is not emitted directly into the air, but is a regional pollutant formed by a photochemical reaction in the atmosphere. Ozone precursors, volatile organic gases (VOC) and NO_X, react in the atmosphere in the presence of sunlight to form ozone. Therefore, the SCAQMD does not have a recommended ozone threshold, but it does have thresholds of significance for VOC and NO_X. This impact section includes analysis of, and significance determinations for, those pollutants.

The SCAQMD's significance thresholds for project construction and operation are provided within the respective analyses below.

Regional Construction Analysis

Construction activities associated with the proposed development could temporarily increase NO_X, VOC, PM_{10}, $PM_{2.5}$, and sulfur oxides (SO_x) concentrations in the project vicinity. The primary source of construction-related VOC and NO_X emission is gasoline- and diesel-powered, heavy-duty mobile construction equipment. Primary sources of PM_{10} and $PM_{2.5}$ emissions are generally earthmoving activity and wind blowing over exposed surfaces. Table 5 and Table 6 show the maximum daily construction emissions anticipated during construction. As shown in Table 5 and Table 6, the proposed project's construction emissions would be less than the SCAQMD's regional significance thresholds. Therefore, impacts from construction emissions would be less than significant.

Table 5: Maximum Daily Construction Emissions (2014)

Activity/Year	Emissions (lbs/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
New Force Main						
Site Preparation	1.84	11.81	8.79	0.01	1.05	1.01
Excavation/Shoring/Pipe Install	4.12	39.89	26.10	0.04	2.92	2.29
Maximum Daily Emissions	5.96	51.70	34.89	0.06	3.97	3.29
SCAQMD Daily Thresholds	75	100	550	150	150	55
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Notes:
lbs = pounds VOC = volatile organic compounds NO_X = nitrogen oxides
CO = carbon monoxide SO_x = sulfur oxides PM_{10} and $PM_{2.5}$ = particulate matter
Source of emissions: Attachment B: CalEEMod Output.
Source of thresholds: South Coast Air Quality Management District 2011a.

Table 6: Maximum Daily Construction Emissions (2015)

Activity/Year	Emissions (lbs/day)					
	VOC	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
New Force Main						
Excavation/Shoring/Pipe Install	4.00	38.48	25.64	0.04	2.76	2.19
Paving and Work Site Restoration	1.72	15.77	9.02	0.01	1.13	0.96
Beachwood Pump Station Upgrade						
Pump and Equipment Removal	1.03	9.33	4.50	0.01	0.54	0.44
Wet Well Rehabilitation	2.59	22.31	14.21	0.02	1.51	1.45
Excavation and Shoring	1.95	17.07	12.28	0.02	1.28	1.13
Pipe Installation and Backfilling	1.93	17.51	10.47	0.02	1.27	1.07
Work Site Restoration	1.27	12.17	6.71	0.01	1.29	0.75
Maximum Daily Emissions[1]	8.31	76.57	48.87	0.07	5.40	4.60
SCAQMD Daily Thresholds	75	100	550	150	150	55
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Activity/Year	Emissions (lbs/day)					
	VOC	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$

Notes:
1. The above activities does not necessary occur at the same time; therefore, the maximum daily emissions represent the maximum emissions that would occur in one day. Maximum emissions reflect the overlapping phases of New Force Main Excavation/Shoring/Installation, Paving and work Site Restoration, and the maximum emissions from the Beachwood Pump Station Upgrade, which would be during Wet Well Rehab.

lbs = pounds VOC = volatile organic compounds NO_x = nitrogen oxides
CO = carbon monoxide SO_x = sulfur oxides PM_{10} and $PM_{2.5}$ = particulate matter
Source of emissions: Attachment B: CalEEMod Output.
Source of thresholds: South Coast Air Quality Management District 2011a.

Regional Operational Analysis

As the project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment, the operational emissions would be from infrequent visits by maintenance personnel's vehicles. The wastewater pumps are driven by electric motors and will not emit criteria pollutants. The existing, 150-hp pumps will be replaced with new, 150-hp pumps. Therefore, project operational emissions are less than significant.

AIR d) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact. This discussion addresses whether the project would expose sensitive receptors to substantial concentrations from localized construction emissions, construction-generated diesel particulate matter (DPM), or localized operational emissions.

Construction: Localized Emissions

Air pollutant emissions from project construction could create localized health impacts if the ambient air quality standards are exceeded. As shown in Impact AIR b) above, the proposed project would not exceed the SCAQMD's localized significance thresholds for construction-generated emissions. Therefore, the proposed project would not expose receptors to substantial air pollutant concentrations from construction activities.

Construction: Diesel Particulate Matter

Equipment used during construction of the project would emit DPM, which is a carcinogen. However, the DPM emissions are short-term in nature. Determination of risk from DPM is considered over a 70-year exposure time. Guidance published by the California Air Pollution Control Officers Association (CAPCOA), Health Risk Assessments for Proposed Land Use Projects, does not currently include guidance for health risks from construction projects addressed in CEQA documents; standards for receptors near construction projects are expected to be included later when the toxic emissions from construction activities are better understood. However, given the brief duration of the construction period and the 70-year exposure time recommended for health risk assessment of DPM health impacts, and considering the dispersion of the emissions, exposure to DPM, potential health impacts would be considered less than significant.

Operation: Localized Emissions

As shown in Impact AIR b), above, the proposed project would not create a localized impact. Therefore, the proposed project would not expose receptors to substantial air pollutant concentrations from operational activities.

AIR e) Would the project create objectionable odors affecting a substantial number of people?

Less Than Significant Impact. The SCAQMD recommends that odor impacts be addressed in a qualitative manner. Such an analysis shall determine whether the proposed project would result in excessive nuisance odors, as defined under the California Code of Regulations and Section 41700 of the California Health and Safety Code, and thus would constitute a public nuisance related to air quality.

Land uses typically considered associated with odors include wastewater treatment facilities, waste-disposal facilities, or agricultural operations. The proposed project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment. The upgrades include improvements to the odor control facilities. Therefore, the improvements will reduce the potential for odors from the facility and will improve odor-control compared to the existing condition.

Exhaust and VOC would be emitted during construction of the proposed project, which are objectionable to some. These emissions would be short-term in duration and disperse rapidly from the project site. As such, odors should not reach an objectionable level at the nearest sensitive receptors. Therefore, impacts associated with objectionable odors would be less than significant.

4.2 - Greenhouse Gas Emissions

Would the Project[1]	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Note:
[1] Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the significance determinations.

4.2.1 - Discussion

Responses to Impact Questions

According to the City's Air Quality and Climate Change Element,

> Burbank's biggest challenge, as a prominent city in the most populous county in California, is how best to accommodate growth and encourage economic development, while protecting air quality and taking action to curb GHG emissions. Looking ahead to 2035, Burbank will transition to clean, efficient energy and transportation choices. With high-speed rail, electric trains, and zero-emission vehicles, people and goods will move more efficiently to, from, and through the community. Buildings and infrastructure will be energy efficient and comfortable. Natural resources will be preserved, and all of this will be accomplished without the costly health and environmental effects of air pollution.

GHG a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact. Greenhouse gases (GHGs) are not presented in lbs/day as are criteria pollutants; they are typically evaluated on an annual basis using the metric system. The SCAQMD is in the process of preparing recommended significance thresholds for GHGs for local lead agency consideration (SCAQMD Draft Local Agency Threshold); however, the SCAQMD Governing Board has not approved the thresholds as of the date of this analysis. The current draft thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a GHG reduction plan. If a project is consistent with a qualifying local greenhouse gas reduction plan, it does not have significant greenhouse gas emissions.
- Tier 3 consists of screening values, which the lead agency can choose but must be consistent. A project's construction emissions are averaged over 30 years and are added to a project's operational emissions. Where SCAQMD is the lead agency on industrial projects, a threshold of 10,000 metric tons of carbon dioxide equivalents ($MTCO_2e$) per year applies. SCAQMD is also encouraging other lead agencies to use the 10,000 $MTCO_2e$ per year for industrial projects. If a project's commercial/residential emissions are under one of the following screening thresholds, then the project is less than significant:
  - All land use types: 3,000 $MTCO_2e$ per year
  - Based on land use type: residential—3,500 $MTCO_2e$ per year; commercial—1,400 $MTCO_2e$ per year; or mixed use—3,000 $MTCO_2e$ per year
- Tier 4 has the following options:
  - Option 1: Reduce emissions from business as usual by a certain percentage
  - Option 2: Early implementation of applicable AB 32 Scoping Plan measures

- Option 3:
  - 2020 efficiency target: 4.8 $MTCO_2e$/service population (SP)/year for projects and 6.6 $MTCO_2e$/SP/year for plans; or
  - 2035 target: 3.0 $MTCO_2e$/SP/year for projects and 4.1 $MTCO_2e$/SP/year for plans

- Tier 5 would allow the purchase of mitigation offsets to achieve target significance threshold.

There is currently no draft threshold for construction-related GHG emissions. However, SCAQMD recommends amortizing construction over 30 years. The project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment. Operational emissions would be from infrequent visits by maintenance personnel's vehicles and, as such, would not be a significant source of operational GHG emissions. The project's construction-related GHG emissions are reported in Table 7.

Construction

The proposed project would emit GHGs from upstream emission sources and direct sources (combustion of fuels from worker vehicles and construction equipment). Table 7 summarizes the output results.

Table 7: Construction Greenhouse Gas Emissions

Phase	Greenhouse Gas Emissions ($MTCO_2e$)
New Force Main	432.77
Beachwood Pump Station Upgrades	67.36
Total Construction Emissions	500.13
Total Amortized over 30 years	16.67
SCAQMD Draft Threshold	3,000
Exceed Threshold?	**No**

Note:
$MTCO_2e$ = metric tons of carbon dioxide equivalents (includes carbon dioxide, methane, and/or nitrous oxide).
Source: CalEEMod output (Attachment B).

As shown by the results in Table 7, the construction of the project would produce approximately 500.13 $MTCO_2e$. Amortized construction emissions are 16.67 $MTCO_2e$ GHG per year. Both the total and amortized values are well under the draft SCAQMD threshold of 3,000 $MTCO_2e$ per year (threshold considered for all land use types as described above). Impacts are considered to be less than significant.

GHG b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less Than Significant Impact. The City of Burbank has a Sustainability Action Plan that details a number of "Accords": a series of goals (called "action items") that can be adopted at the local level to achieve urban sustainability, promote healthy economies, advance social equity and protect the world's ecosystem. The action items can be used as reference points for setting achievable goals and standards that can be tailored to fit the specific structures of individual communities. The Accords include 21 specific actions organized into seven Urban Themes designed to collectively address urban sustainability concerns. The Urban Themes focus on the areas of: energy, waste reduction, urban design, urban nature, transportation, environmental health, and water.

As the project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment, many of the Goals and Policies within the Air Quality and Climate Change Element chapter of the General Plan are not applicable. However, the project will be consistent with applicable actions of the Sustainability Action Plan, such as GHG reduction development through use of current technology, since the existing 150-hp electric pumps will be replaced with new, more efficient and effective, 150-hp electric pumps.

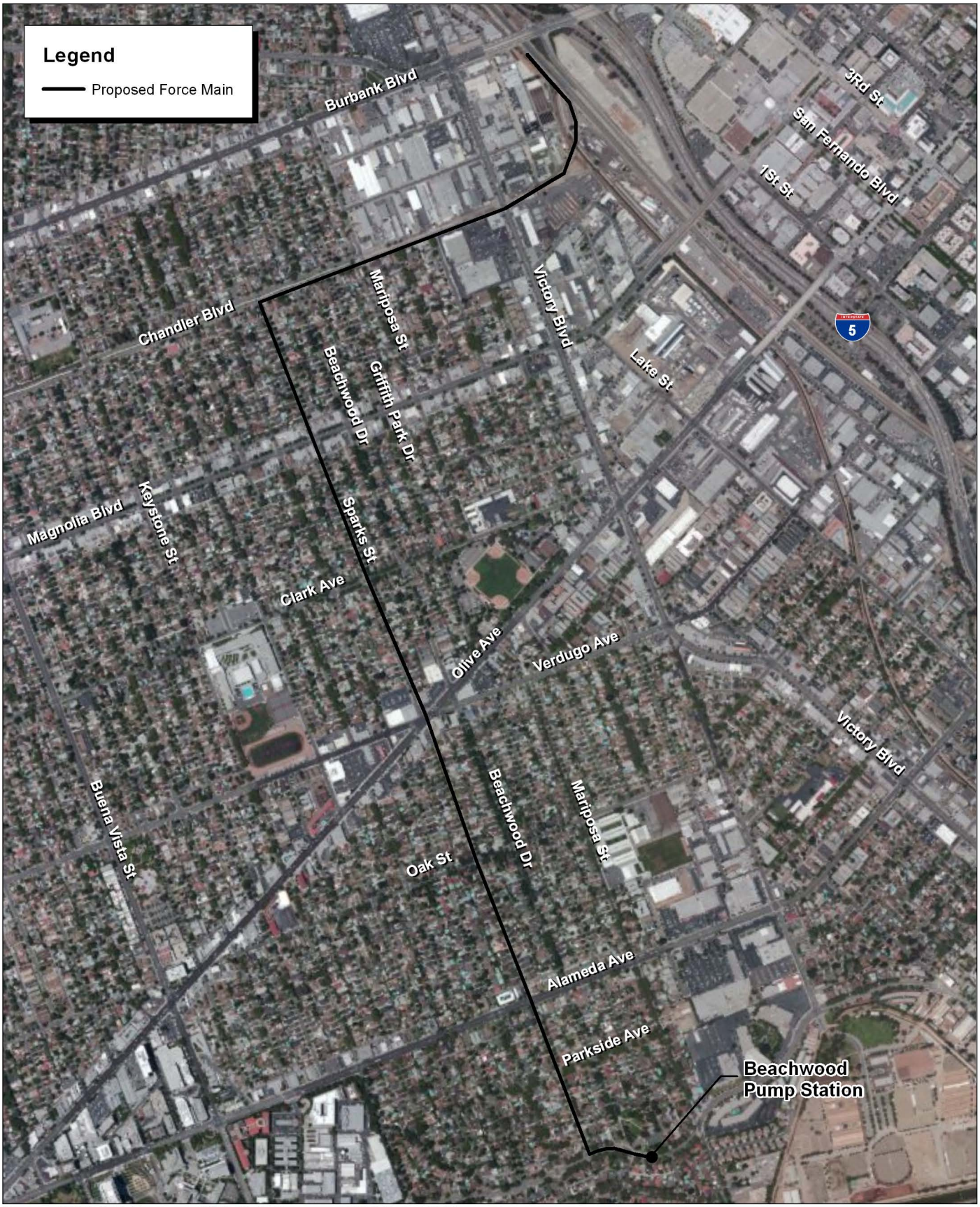
The proposed project's emissions are substantially less than those described in the SCAQMD draft thresholds, and the level of GHG emissions generated by the project would not conflict with the goals of the State's Scoping Plan, adopted pursuant to AB 32. Therefore, impacts associated with an applicable GHG reduction plan, policy, or regulation would be less than significant.

SECTION 5: REFERENCES

Michael Donovan. P S O M A S. April 8, 2014. Personal communication: email.

South Coast Air Quality Management District (SCAQMD). 2008. June 2003, revised July 2008. Final Localized Significance Threshold Methodology. Website: www.aqmd.gov/CEQA/handbook /LST/Method_final.pdf. Accessed July 18, 2013.

Attachment A: Project Alignment Map



Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012.

Michael Brandman Associates

NORTH

1,200 600 0 1,200 Feet

Attachment A
Project Alignment Map

09140031 • 04/2014 | A_project_alignment.mxd

P S O M A S • CITY OF BURBANK PUMP STATION AND FORCE MAIN PROJECT
AIR QUALITY AND GREENHOUSE GAS ENISSIONS ANALYSIS

Attachment B: CalEEMod Output

Beachwood Pump Station and Force Main - New Force main

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	1.17	Acre	1.17	50,965.20	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2014
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 1.17 acres estimated to be disturbed

Construction Phase - Project-specific Phasing

Off-road Equipment - Project-specific mix

Grading - 1.17 total acres disturbed. 0.02 acre daily disturbance. Est. 10,000 cy exported or moved to other pipe sections

Trips and VMT - 10,000 cy hauled at 16 cy truck capacity = 1,250 total haul truck trips

Construction Off-road Equipment Mitigation - Rule 403 Compliance

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	4.00	195.00
tblConstructionPhase	NumDays	10.00	70.00
tblConstructionPhase	NumDays	2.00	10.00

tblGrading	AcresOfGrading	0.00	1.17
tblGrading	MaterialExported	0.00	10,000.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,250.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2014	4.1225	39.8860	26.0993	0.0435	0.6421	2.2786	2.9207	0.1671	2.1193	2.2863	0.0000	4,380.4554	4,380.4554	0.9432	0.0000	4,400.2623
2015	5.7249	54.2581	34.6643	0.0556	0.6833	3.2076	3.8909	0.1794	2.9727	3.1521	0.0000	5,565.4417	5,565.4417	1.2706	0.0000	5,592.1242
Total	**9.8474**	**94.1440**	**60.7636**	**0.0990**	**1.3254**	**5.4862**	**6.8116**	**0.3465**	**5.0919**	**5.4384**	**0.0000**	**9,945.8971**	**9,945.8971**	**2.2138**	**0.0000**	**9,992.3865**

2.2 Overall Operational

Not Applicable

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2014	9/12/2014	5	10	Site Preparation
2	Excavation/Shoring/Pipe Install	Grading	9/13/2014	6/12/2015	5	195	Excavation/Shoring/Pipe Install
3	Paving and Work Site Restoration	Paving	5/22/2015	8/27/2015	5	70	Paving and Work Site Restoration

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Concrete/Industrial Saws	1	8.00	81	0.73
Site Preparation	Crushing/Proc. Equipment	1	8.00	85	0.78
Excavation/Shoring/Pipe Install	Bore/Drill Rigs	1	8.00	82	0.50
Excavation/Shoring/Pipe Install	Tractors/Loaders/Backhoes	1	8.00	75	0.37
Excavation/Shoring/Pipe Install	Cranes	1	8.00	208	0.29
Excavation/Shoring/Pipe Install	Dumpers/Tenders	6	8.00	16	0.38
Excavation/Shoring/Pipe Install	Excavators	2	8.00	157	0.38
Excavation/Shoring/Pipe Install	Generator Sets	1	3.00	84	0.74
Excavation/Shoring/Pipe Install	Rubber Tired Loaders	1	8.00	87	0.36
Paving and Work Site Restoration	Pavers	1	7.00	89	0.42
Paving and Work Site Restoration	Rollers	1	7.00	84	0.38
Excavation/Shoring/Pipe Install	Trenchers	1	8.00	69	0.50
Paving and Work Site Restoration	Graders	1	7.00	162	0.41
Paving and Work Site Restoration	Plate Compactors	1	7.00	8	0.43

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Excavation/Shoring/Pipe Install	14	35.00	0.00	1,250.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving and Work Site Restoration	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	1.8066	11.7751	8.3906	0.0133		0.9921	0.9921		0.9921	0.9921		1,257.1948	1,257.1948	0.1623		1,260.6020
Total	**1.8066**	**11.7751**	**8.3906**	**0.0133**	**0.0000**	**0.9921**	**0.9921**	**0.0000**	**0.9921**	**0.9921**		**1,257.1948**	**1,257.1948**	**0.1623**		**1,260.6020**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0286	0.0382	0.3996	6.9000e-004	0.0559	6.0000e-004	0.0565	0.0148	5.5000e-004	0.0154		61.8550	61.8550	3.9500e-003		61.9379
Total	**0.0286**	**0.0382**	**0.3996**	**6.9000e-004**	**0.0559**	**6.0000e-004**	**0.0565**	**0.0148**	**5.5000e-004**	**0.0154**		**61.8550**	**61.8550**	**3.9500e-003**		**61.9379**

3.3 Excavation/Shoring/Pipe Install - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0122	0.0000	0.0122	1.5700e-003	0.0000	1.5700e-003			0.0000			0.0000
Off-Road	3.7664	37.2255	21.5810	0.0339		2.2310	2.2310		2.0755	2.0755		3,454.9471	3,454.9471	0.9111		3,474.0810
Total	**3.7664**	**37.2255**	**21.5810**	**0.0339**	**0.0122**	**2.2310**	**2.2432**	**1.5700e-003**	**2.0755**	**2.0771**		**3,454.9471**	**3,454.9471**	**0.9111**		**3,474.0810**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1558	2.3934	1.7210	4.7900e-003	0.2387	0.0434	0.2821	0.0618	0.0399	0.1017		492.5235	492.5235	4.4100e-003		492.6162
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2003	0.2671	2.7972	4.8000e-003	0.3912	4.1900e-003	0.3954	0.1038	3.8300e-003	0.1076		432.9848	432.9848	0.0276		433.5652
Total	**0.3560**	**2.6605**	**4.5183**	**9.5900e-003**	**0.6299**	**0.0476**	**0.6775**	**0.1655**	**0.0438**	**0.2093**		**925.5083**	**925.5083**	**0.0321**		**926.1814**

3.3 Excavation/Shoring/Pipe Install - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0122	0.0000	0.0122	1.5700e-003	0.0000	1.5700e-003			0.0000			0.0000
Off-Road	3.6845	36.1379	21.5297	0.0339		2.1558	2.1558		2.0044	2.0044		3,426.4111	3,426.4111	0.9078		3,445.4739
Total	**3.6845**	**36.1379**	**21.5297**	**0.0339**	**0.0122**	**2.1558**	**2.1680**	**1.5700e-003**	**2.0044**	**2.0060**		**3,426.4111**	**3,426.4111**	**0.9078**		**3,445.4739**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1364	2.1056	1.5892	4.7800e-003	0.1681	0.0337	0.2018	0.0444	0.0310	0.0754		486.7372	486.7372	4.0100e-003		486.8215
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1799	0.2406	2.5216	4.8000e-003	0.3912	3.9100e-003	0.3951	0.1038	3.5800e-003	0.1073		420.0376	420.0376	0.0254		420.5710
Total	**0.3162**	**2.3462**	**4.1108**	**9.5800e-003**	**0.5593**	**0.0376**	**0.5969**	**0.1482**	**0.0345**	**0.1827**		**906.7748**	**906.7748**	**0.0294**		**907.3924**

3.4 Paving and Work Site Restoration - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6290	15.7053	8.3033	0.0107		1.0131	1.0131		0.9328	0.9328		1,112.2450	1,112.2450	0.3262		1,119.0947
Paving	0.0438					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6727**	**15.7053**	**8.3033**	**0.0107**		**1.0131**	**1.0131**		**0.9328**	**0.9328**		**1,112.2450**	**1,112.2450**	**0.3262**		**1,119.0947**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0514	0.0688	0.7205	1.3700e-003	0.1118	1.1200e-003	0.1129	0.0296	1.0200e-003	0.0307		120.0108	120.0108	7.2600e-003		120.1631
Total	**0.0514**	**0.0688**	**0.7205**	**1.3700e-003**	**0.1118**	**1.1200e-003**	**0.1129**	**0.0296**	**1.0200e-003**	**0.0307**		**120.0108**	**120.0108**	**7.2600e-003**		**120.1631**

Beachwood Pump Station and Force Main - Beachwood Pump Station Upgrades

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.00	Acre	0.01	80.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2014
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 80 square feet estimated to be disturbed

Construction Phase - Project-specific Phasing

Off-road Equipment - Project-specific mix

Grading - 80 square feet disturbed.

Construction Off-road Equipment Mitigation - Rule 403 Compliance

Off-road Equipment - Project-Specific Fleet

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	100.00	15.00
tblConstructionPhase	NumDays	2.00	30.00
tblConstructionPhase	NumDays	1.00	5.00

tblConstructionPhase	NumDays	1.00	10.00
tblGrading	AcresOfGrading	0.00	0.01
tblLandUse	LandUseSquareFeet	0.00	80.00
tblLandUse	LotAcreage	0.00	0.01

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	2.5899	22.3120	14.2080	0.0219	0.5539	1.5132	1.5132	0.0739	1.4477	1.4477	0.0000	2,173.3158	2,173.3158	0.4517	0.0000	2,182.8015
Total	**2.5899**	**22.3120**	**14.2080**	**0.0219**	**0.5539**	**1.5132**	**1.5132**	**0.0739**	**1.4477**	**1.4477**	**0.0000**	**2,173.3158**	**2,173.3158**	**0.4517**	**0.0000**	**2,182.8015**

2.2 Overall Operational

Not Applicable

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Pump and Equipment Removal	Site Preparation	2/9/2015	2/13/2015	5	5	Pump and Equipment Removal
2	Wet Well Rehabilitation	Building Construction	2/14/2015	3/6/2015	5	15	Wet Well Rehabilitation
3	Excavation and Shoring	Grading	3/7/2015	4/17/2015	5	30	Excavation and Shoring
4	Pipe Installation and Backfilling	Trenching	4/18/2015	5/29/2015	5	30	Pipe Installation and Backfilling
5	Work Site Restoration	Site Preparation	5/30/2015	6/12/2015	5	10	Work Site Restoration

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Wet Well Rehabilitation	Cranes	1	3.00	208	0.29
Pump and Equipment Removal	Cranes	1	8.00	208	0.29
Pump and Equipment Removal	Dumpers/Tenders	1	8.00	16	0.38
Pump and Equipment Removal	Welders	1	3.00	46	0.45
Wet Well Rehabilitation	Forklifts	2	6.00	149	0.20
Work Site Restoration	Graders	1	7.00	162	0.41
Wet Well Rehabilitation	Tractors/Loaders/Backhoes	2	8.00	75	0.37
Excavation and Shoring	Tractors/Loaders/Backhoes	1	8.00	75	0.37
Wet Well Rehabilitation	Air Compressors	1	8.00	78	0.48
Wet Well Rehabilitation	Dumpers/Tenders	1	8.00	16	0.38
Wet Well Rehabilitation	Generator Sets	1	8.00	84	0.74
Excavation and Shoring	Excavators	1	8.00	157	0.38
Excavation and Shoring	Generator Sets	1	8.00	84	0.74

Excavation and Shoring	Trenchers	1	8.00	69	0.50
Pipe Installation and Backfilling	Cranes	1	8.00	208	0.29
Pipe Installation and Backfilling	Excavators	1	8.00	87	0.38
Pipe Installation and Backfilling	Rubber Tired Loaders	1	8.00	69	0.36
Pipe Installation and Backfilling	Tractors/Loaders/Backhoes	1	8.00	75	0.37
Pipe Installation and Backfilling	Welders	1	3.00	46	0.45
Work Site Restoration	Plate Compactors	1	7.00	8	0.43
Work Site Restoration	Rollers	1	7.00	84	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Wet Well Rehabilitation	8	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pump and Equipment Removal	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Excavation and Shoring	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Work Site Restoration	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pipe Installation and Backfilling	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Pump and Equipment Removal - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.9926	9.2803	3.8363	6.9000e-003		0.4491	0.4491		0.4195	0.4195		683.9194	683.9194	0.1905		687.9197
Total	**0.9926**	**9.2803**	**3.8363**	**6.9000e-003**	**0.0000**	**0.4491**	**0.4491**	**0.0000**	**0.4195**	**0.4195**		**683.9194**	**683.9194**	**0.1905**		**687.9197**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0395	0.0496	0.6117	1.1600e-003	0.0894	8.9000e-004	0.0903	0.0237	8.2000e-004	0.0245		101.7137	101.7137	5.8000e-003		101.8356
Total	**0.0395**	**0.0496**	**0.6117**	**1.1600e-003**	**0.0894**	**8.9000e-004**	**0.0903**	**0.0237**	**8.2000e-004**	**0.0245**		**101.7137**	**101.7137**	**5.8000e-003**		**101.8356**

3.3 Wet Well Rehabilitation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.5899	22.3120	14.2080	0.0219		1.5132	1.5132		1.4477	1.4477		2,173.3158	2,173.3158	0.4517		2,182.8015
Total	**2.5899**	**22.3120**	**14.2080**	**0.0219**		**1.5132**	**1.5132**		**1.4477**	**1.4477**		**2,173.3158**	**2,173.3158**	**0.4517**		**2,182.8015**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Excavation and Shoring - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.5000e-004	0.0000	3.5000e-004	4.0000e-005	0.0000	4.0000e-005			0.0000			0.0000
Off-Road	1.8977	17.0101	11.5160	0.0171		1.1654	1.1654		1.1026	1.1026		1,732.5208	1,732.5208	0.3948		1,740.8119
Total	**1.8977**	**17.0101**	**11.5160**	**0.0171**	**3.5000e-004**	**1.1654**	**1.1658**	**4.0000e-005**	**1.1026**	**1.1027**		**1,732.5208**	**1,732.5208**	**0.3948**		**1,740.8119**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0493	0.0620	0.7646	1.4500e-003	0.1118	1.1200e-003	0.1129	0.0296	1.0200e-003	0.0307		127.1422	127.1422	7.2600e-003		127.2945
Total	**0.0493**	**0.0620**	**0.7646**	**1.4500e-003**	**0.1118**	**1.1200e-003**	**0.1129**	**0.0296**	**1.0200e-003**	**0.0307**		**127.1422**	**127.1422**	**7.2600e-003**		**127.2945**

3.5 Pipe Installation and Backfilling - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8649	17.4264	9.4714	0.0135		1.1192	1.1192		1.0344	1.0344		1,390.5651	1,390.5651	0.4130		1,399.2381
Total	**1.8649**	**17.4264**	**9.4714**	**0.0135**		**1.1192**	**1.1192**		**1.0344**	**1.0344**		**1,390.5651**	**1,390.5651**	**0.4130**		**1,399.2381**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0641	0.0806	0.9940	1.8900e-003	0.1453	1.4500e-003	0.1468	0.0385	1.3300e-003	0.0399		165.2848	165.2848	9.4300e-003		165.4829
Total	**0.0641**	**0.0806**	**0.9940**	**1.8900e-003**	**0.1453**	**1.4500e-003**	**0.1468**	**0.0385**	**1.3300e-003**	**0.0399**		**165.2848**	**165.2848**	**9.4300e-003**		**165.4829**

3.6 Work Site Restoration - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4645	0.0000	0.4645	0.0502	0.0000	0.0502			0.0000			0.0000
Off-Road	1.2325	12.1238	6.0943	7.8900e-003		0.7337	0.7337		0.6757	0.6757		815.2100	815.2100	0.2375		820.1975
Total	**1.2325**	**12.1238**	**6.0943**	**7.8900e-003**	**0.4645**	**0.7337**	**1.1982**	**0.0502**	**0.6757**	**0.7258**		**815.2100**	**815.2100**	**0.2375**		**820.1975**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0395	0.0496	0.6117	1.1600e-003	0.0894	8.9000e-004	0.0903	0.0237	8.2000e-004	0.0245		101.7137	101.7137	5.8000e-003		101.8356
Total	**0.0395**	**0.0496**	**0.6117**	**1.1600e-003**	**0.0894**	**8.9000e-004**	**0.0903**	**0.0237**	**8.2000e-004**	**0.0245**		**101.7137**	**101.7137**	**5.8000e-003**		**101.8356**

Beachwood Pump Station and Force Main - New Force main

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	1.17	Acre	1.17	50,965.20	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2014
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 1.17 acres estimated to be disturbed

Construction Phase - Project-specific Phasing

Off-road Equipment - Project-specific mix

Grading - 1.17 total acres disturbed. 0.02 acre daily disturbance. Est. 10,000 cy exported or moved to other pipe sections

Trips and VMT - 10,000 cy hauled at 16 cy truck capacity = 1,250 total haul truck trips

Construction Off-road Equipment Mitigation - Rule 403 Compliance

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	4.00	195.00
tblConstructionPhase	NumDays	10.00	70.00
tblConstructionPhase	NumDays	2.00	10.00

tblGrading	AcresOfGrading	0.00	1.17
tblGrading	MaterialExported	0.00	10,000.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,250.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2014	0.1694	1.6166	1.0623	1.7700e-003	0.0255	0.0938	0.1194	6.5600e-003	0.0876	0.0942	0.0000	161.2384	161.2384	0.0341	0.0000	161.9549
2015	0.2935	2.8060	1.8168	2.9700e-003	0.0371	0.1638	0.2009	9.6800e-003	0.1520	0.1616	0.0000	269.5438	269.5438	0.0603	0.0000	270.8106
Total	**0.4629**	**4.4226**	**2.8791**	**4.7400e-003**	**0.0627**	**0.2576**	**0.3203**	**0.0162**	**0.2396**	**0.2558**	**0.0000**	**430.7822**	**430.7822**	**0.0944**	**0.0000**	**432.7655**

2.2 Overall Operational

Not Applicable

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2014	9/12/2014	5	10	Site Preparation
2	Excavation/Shoring/Pipe Install	Grading	9/13/2014	6/12/2015	5	195	Excavation/Shoring/Pipe Install
3	Paving and Work Site Restoration	Paving	5/22/2015	8/27/2015	5	70	Paving and Work Site Restoration

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Concrete/Industrial Saws	1	8.00	81	0.73
Site Preparation	Crushing/Proc. Equipment	1	8.00	85	0.78
Excavation/Shoring/Pipe Install	Bore/Drill Rigs	1	8.00	82	0.50
Excavation/Shoring/Pipe Install	Tractors/Loaders/Backhoes	1	8.00	75	0.37
Excavation/Shoring/Pipe Install	Cranes	1	8.00	208	0.29
Excavation/Shoring/Pipe Install	Dumpers/Tenders	6	8.00	16	0.38
Excavation/Shoring/Pipe Install	Excavators	2	8.00	157	0.38
Excavation/Shoring/Pipe Install	Generator Sets	1	3.00	84	0.74
Excavation/Shoring/Pipe Install	Rubber Tired Loaders	1	8.00	87	0.36
Paving and Work Site Restoration	Pavers	1	7.00	89	0.42
Paving and Work Site Restoration	Rollers	1	7.00	84	0.38
Excavation/Shoring/Pipe Install	Trenchers	1	8.00	69	0.50
Paving and Work Site Restoration	Graders	1	7.00	162	0.41
Paving and Work Site Restoration	Plate Compactors	1	7.00	8	0.43

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Excavation/Shoring/Pipe Install	14	35.00	0.00	1,250.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving and Work Site Restoration	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.0300e-003	0.0589	0.0420	7.0000e-005		4.9600e-003	4.9600e-003		4.9600e-003	4.9600e-003	0.0000	5.7025	5.7025	7.4000e-004	0.0000	5.7180
Total	**9.0300e-003**	**0.0589**	**0.0420**	**7.0000e-005**	**0.0000**	**4.9600e-003**	**4.9600e-003**	**0.0000**	**4.9600e-003**	**4.9600e-003**	**0.0000**	**5.7025**	**5.7025**	**7.4000e-004**	**0.0000**	**5.7180**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	2.0000e-004	2.0400e-003	0.0000	2.7000e-004	0.0000	2.8000e-004	7.0000e-005	0.0000	8.0000e-005	0.0000	0.2851	0.2851	2.0000e-005	0.0000	0.2855
Total	**1.4000e-004**	**2.0000e-004**	**2.0400e-003**	**0.0000**	**2.7000e-004**	**0.0000**	**2.8000e-004**	**7.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2851**	**0.2851**	**2.0000e-005**	**0.0000**	**0.2855**

3.3 Excavation/Shoring/Pipe Install - 2014

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.1900e-003	0.0000	1.1900e-003	1.5000e-004	0.0000	1.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1469	1.4518	0.8417	1.3200e-003		0.0870	0.0870		0.0809	0.0809	0.0000	122.2367	122.2367	0.0322	0.0000	122.9137
Total	**0.1469**	**1.4518**	**0.8417**	**1.3200e-003**	**1.1900e-003**	**0.0870**	**0.0882**	**1.5000e-004**	**0.0809**	**0.0811**	**0.0000**	**122.2367**	**122.2367**	**0.0322**	**0.0000**	**122.9137**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.9500e-003	0.0950	0.0655	1.9000e-004	9.1200e-003	1.6900e-003	0.0108	2.3600e-003	1.5500e-003	3.9200e-003	0.0000	17.4492	17.4492	1.6000e-004	0.0000	17.4525
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.3800e-003	0.0107	0.1112	1.9000e-004	0.0150	1.6000e-004	0.0151	3.9700e-003	1.5000e-004	4.1200e-003	0.0000	15.5648	15.5648	9.8000e-004	0.0000	15.5853
Total	**0.0133**	**0.1057**	**0.1767**	**3.8000e-004**	**0.0241**	**1.8500e-003**	**0.0259**	**6.3300e-003**	**1.7000e-003**	**8.0400e-003**	**0.0000**	**33.0140**	**33.0140**	**1.1400e-003**	**0.0000**	**33.0378**

3.3 Excavation/Shoring/Pipe Install - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.1900e-003	0.0000	1.1900e-003	1.5000e-004	0.0000	1.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2155	2.1141	1.2595	1.9800e-003		0.1261	0.1261		0.1173	0.1173	0.0000	181.8407	181.8407	0.0482	0.0000	182.8524
Total	**0.2155**	**2.1141**	**1.2595**	**1.9800e-003**	**1.1900e-003**	**0.1261**	**0.1273**	**1.5000e-004**	**0.1173**	**0.1174**	**0.0000**	**181.8407**	**181.8407**	**0.0482**	**0.0000**	**182.8524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.8200e-003	0.1254	0.0904	2.8000e-004	9.6500e-003	1.9600e-003	0.0116	2.5500e-003	1.8100e-003	4.3600e-003	0.0000	25.8665	25.8665	2.1000e-004	0.0000	25.8709
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.9300e-003	0.0145	0.1505	2.9000e-004	0.0224	2.3000e-004	0.0227	5.9600e-003	2.1000e-004	6.1700e-003	0.0000	22.6496	22.6496	1.3500e-003	0.0000	22.6779
Total	**0.0178**	**0.1398**	**0.2410**	**5.7000e-004**	**0.0321**	**2.1900e-003**	**0.0343**	**8.5100e-003**	**2.0200e-003**	**0.0105**	**0.0000**	**48.5160**	**48.5160**	**1.5600e-003**	**0.0000**	**48.5488**

3.4 Paving and Work Site Restoration - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0570	0.5497	0.2906	3.8000e-004		0.0355	0.0355		0.0327	0.0327	0.0000	35.3154	35.3154	0.0104	0.0000	35.5329
Paving	1.5300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0585**	**0.5497**	**0.2906**	**3.8000e-004**		**0.0355**	**0.0355**		**0.0327**	**0.0327**	**0.0000**	**35.3154**	**35.3154**	**0.0104**	**0.0000**	**35.5329**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-003	2.4700e-003	0.0257	5.0000e-005	3.8400e-003	4.0000e-005	3.8700e-003	1.0200e-003	4.0000e-005	1.0500e-003	0.0000	3.8717	3.8717	2.3000e-004	0.0000	3.8766
Total	**1.7000e-003**	**2.4700e-003**	**0.0257**	**5.0000e-005**	**3.8400e-003**	**4.0000e-005**	**3.8700e-003**	**1.0200e-003**	**4.0000e-005**	**1.0500e-003**	**0.0000**	**3.8717**	**3.8717**	**2.3000e-004**	**0.0000**	**3.8766**

Beachwood Pump Station and Force Main - Beachwood Pump Station Upgrades

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.00	Acre	0.01	80.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2014
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 80 square feet estimated to be disturbed

Construction Phase - Project-specific Phasing

Off-road Equipment - Project-specific mix

Grading - 80 square feet disturbed.

Construction Off-road Equipment Mitigation - Rule 403 Compliance

Off-road Equipment - Project-Specific Fleet

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	100.00	15.00
tblConstructionPhase	NumDays	2.00	30.00
tblConstructionPhase	NumDays	1.00	5.00

tblConstructionPhase	NumDays	1.00	10.00
tblGrading	AcresOfGrading	0.00	0.01
tblLandUse	LandUseSquareFeet	0.00	80.00
tblLandUse	LotAcreage	0.00	0.01

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	0.0865	0.7708	0.4913	7.4000e-004	6.7700e-003	0.0505	0.0572	1.4300e-003	0.0474	0.0488	0.0000	67.0287	67.0287	0.0159	0.0000	67.3615
Total	**0.0865**	**0.7708**	**0.4913**	**7.4000e-004**	**6.7700e-003**	**0.0505**	**0.0572**	**1.4300e-003**	**0.0474**	**0.0488**	**0.0000**	**67.0287**	**67.0287**	**0.0159**	**0.0000**	**67.3615**

2.2 Overall Operational

Not Applicable

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Pump and Equipment Removal	Site Preparation	2/9/2015	2/13/2015	5	5	Pump and Equipment Removal
2	Wet Well Rehabilitation	Building Construction	2/14/2015	3/6/2015	5	15	Wet Well Rehabilitation
3	Excavation and Shoring	Grading	3/7/2015	4/17/2015	5	30	Excavation and Shoring
4	Pipe Installation and Backfilling	Trenching	4/18/2015	5/29/2015	5	30	Pipe Installation and Backfilling
5	Work Site Restoration	Site Preparation	5/30/2015	6/12/2015	5	10	Work Site Restoration

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Excavation and Shoring	Concrete/Industrial Saws	0	0.00	81	0.73
Wet Well Rehabilitation	Cranes	1	3.00	208	0.29
Pump and Equipment Removal	Cranes	1	8.00	208	0.29
Pump and Equipment Removal	Graders	0	0.00	174	0.41
Pump and Equipment Removal	Rubber Tired Dozers	0	0.00	255	0.40
Pump and Equipment Removal	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Pump and Equipment Removal	Dumpers/Tenders	1	8.00	16	0.38
Pump and Equipment Removal	Welders	1	3.00	46	0.45
Wet Well Rehabilitation	Forklifts	2	6.00	149	0.20
Work Site Restoration	Graders	1	7.00	162	0.41
Excavation and Shoring	Rubber Tired Dozers	0	0.00	255	0.40
Wet Well Rehabilitation	Tractors/Loaders/Backhoes	2	8.00	75	0.37
Excavation and Shoring	Tractors/Loaders/Backhoes	1	8.00	75	0.37

Work Site Restoration	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Wet Well Rehabilitation	Air Compressors	1	8.00	78	0.48
Wet Well Rehabilitation	Dumpers/Tenders	1	8.00	16	0.38
Wet Well Rehabilitation	Generator Sets	1	8.00	84	0.74
Excavation and Shoring	Excavators	1	8.00	157	0.38
Excavation and Shoring	Generator Sets	1	8.00	84	0.74
Excavation and Shoring	Trenchers	1	8.00	69	0.50
Pipe Installation and Backfilling	Cranes	1	8.00	208	0.29
Pipe Installation and Backfilling	Excavators	1	8.00	87	0.38
Pipe Installation and Backfilling	Rubber Tired Loaders	1	8.00	69	0.36
Pipe Installation and Backfilling	Tractors/Loaders/Backhoes	1	8.00	75	0.37
Pipe Installation and Backfilling	Welders	1	3.00	46	0.45
Work Site Restoration	Plate Compactors	1	7.00	8	0.43
Work Site Restoration	Rollers	1	7.00	84	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Wet Well Rehabilitation	8	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pump and Equipment Removal	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Excavation and Shoring	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Work Site Restoration	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pipe Installation and Backfilling	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Pump and Equipment Removal - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.4800e-003	0.0232	9.5900e-003	2.0000e-005		1.1200e-003	1.1200e-003		1.0500e-003	1.0500e-003	0.0000	1.5511	1.5511	4.3000e-004	0.0000	1.5602
Total	**2.4800e-003**	**0.0232**	**9.5900e-003**	**2.0000e-005**	**0.0000**	**1.1200e-003**	**1.1200e-003**	**0.0000**	**1.0500e-003**	**1.0500e-003**	**0.0000**	**1.5511**	**1.5511**	**4.3000e-004**	**0.0000**	**1.5602**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	1.4000e-004	1.4700e-003	0.0000	2.2000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.2212	0.2212	1.0000e-005	0.0000	0.2215
Total	**1.0000e-004**	**1.4000e-004**	**1.4700e-003**	**0.0000**	**2.2000e-004**	**0.0000**	**2.2000e-004**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**0.0000**	**0.2212**	**0.2212**	**1.0000e-005**	**0.0000**	**0.2215**

3.3 Wet Well Rehabilitation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0194	0.1673	0.1066	1.6000e-004		0.0114	0.0114		0.0109	0.0109	0.0000	14.7870	14.7870	3.0700e-003	0.0000	14.8515
Total	**0.0194**	**0.1673**	**0.1066**	**1.6000e-004**		**0.0114**	**0.0114**		**0.0109**	**0.0109**	**0.0000**	**14.7870**	**14.7870**	**3.0700e-003**	**0.0000**	**14.8515**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Excavation and Shoring - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0285	0.2552	0.1727	2.6000e-004		0.0175	0.0175		0.0165	0.0165	0.0000	23.5758	23.5758	5.3700e-003	0.0000	23.6886
Total	**0.0285**	**0.2552**	**0.1727**	**2.6000e-004**	**1.0000e-005**	**0.0175**	**0.0175**	**0.0000**	**0.0165**	**0.0165**	**0.0000**	**23.5758**	**23.5758**	**5.3700e-003**	**0.0000**	**23.6886**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.3000e-004	1.0600e-003	0.0110	2.0000e-005	1.6400e-003	2.0000e-005	1.6600e-003	4.4000e-004	2.0000e-005	4.5000e-004	0.0000	1.6593	1.6593	1.0000e-004	0.0000	1.6614
Total	**7.3000e-004**	**1.0600e-003**	**0.0110**	**2.0000e-005**	**1.6400e-003**	**2.0000e-005**	**1.6600e-003**	**4.4000e-004**	**2.0000e-005**	**4.5000e-004**	**0.0000**	**1.6593**	**1.6593**	**1.0000e-004**	**0.0000**	**1.6614**

3.5 Pipe Installation and Backfilling - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0280	0.2614	0.1421	2.0000e-004		0.0168	0.0168		0.0155	0.0155	0.0000	18.9225	18.9225	5.6200e-003	0.0000	19.0405
Total	**0.0280**	**0.2614**	**0.1421**	**2.0000e-004**		**0.0168**	**0.0168**		**0.0155**	**0.0155**	**0.0000**	**18.9225**	**18.9225**	**5.6200e-003**	**0.0000**	**19.0405**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.5000e-004	1.3800e-003	0.0143	3.0000e-005	2.1400e-003	2.0000e-005	2.1600e-003	5.7000e-004	2.0000e-005	5.9000e-004	0.0000	2.1571	2.1571	1.3000e-004	0.0000	2.1598
Total	**9.5000e-004**	**1.3800e-003**	**0.0143**	**3.0000e-005**	**2.1400e-003**	**2.0000e-005**	**2.1600e-003**	**5.7000e-004**	**2.0000e-005**	**5.9000e-004**	**0.0000**	**2.1571**	**2.1571**	**1.3000e-004**	**0.0000**	**2.1598**

3.6 Work Site Restoration - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3200e-003	0.0000	2.3200e-003	2.5000e-004	0.0000	2.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.1800e-003	0.0608	0.0306	4.0000e-005		3.6800e-003	3.6800e-003		3.3900e-003	3.3900e-003	0.0000	3.7122	3.7122	1.0800e-003	0.0000	3.7349
Total	**6.1800e-003**	**0.0608**	**0.0306**	**4.0000e-005**	**2.3200e-003**	**3.6800e-003**	**6.0000e-003**	**2.5000e-004**	**3.3900e-003**	**3.6400e-003**	**0.0000**	**3.7122**	**3.7122**	**1.0800e-003**	**0.0000**	**3.7349**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	2.8000e-004	2.9400e-003	1.0000e-005	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.4425	0.4425	3.0000e-005	0.0000	0.4430
Total	**1.9000e-004**	**2.8000e-004**	**2.9400e-003**	**1.0000e-005**	**4.4000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.4425**	**0.4425**	**3.0000e-005**	**0.0000**	**0.4430**

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Appendix B
Biological Resources Technical Report

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BIOLOGICAL RESOURCES TECHNICAL REPORT
BEACHWOOD PUMP STATION UPGRADE AND FORCE MAIN REPLACEMENT PROJECT

April 30, 2014

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Appendices

Appendix A Listed, Candidate, and Sensitive Species Having the Potential to Occur within the Proposed Project Area

List of Abbreviations

CAGN	Coastal California gnatcatcher
Caltrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	State Endangered Species Act
cfs	cubic feet per second
City	City of Burbank
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CWA	Clean Water Act
EPA	Environmental Protection Agency
ESA	Federal Endangered Species Act
FERC	Federal Energy Regulatory Commission
MBTA	Migratory Bird Treaty Act of 1918
MSL	mean sea level
SAA	Streambed Alteration Agreement
USACOE	United States Army Corps of Engineers
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 Introduction

This biological resources letter report transmits to the City of Burbank (City) the results of a biological resources study in support of the Beachwood Pump Station Upgrade Project (proposed project). This report is based on the results of a literature review, review of the proposed project's description, and a site visit performed by Psomas. The purpose of this report is to analyze the potential impacts to biological resources resulting from implementation of the proposed project.

1.1 Summary of Findings

The biological resources study determined that no endangered, threatened, or otherwise sensitive species of plants or wildlife would be impacted from construction and operation of the proposed project. No waters of the United States, waters of the state, or riparian or other sensitive plant communities are present within or near the proposed project's alignment; hence, no impacts to those resources would occur. The proposed project would not conflict with any City ordinances, or regional plans protecting biological resources. The proposed project would potentially require the trimming of trees along the proposed alignment. Trimming of trees during the normal recognized nesting season would have the potential to impact nesting migratory birds and raptors. This potential impact can be reduced below the level of significance by trimming trees outside the nesting season or by performing pre-construction nesting migratory bird and raptor surveys prior to the initiation of construction activities, and providing an exclusion zone around and active nests, and/or providing a biological monitor if any protected nesting birds or raptors are located within 50 feet of the project alignment.

The proposed project would require trenching that may disturb the root systems of mature trees growing along the route. This disturbance could result in the death of mature trees. Should any trees need to be removed the City's project manager will notify the Director of the City's Park, Recreation, and Community Services Department to ensure compliance with the City's Municipal Code so that any impacted trees will be replaced in-kind with a nursery stock minimum of 5-10 gallon size container tree, in compliance with the City's Mature Tree Protection Ordinance.

2.0 Project Background

The City owns and operates its own sewer collection and water reclamation plant that serves a current population of approximately 105,000 people. The collection system includes approximately 230 miles of sewer pipelines ranging in diameter from 6-inch to 30-inch, the Beachwood Pump Station, the Mariposa Pump Station, and the Burbank Water Reclamation Plant (BWRP). Sewage generated in the northern half of the City reaches the BWRP under gravity conditions, while sewage generated in the southerly half flows into the Beachwood Pump Station, from which it is lifted to the BWRP using a force main sewer line located in Beachwood Drive and Chandler Boulevard. Sewage along the extreme southeastern edge of the City discharges into the Mariposa Pump Station, where it is lifted to the Beachwood Pump Station before lifted a final time to the BWRP.

The vast majority of sewage generated within the City boundaries ends up in the BWRP, except for a small 365 acre area at the southwesterly corner of the City as well as excess capacity that might occur at the Beachwood Pump Station where the sewage is discharged to the Los Angeles 48-inch diameter North Outfall Sewer (NOS) that runs from west to east through the southern portion of the City.

The BWRP currently treats approximately 8.5 million gallons per day (MGD) and has the design capacity to treat up to 12.5 MGD. Therefore, the City desires to reduce contribution to the NOS by upgrading the Beachwood Pump Station in order to achieve its full design capability.

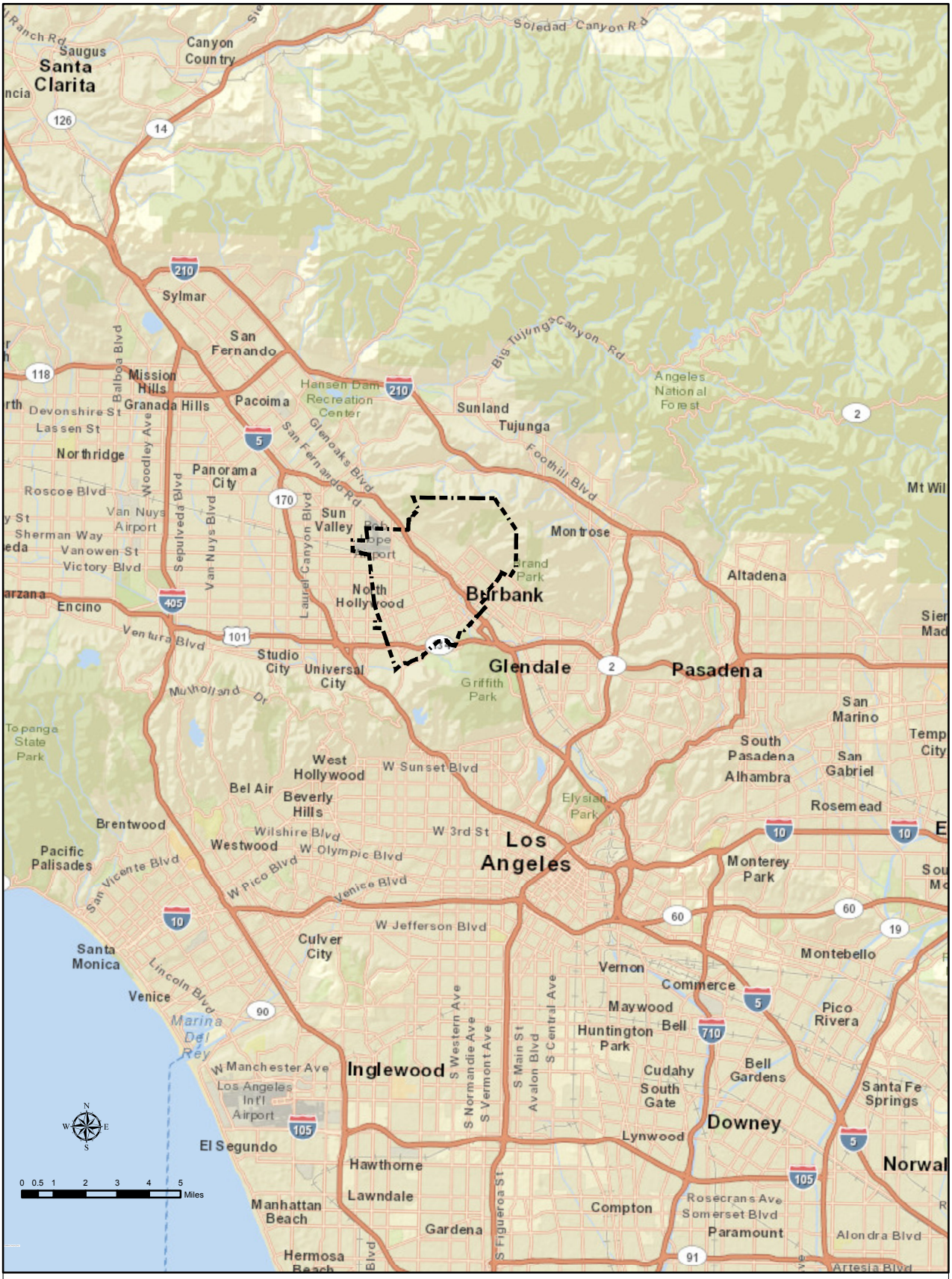
2.1 Project Location

The City is located in the eastern San Fernando Valley (see Figure 1, *Regional and Vicinity Map*), in Los Angeles County, California, approximately 12 miles northeast of downtown Los Angeles. The City spans 17.13 square miles in area. Burbank is a full-service city, with an elected Council/City Manager form of government and has more than 1,400 full time employees.

The Beachwood Pump Station is located in Mountain View Park, near the corner of Beachwood Drive and Riverside Drive (see Figure 2, *Beachwood Pump Station*). The Beachwood Pump Station receives wastewater from the southern portion of the City. Raw sewage entering the Beachwood Pump Station wet well is pumped via Beachwood Force Main which heads north up Beachwood Drive to West Chandler Boulevard then east into the Burbank Water Reclamation Plant (BWRP).

The project is located on the U.S. Geological Survey 7.5 minute series Burbank topographic quadrangle (Township 1 North; Range 14 West [San Bernardino Base & Meridian]) within sections 11, 14 and 2 (see Figure 3, *Project Site Overview Map*). The proposed project would take place at the following locations:

- Along a railroad spur east of the intersection of North Victory Boulevard and West Chandler Boulevard
- Along West Chandler Boulevard between North Victory Boulevard and North Beachwood Drive



Legend

Burbank City Limits

Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project
City of Burbank

Regional and Vicinity Map

2BUR080200

PSOMAS

Figure 1

Legend

- Burbank City Limits
- Existing Force Main
- Beachwood Pump Station
- Proposed New Force Main

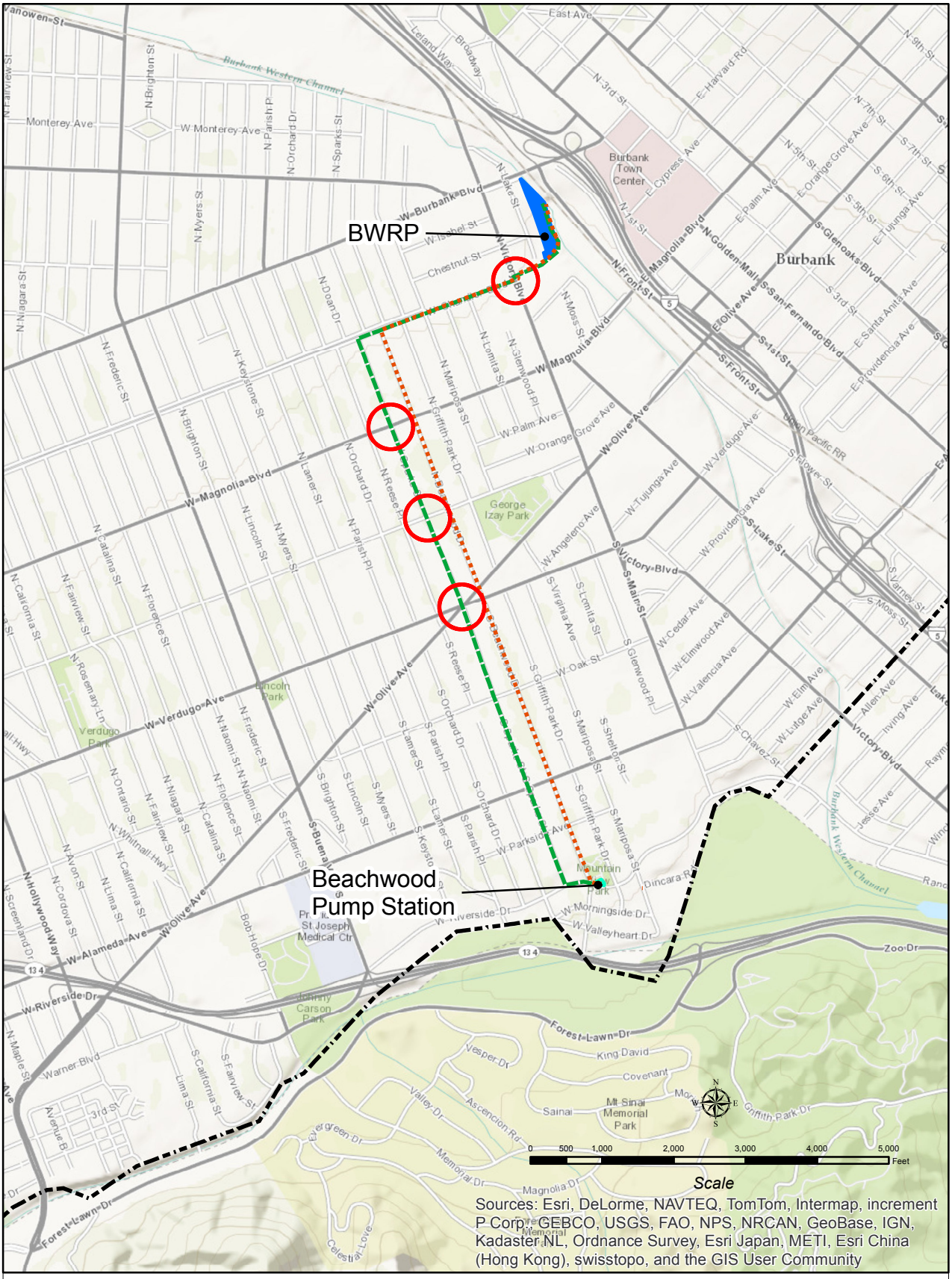
Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project
City of Burbank

Beachwood Pump Station

PSOMAS

Figure 2

2BUR080200



Legend

- Burbank City Limits
- Existing Force Main
- Burbank Water Reclamation Plant
- Beachwood Pump Station
- Proposed New Force Main
- Pipe Jacking Locations

Beachwood-Sparks Force Main Replacement and Pump Station Upgrade Project
City of Burbank

Project Site Overview Map

PSOMAS

Figure 3

2BUR080200

-
- Along North/South Sparks Street between West Chandler Boulevard and West Riverside Drive
- Along Riverside Drive between Mountain view Park and South Sparks Street
- On the southern edge of Mountain View Park

The elevation of the proposed project study area varies from approximately 580 feet above mean sea level (MSL) at the BWRP to 500 feet above MSL at the Beachwood Pump Station at Mountain View Park.

2.2 Project Description

The proposed project consists of an upgrade of an existing Beachwood Pump Station and replacement of the Force Main between the Beachwood Pump Station and the BWRP. The major features of the project are described below:

2.2.1 Beachwood Pump Station Upgrade

The Beachwood Pump Station Upgrade will consist of:

- Replacing three existing 150-hp closed-impeller pumps with new 150-hp open-impeller pumps
- Custom fabricated fittings to retrofit new pumps into piping designed for old pump dimensions
- Replacing suction and discharge isolation and check valves
- Re-coating wet well with polymer liner
- Improvements or modifications to odor control facilities
- Integrating new pumps with VFD's and controls.

The proposed project includes a combination of cut-and-cover pipeline construction and jacking and boring across major arterial streets on North/South Sparks Street (see Figure 2, above). The alignment begins at the Beachwood Pump Station and continues west on West Riverside Drive for approximately 500 feet, at which point the alignment turns north and continues 8,200 feet on South Sparks Street up to West Olive Avenue. The alignment continues north on North Sparks Street to West Chandler Boulevard, where it turns east and parallels the existing Beachwood Force Main on West Chandler Boulevard for approximately 4,000 feet. The parallel alignment continues into the BWRP until it discharges into the BWRP headworks located at the northeast side of the plant. A new magnetic flow meter in an underground vault will be constructed inside the BWRP site similar to the existing flow meter.

2.2.2 Replacement Force Main Sewer

The replacement force main sewer will be 20-inches in diameter and constructed with either:

- Class 250 ductile iron pipe with fusion-bonded epoxy, ceramic epoxy, polyurethane or polyethylene lining, or
- High density polyethylene (HDPE) pipe with fused joints.

It is expected that pipe-jacking (a form of tunneling) will be performed at strategic street intersections (Figure 2) and include the following locations:

- Victory Boulevard and West Chandler Boulevard
- West Magnolia Boulevard and North Sparks Street
- West Olive Avenue/West Verdugo Avenue and North/South Sparks Street
- Alameda Avenue and South Sparks Street

The pipe-jacking operations will generally consist of:

- Site preparation,
- Excavation and shoring of jacking and receiving pits,
- Jacking of steel casing,
- Installation of carrier pipe,
- Filling of annular space with sand or slurry, and
- Work site restoration.

Topside equipment used to support the jacking and boring operation is listed in Table 1 and includes a crane, a hydraulic jacking machine, a boring machine, backhoe and front end loader for pit excavation and spoil handling, and truck transport for equipment movement.

Table 1
Major Equipment Used During Construction Activities for Force Main Pipeline Replacement and Beachwood Pump Station Upgrade

COMPONENT	ACTIVITY	MAJOR EQUIPMENT REQUIRED
Beachwood Pump Station Upgrade	Pump and Mechanical Equipment Removal	Crane; welder; heavy duty truck
	Wet Well Rehabilitation	Vacuum truck; steam/jet sprayer; generator; compressor; crane
	Excavation and Shoring	Excavator; backhoe; haul trucks; trencher; generator; water truck
	Pump and Pipe Installation and Backfilling	Excavator; crane; rubber-tired loader; rubber-tired backhoe with compactor; water truck; dump truck; welder
	Work Site Restoration	Plate compactor; dump truck; grader; roller; water truck
New Force Main Sewer	Site Preparation	Concrete/industrial saw; pavement breaker/jackhammer
	Excavation and Shoring	Excavator; backhoe; haul trucks; trencher; generator; water truck
	Pipe Installation and Backfilling (including jacking and receiving pits)	Excavator; crane; rubber-tired loader; rubber-tired backhoe with compactor; pipe-jacking equipment; boring machine; compressors; generators; haul trucks; water truck; dump truck
	Work Site Restoration	Plate compactor; asphalt dump truck; asphalt paver; grader; roller; water truck

2.3 Existing Site Features

Land uses within the proposed project area include low density residential along the north and south of West Chandler Boulevard, and commercial/industrial along North Victory. Land uses along the west and east side of North Sparks Street includes low density residential with some corridor commercial and medium residential along major streets (Alameda Avenue, West Olive Avenue, and West Magnolia Boulevard).

West Chandler Boulevard is a residential street that extends from North Clybourn Avenue in the west to North Victory Boulevard in the east. West Chandler Boulevard is a two-lane roadway over its entire length and is approximately 30 feet wide that generally includes parking on the south side of the residential street and a bike path (Chandler Bikeway) to the north in a median area that separates West Chandler Boulevard from Chandler Boulevard.

North Sparks Street is a residential street that extends from just north of West Victory Boulevard in the north to West Riverside Drive at the southern edge of the City of Burbank. North Sparks Street is a two-lane roadway over its entire length and is approximately 36 feet wide that generally includes parking on both sides of the residential street. Major intersections along North Sparks Street includes: Alameda Avenue, West Olive Avenue/West Verdugo Avenue, and West Magnolia Boulevard. The current roadway configuration includes portions that have been fully improved to the ultimate right-of-way with two travel lanes in both directions, curb gutter and sidewalk, and street parking.

Land uses along the west and east side of North Sparks Street includes low density residential with some corridor commercial and medium residential along major streets (Alameda Avenue, West Olive Avenue, and West Magnolia Boulevard).

Minimal vegetation will be impacted during the proposed project activities; however, the City of Burbank will employ impact avoidance measures throughout construction (see attached Best Management Practices). All construction activities will be confined to existing access roads and developed areas, work areas and previously disturbed areas adjacent to existing facilities. No negative effect to any listed or sensitive plant or wildlife species is anticipated with implementation of the proposed project.

3.0 Methods

3.1 Literature Review

Prior to initiating field surveys, Psomas reviewed available literature regarding listed, candidate, and sensitive plant and wildlife species to identify special status species having the potential to occur within the proposed project areas. Literature reviewed included:

- California Natural Diversity Database (CNDDB) output for the Burbank Quadrangle (CDFW 2013);
- California Native Plant Society Inventory of Rare and Endangered Plants of California (CNPS 2013);
- The State and Federally Listed Endangered and Threatened Animals of California (CDFW 2013);
- The State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFW 2013);
- The Special Animals List (CDFW 2013);
- Species Accounts from CDFW website (CDFW 2013);
- The Jepson Manual: Higher Plants of California;
- Mammals of California (Eder 2005);
- Field Guide to the Birds of North America, 4th Edition (The National Geographic Society 2002);
- A Field Guide to Western Reptiles and Amphibians, 3rd ed. (Stebbins 2003)

An inventory of listed, candidate and sensitive plant and wildlife species was derived from the literature review. Additionally, the life history, habitat requirements, and survey requirements for listed and sensitive plant and wildlife species identified by the literature review were reviewed.

As a result of the literature review, three (3) plant species and three (3) wildlife species listed as endangered, threatened, candidate or state rare pursuant to the federal or state Endangered Species Acts were identified as having the potential to occur within the proposed project area. Eight (8) sensitive plant species and eleven (11) sensitive wildlife species were identified by the literature review as potentially occurring within the proposed project area or in the vicinity of the proposed project area. These plant and wildlife species were assessed for their potential to occur within the proposed project area based on habitat requirements, availability and quality of suitable habitat, and distribution. Species determined to have the potential to occur within the Project area are presented in Appendix A, *Special Status Species*. A number of plant and wildlife species were identified as having no potential to occur within the proposed project area because the project area does not contain suitable habitat, or is located out of the species' known geographic range, or is located out of the species' known elevational range limits. Appendix A also summarizes conclusions from analysis regarding the potential occurrence of listed and sensitive plant and wildlife species within the proposed project area. Appendix A provides the taxonomic and common names of each potentially occurring species, describes each species' status, describes each species' preferred habitat and distribution, and analyzes the species' potential to occur within the proposed project area.

Four sensitive plant communities were identified during the literature review, including California Walnut Woodland, Southern Coast Live Oak Riparian Forest, Southern Cottonwood Willow Riparian Forest, and Southern Sycamore Alder Riparian Forest (CNDDB 2013). None of these plant communities were observed within or adjacent to the proposed project area.

3.2 Field Surveys

Following completion of the literature review, Psomas conducted two field surveys. During the two site visits, Psomas biologist Dr. Brad Blood and Project Manager Mr. Michael Donovan, visited the proposed project area and assessed the proposed project area for the presence of special status species, U.S. Army Corps of Engineers (USACOE) and California Department of Fish and Wildlife (CDFW) jurisdictional boundaries, suitable habitats for endangered and threatened, and candidate plant and wildlife species, and the presence of protected plant communities.

4.0 Results

As a result of the field surveys, no federally or state endangered, threatened, rare, or candidate plant or wildlife species were determined to have the potential to occur within the proposed project area (Appendix A). No special-status plant or wildlife species were observed within or adjacent to the proposed project area during the surveys. Therefore, no federally or state listed endangered, threatened, rare, or candidate plant or wildlife species would be impacted by implementation of the proposed project.

No riparian or sensitive plant communities were found within or near the proposed project alignment, and therefore, no impacts to these resources would occur. There are no HCPs, or NCCPS plan areas within the proposed project Alignment, and therefore, no impacts to existing NCCPs or HCPs would occur with implementation of the proposed project.

The proposed project also lies outside USACOE and CDFW jurisdiction; therefore, no impacts to jurisdictional waters would occur in association with implementation of the proposed project.

Due to the presence of mature trees and the potential need for trimming of those trees, the proposed project has the potential to impact nesting migratory birds and raptors. Nesting migratory birds and raptors are protected by the federal Migratory Bird Treaty Act of 1918, and State Fish and Game Code 3700 to 3705. The recognized nesting season for migratory birds and raptors is February 15 to August 31, depending on weather conditions for any particular year. To reduce any potential impact to nesting birds and raptors Psomas recommends that any trimming or trees be performed outside of the nesting season. If trimming of trees cannot be performed outside the nesting season, the City shall have a qualified biologist survey the proposed project alignment for the presence of nesting migratory birds and raptors. Surveys should take place within 7 days of the proposed Projects start-date for construction. Should any nest of a protected species be observed within 50 feet of the proposed Project's construction alignment, then the biologist will consult with the City on the timing of disturbance and then the biologist will make a determination on the need for monitoring. Fifty feet is deemed a sufficient buffer given the proposed project's urban surroundings.

4.1 Impact Analysis

The California Environmental Quality Act (CEQA) requires that any development, refurbishment, repair, or construction that can be defined as a "project" is subject to analysis of potential environmental impacts. That analysis includes an assessment of whether or not a potential impact can be defined as a "significant effect." A "significant effect" is defined by Section 15382 of the CEQA Guidelines of 2013 as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by a project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." According to the CEQA Guidelines, "an economic or social change by itself shall not be considered a significant effect on the environment, but may be considered in determining whether the physical change is significant."

The following impact analysis is a summary of the substantial evidence that was used to supports the impact conclusions arrived at by the Psomas biologist and the Psomas project manager. The impact analysis is intended to support the conclusions that will be provided in the Initial Study/Mitigated Negative Declaration (IS/MND) for the proposed project. The following analysis answers the questions required to be answered by CEQA in the CEQA Environmental Checklist.

Would the proposed project:

a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

No Impact. The proposed project would have no substantial adverse impact, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS because no federally endangered, -threatened, rare, candidate, or state endangered, threatened, candidate, or otherwise sensitive plant or wildlife species have the potential to occur within the proposed project area (Appendix B). No listed or otherwise sensitive plant or wildlife species were observed within or adjacent to the proposed project area during the surveys.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?

No Impact. The proposed project would not result in impacts to biological resources in relation to riparian habitat or other sensitive natural communities identified in local or regional plans, policies, regulations or by the CDFW or USFWS because no riparian habitats or sensitive plant communities are present within or near the proposed project area.

c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. The proposed project would not impact any federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means because no federally protected wetlands or waters regulated by the federal clean water act are present within or near the proposed project.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant With Mitigation Incorporation. The proposed project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors. No migratory fish or wildlife or habitat to support migratory fish or wildlife is present within or near the proposed project.

The proposed project has the potential to impact the use of native wildlife nursery sites because the proposed project may require the trimming of trees, which provide nesting habitat for migratory birds and raptors protected by the federal Migratory Bird Treaty Act (MBTA) and by state Fish and Game Code 3503 and 3700-3705.

Nesting birds are protected under the MBTA. The MBTA protects all common wild birds found in the United States except the house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), and resident game birds such as pheasant, grouse, quail, and wild turkey (*Meleagris gallopavo*). Resident game birds are managed separately by each state. The MBTA makes it unlawful for anyone to kill, capture, collect, posses, buy, sell, trade, ship, import or export any migratory bird including feathers, parts, nests, or eggs. State Fish and Game Code 3503 and 3700 to 3705 makes it illegal to destroy any birds' nest or any birds' eggs that are protected under the MBTA during the breeding season. Code 3503.5 further protects all birds of prey, such as hawks and owls, and their eggs and nests from any form of take during the breeding season.

Implementation of the following mitigation measure will lessen potential impacts below the level of significance.

MM BIO-1 The City shall schedule proposed project activities, to the extent practical, outside the recognized nesting season (February 15-August 31) so as to not affect breeding birds. However, should project activities need to be scheduled during the recognized nesting season, the City shall complete the following activities to avoid impacts to nesting birds:

- The City shall clearly define all work area limits and instruct all construction personnel and contractors to respect these defined limits.
- Pre-construction nesting bird surveys shall be performed to identify any nests that may be impacted by construction activities. The City of Burbank shall have a qualified biologist perform nesting bird surveys. Surveys should take place at least seven days prior to the onset of scheduled mobilization and staging activities. Should any active nests be found, the biologist will flag the nest area 50 feet on either side of the nest.
- Should active nests be found within 50 feet of scheduled active construction areas, a biologist will be assigned to monitor the nest during mobilization and staging activities to determine if the activities are detrimental to the nesting process. Should the biologist determine

that the nesting activities are being disturbed or disrupted, the biologist will discuss with the City of Burbank and the construction contractor practical alternatives to activities at the nest site. If needed, the City of Burbank shall contact the USFWS and CDFW for further guidance.

- If the City of Burbank workers or subcontractors discover any nests, the City of Burbank shall follow protocols specified by the USFWS or CDFW.
- Under no circumstances shall the City of Burbank disturb, capture, handle or move birds or their nests.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less Than Significant With Mitigation Incorporation. The proposed project does no conflict with local policies protecting biological resources. The City of Burbank Municipal Code, Title 7 Chapters 1 and 4, regulate the removal of trees within the City of Burbank. Section 7-1-222 states that "Every person making an excavation, tunnel or bore in or under the surface of any street shall exercise due care in performing such work in order that damage to any trees growing therein shall be avoided. It shall be the duty of the person making the excavation, tunnel, or bore to notify the Park, Recreation, and Community Services Department whenever there is danger of such damage occurring." In addition, Section 7-4-102 states that the Park, Recreation, and Community Services Department "shall have exclusive jurisdiction and control over the planting, care and removal of trees, shrubs, and plants in the streets and on other property under the control of the City, and any work incidental thereto..." At this time it is unknown if any trees will need to be removed to implement the proposed project. Therefore, mitigation is provided below to ensure the project does not conflict with the established tree protection ordinance, and impacts would be less than significant. Minimal trimming of tree branches would occur with the implementation of the proposed project. No trees are anticipated to be removed with the proposed project.

Potential impacts to trees may come from impacts to the root systems with the tunneling proposed with the proposed project.

Implementation of the following mitigation measure will lessen potential impacts below the level of significance.

MM BIO-2 Prior to any tree removal within any portion of the proposed project, the Director of the City of Burbank Park, Recreation, and Community Services Department shall be contacted to ensure compliance with the City of Burbank Municipal Code, specifically Title 7 Chapters 1 and 4 (Section 7-1-222 and 7-4-102). Any impacted trees will be replaced in-kind with a nursery stock minimum of 5-10 gallon size container tree.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The proposed project would not impact biological resources in relation to conflicts with the provisions of any adopted Habitat Conservation Plan (HCP) or Natural Community Conservation Plans (NCCPs) or other approved local, regional, or state habitat conservation plan. The proposed project would not conflict with any local HCP or NCCP because the proposed project area is not within any HCP or NCCPs planning area or other approved local, regional, or state habitat conservation plan.

As a result of a review of the conservation planning program administered by the CDFW, it was determined that there are no NCCPs within the vicinity of the proposed project (CDFW/NCCP 2010). As a result of a review of the conservation planning program administered by the Ventura Field Office of the USFWS, it was determined that there are no permitted HCPs or draft HCPs within the vicinity of the proposed project (USFWS 2010). Therefore, there are no expected impacts to biological resources related to conflicts with the provisions of any adopted HCPs or NCCPs.

5.0 References

California Code of Regulations. Title 14, Division 6, Chapter 3, Sections 15000–15387, Appendix G.

California Department of Conservation. 2010. *Los Angeles County Important Farmland 2010 Map*. Division of Land Resource Protection, Farmland Mapping and Monitoring Program, Sacramento, CA.

California Department of Conservation, Division of Mines and Geology. 1966. *Minerals of California Volume (1866–1966)*. Bulletin 189. Los Angeles, CA.

California Department of Fish and Wildlife. Accessed November 2012. *RareFind 3: California Natural Diversity Database*. Sacramento, CA.

California Department of Fish and Wildlife/NCCP. 2012. *Natural Community Conservation Planning (NCCP), Summary of table of NCCPs and associated map*. Available at: http://www.dfg.ca.gov/habcon/nccp/status/index.html

California Native Plant Society. Accessed November 2012. *Inventory of Rare and Endangered Plants*. Sacramento, CA. Available at: http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi

City of Burbank, "Burbank Municipal Code," Chapter 31, Zoning, Burbank, California City of Burbank "Zoning Map," Burbank, California

City of Burbank, Community Development Department, 2013. *Burbank 2035 General Plan*, Burbank, California, February 2013.

City of Burbank, Community Development Department, "Open Space/Conservation Element of the City of Burbank General Plan," Burbank, California, adopted by Burbank City Council on December 19, 1972, Resolution No. 16,280

City of Burbank, Community Development Department, "Safety Element of the City of Burbank General Plan," Burbank, California, adopted by Burbank City Council on July 1, 1997, Resolution No. 25,087

City of Burbank, Department of Water and Power. *Recycled Water Master Plan.* October 2007.

James M. Montgomery, Inc., 1992. *Remedial Investigation of Groundwater Contamination in the San Fernando Valley*. December 1992.

Hickman, J.C. (ed.). 1993. *The Jepson Manual: Higher Plants of California*. Berkeley, CA: University of California Press.

Holland, Robert F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Sacramento, CA: California Department of Fish and Game.

Munz, P. 1974. *A Flora of Southern California*. Berkeley, CA: University of California Press.

Psomas, 2013. *Preliminary Design Report – Beachwood Sewer Upgrades Project*.

Sawyer, J.O., and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. Sacramento, CA: California Native Plant Society.

Appendix A
Listed, Candidate, and Sensitive Species Having the Potential to Occur within the Proposed Project Area

Appendix A
Listed, Candidate, and Sensitive Species Having the Potential to Occur within the Proposed Project Area

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
Listed Endangered and Threatened Plants					
Berberis nevinii	Nevin's barberry	FE, SE, CNPS: 1B.1	Nevin's barberry grows in two habitat types. In the alluvial scrub community it grows on sandy and gravelly substrates along the margins of dry washes. In the chaparral community, it grows on steep, north-facing slopes with coarse soils and rocky slopes. It has also been found in cismontane woodlands, riparian scrub, and coastal sage scrub. Blooming period: Mar – Apr.	The distribution of the Nevin's barberry includes dry washes below the foothill zone of the southern California Transverse and Peninsular Ranges in Los Angeles, San Bernardino, Riverside and San Diego counties. Nevin's barberry is endemic to southwestern cismontane southern California. It occurs in restricted localized populations from the interior foothills of the San Gabriel Mountains of Los Angeles County and San Bernardino County southeast to near the foothills of the Agua Tibia Mountains of southwestern Riverside County. Scattered naturalized populations have been established outside this range in San Diego County. Elevational range: 970 – 2,700 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for Nevin's barberry. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	FC, SE, CNPS: 1B.1	Grows in sandy and gravelly places associated with sandstone, sometimes in washes, typically in open areas associated with mixed grassland, chaparral, and coastal sage scrub communities. Rediscovered in 1999. Blooming period: Apr – Jul.	Currently is known only from Laskey Mesa of Ahmanson Ranch in the Simi Hills, Ventura County; and from the Newhall Ranch and adjoining county land in the Santa Susana foothills, Los Angeles County. Elevational range: 492 – 4,002 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for San Fernando Valley spineflower. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Dodecahema leptoceras	slender-horned spineflower	FE, SE, CNPS: 1B.1	This species grows on sandy soil of alluvium in flood plains and in washes. This spineflower is associated with the eastern-most occurrence of coastal sage scrub, known as alluvial fan sage scrub. Cryptogrammic crusts are frequently present in areas occupied by this plant. Blooming period: Apr – Jun.	Presently, records recognize nine to eleven populations of this species in Los Angeles, Riverside and San Bernardino counties on both private and federal land. Populations occur within eight watersheds: Santa Clara River, Big Tujunga Wash, Lytle Creek, Santa Ana River, San Jacinto River, Bautista Creek, Temescal Canyon, and Vail Lake. Most of these support only a small number of	No potential to occur. The Project area lacks appropriate habitat for slender-horned spineflower. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas;

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
				subpopulations. This species ranges from Tujunga Canyon at the eastern edge of the San Fernando Valley eastward to the Santa Ana Wash near Redlands and southward to the San Jacinto River flood plain near Hemet and Temescal Canyon near Elsinore. A new population was recently discovered on the Pechanga Indian Reservation along Pechanga Creek in Temecula, Riverside County. Elevational range: 660 – 2,500 feet MSL.	therefore Project will not affect this species.
Sensitive Plants					
Atriplex parishii	Parish's brittlescale	CNPS: 1B.1	Occurs within alkali vernal pools, alkali annual grassland, alkali playa, and alkali chenopod scrub and alkali vernal plains. Usually found on drying alkaline flats with fine soils. Blooming period: Jun – Oct.	Found in western Riverside and San Diego counties. In Riverside, this plant is found at Salt Creek west of Hemet and the Winchester Valley. Elevational range: 80 – 6,230 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for Parish's brittlescale. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
California macrophylla	round-leaved filaree	CNPS: 1B.1	Round-leaved filaree occurs in grasslands on friable clay soils, although it may historically have been common on other soil types. It has been found in non-native grassland on clay soils with relatively low cover of annual grasses. It most often occurs in foothill locations. Blooming period: Mar – May.	Round-leaved filaree ranges from southern Oregon through California into northern Mexico. In California, it is known from scattered occurrences in the Great Valley, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges. Round-leaved filaree is found in the following counties: Alameda, Contra Costa, Colusa, Fresno, Glenn, Kings, Kern, Lake, Lassen, Los Angeles, Merced, Monterey, Napa, Riverside, Santa Barbara, San Benito, Santa Clara, San Diego, San Joaquin, San Luis Obispo, San Mateo, Solano, Sonoma, Stanislaus, Tehama, Ventura, and Yolo. The elevational range of this plant is 30 – 4,000 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for round-leaved filaree. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
				Elevational range: 30 – 4,000 feet MSL.	
Calochortus clavatus var. *gracilis*	slender mariposa lily	CNPS: 1B.2	Found on shaded foothill canyons often on grassy slopes within other habitat such as chaparral and coastal sage scrub. Can be found after fire. Blooming period: Mar – Jun.	Known from only nine occurrences in the San Gabriel Mountains in Los Angeles County. Elevational range: 1,181 – 3,280 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for slender mariposa lily. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Calochortus plummerae	Plummer's mariposa lily	CNPS: 4.2	This plant prefers openings in chaparral, foothill woodland, coastal sage scrub, valley and foothill grasslands, cismontane woodland, lower montane coniferous forest and yellow pine forest. They are found on dry, rocky slopes and soils and brushy areas. Can be very common after fire. Blooming period: May – Jul.	Found in Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. Elevational range: 330 – 5,580 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for Plummer's mariposa lily. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Dudleya multicaulis	many-stemmed dudleya	CNPS: 1B.2	Many-stemmed dudleya is often associated with clay soils in barrens, rocky places, and ridgelines as well as thinly vegetated openings in chaparral, valley and foothill grassland, and coastal sage scrub in heavy soils, often clay. Blooming period: Apr – Jul.	Many-stemmed dudleya is endemic to southwestern California from western Los Angeles County south through extreme southwestern San Bernardino, Orange, and western Riverside Counties south to extreme northern San Diego County. Elevational range: 50 – 2,591 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for many-stemmed dudleya. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Horkelia cuneata var. *puberula*	mesa horkelia	CNPS: 1B.1	Found in sandy or gravelly sites of chaparral, coastal scrub, and cismontane woodlands. Blooming period: Feb - Sept.	Found in San Luis Obispo, Santa Barbara, Ventura, Los Angeles and Orange counties. Elevational range: 229 – 2,657 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for mesa horkelia. Project activities would not impact this species; Project impacts are temporary and located within

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
					disturbed and developed areas; therefore Project will not affect this species.
Malacothamnus davidsonii	Davidson's bush-mallow	CNPS: 1B.2	Found in sandy washes of chaparral, cismontane woodland, coastal scrub, and riparian woodland. Blooming period: Jun - Jan.	In southern California, this species is found in Los Angeles County. Elevational range: 606 – 2,805 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for Davidson's bush-mallow. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Pseudognaphalium leucocephalum	white rabbit-tobacco	CNPS: 2.2	Occurs in chaparral, cismontane woodlands, coastal scrub and riparian woodlands in sandy and gravelly sites. Blooming period: (Jul) Aug – Nov (Dec) Months in parentheses are uncommon.	Found in Los Angeles, Orange, Riverside, Santa Barbara, San Diego, San Luis Obispo, and Ventura counties. Elevational range: 0 – 6,888 feet MSL.	No potential to occur. The Project area lacks appropriate habitat for white rabbit-tobacco. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Listed Endangered, Threatened, and Candidate Wildlife					
Birds					
Empidonax traillii extimus	southwestern willow flycathcher	FE, SE	Southwestern willow flycatchers typically arrive in southern California at the end of April and adults depart from the breeding territory in mid-August to early September. They are restricted to riparian woodlands along streams, rivers, wetlands and marshes with mature, dense stands of willows, cottonwoods, or smaller spring fed or boggy areas with willows or alders. Riparian habitat provides both breeding and foraging habitat for the species. The southwestern willow	It occurs from near sea level to over 8,500 feet MSL, but is primarily found in lower elevation riparian habitat in southern California. Breeds in California from the Mexican border north to Independence in the Owens Valley, the South Fork Kern River, and Santa Ynez River in Santa Barbara County. River systems where the flycatchers persists include the Colorado, Owens, Kern, Mojave, Santa Ana, Pilgrim Creek, Santa Margarita, San Luis Rey, San Diego, San Mateo Creek, San Timoteo Creek, Santa Clara, Santa Ynez, Sweetwater, San Dieguito, and Temecula Creek.	No potential to occur. The project site does not contain suitable nesting or foraging habitat to support southwestern willow flycatcher. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
			flycatcher nests from zero to 13 feet above ground in thickets of trees and shrubs approximately 13 to 23 feet tall with a high percentage of canopy cover and dense foliage. Nesting willow flycatchers invariably prefer areas with surface water nearby.		
Polioptila californica californica	coastal California gnatcatcher	FT, SSC	A non-migratory, permanent resident of coastal sage scrub (css) habitat, which is a broad category of vegetation that includes the following plant communities: Venturan css, Diegan css, maritime succulent scrub, Riversidean sage scrub, Riversidean alluvial fan sage scrub, southern coastal bluff scrub, and coastal sage-chaparral scrub. They also use chaparral, grassland and riparian habitats next to css, but these habitats are used dispersal and foraging. They avoid nesting on steep slopes.	They are restricted to coastal slopes of southern California from Ventura and western San Bernardino counties south to northern Baja below 1,500 feet MSL. May still occur along lower, coastal slopes of San Gabriel and San Bernardino Mountains in Los Angeles and San Bernardino counties, but status is uncertain. Their breeding period is from February to August.	No potential to occur. The project site does not contain suitable nesting or foraging habitat to support coastal California gnatcatcher. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Vireo bellii pusillus	least Bell's vireo	FE, SE	Least Bell's vireos primarily occupy riverine riparian habitats that typically feature dense cover within 1-2 m of the ground and a dense, stratified canopy. Typically it is associated with southern willow scrub, cottonwood-willow forest, mule fat scrub, sycamore alluvial woodland, coast live oak riparian forest, arroyo willow riparian forest, or mesquite in desert localities. It uses habitat which is limited to the immediate vicinity of water courses. 2,000 feet elevation in the interior.	A spring and summer resident of southern California. Except for a few outlying pairs, the subspecies is currently restricted to southern California south of the Tehachapi Mountains, along the coast and the western edge of the Mojave Desert to northwestern Baja California below 2,000 feet in elevation. Breeding pairs have been observed in the counties of Monterey, San Benito, Inyo, Santa Barbara, San Bernardino, Ventura, Los Angeles, Orange, Riverside, and San Diego. They usually arrive from their Mexican wintering areas by end of March, and depart southern California by end of August.	No potential to occur. The project site does not contain suitable nesting or foraging habitat to support least Bell's vireo. Project activities would not impact this species; Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Sensitive and Locally Important Wildlife					
Birds					
Athene cunicularia	burrowing owl	USFWS SSC	The burrowing owl occurs in shortgrass prairies, grasslands, lowland scrub, agricultural lands, rangelands, prairies, coastal dunes, desert floors, and	It is a year-long resident formerly common in appropriate habitats throughout the state, excluding the humid northwest coastal forests and high mountains. In California, burrowing owls are	No potential to occur. The Project site is outside of the known range for this species. The project sites are located

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
			some artificial, open areas as a year-long resident. They may also occur in forb and open shrub stages of pinyon-juniper and ponderosa pine habitats. They require large open expanses of sparsely vegetated areas on gently rolling or level terrain with an abundance of active small mammal burrows, most notably the California ground squirrel. As a critical habitat feature need, they require the use of rodent or other burrows for roosting and nesting cover. They may also use pipes, culverts, and nest boxes where burrows are scarce.	restricted to the central valley extending from Redding south to the Grapevine, east through the Mojave Desert and west to San Jose, the San Francisco Bay area, the outer coastal foothills area which extend from Monterey south to San Diego and the Sonoran desert. It is a resident in the open areas of the lowlands over much of the southern California region. Found as high as 5,300 feet MSL in Lassen County.	within disturbed and developed areas outside of this species normal habitat. . The Project would not negatively impact this species because of its confined work area.
Reptiles					
Anniella pulchra pulchra	silvery legless lizard	SSC	Has been described as a sand-swimmer that is common in several habitats, but especially in coastal dune, valley-foothill, chaparral, coastal sage scrub, oak woodland, pine-oak woodland, sycamores, cottonwoods, and pine forests. Legless lizards also occur in creosote desert scrub at the western edge of the Mojave Desert. A fossorial animal, it is found primarily in areas with sandy or loose organic soil or where there is plenty of leaf litter. They are usually associated with friable soils with some moisture content and some vegetative cover. They are often found under, or in the close vicinity of, surface objects such as logs, rocks, old boards and the compacted debris of woodrat nests. Rocky soils or areas disturbed by agriculture, or other human uses apparently lack legless lizards.	This California endemic ranges from Contra Costa County, south through the Coast, Transverse, and Peninsular ranges; parts of the San Joaquin Valley; and the western edge of the Sierra Nevada Mountains and Mojave Desert to northwestern Baja California, Mexico. It inhabits elevations from sea level along the coast to 6,000 feet MSL in the Sierra Nevada Mountains. It generally occurs west of the desert. Scattered desert slope records are known from Lancaster in Antelope Valley (Los Angeles and Kern counties), Morongo Valley (San Bernardino County), White Water (Riverside County), and in the San Felipe Creek drainage (San Diego County).	No potential to occur. The Project site is outside of the known range for this species. The project sites are within disturbed and developed areas outside of this species normal habitat. . The Project would not negatively impact this species because of its confined work area.
Emys marmorata	western pond turtle	SSC	Inhabits slow moving permanent or intermittent streams, small ponds, small lakes, reservoirs, abandoned gravel pits,	Currently, it ranges south of San Francisco Bay to northern Baja California, Mexico, west of the Sierra-Cascade crest and absent from desert regions, except in	No potential to occur. The Project site is outside of the known range for this species. The project

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
			permanent and ephemeral shallow wetlands, stock ponds, and sewage treatment lagoons. Pools are the preferred habitat within streams. Abundant logs, rocks, submerged vegetation, mud, undercut banks, and ledges are necessary habitat components for cover as well as a water depth greater than 2 m.	the Mojave Desert along the Mojave River and its tributaries. Isolated populations are known to exist as far into the Mojave Desert as Afton Canyon, and in the Amargosa River, County of Los Angeles. Elevation range extends from sea level to 6,000 feet MSL.	sites are located within disturbed and developed areas outside of this species normal habitat. . The Project would not negatively impact this species because of its confined work area.
Mammals					
Antrozous pallidus	pallid bat	SSC, FSS	A wide variety of habitats is occupied by pallid bats, including deserts, grasslands, shrublands, woodlands, and forests form sea level up through mixed conifer forests. They are most common in deserts, preferring areas of open, dry habitats, with rocky areas for roosting and water nearby. Night roosts may be in more open sites, such as porches and open buildings. Pallid bats day roosts in rock crevices, tree hollows, mines, caves, and a variety of man-made structures.	The pallid bat is a locally common species of low elevations in California. It occurs throughout California except for the high Sierra Nevada from Shasta to Kern counties and the northwestern corner of the state from Del Norte and western Siskiyou counties to northern Mendocino County. Local data suggest that this species may be most common at elevations below 6,000 feet MSL on both coastal and desert sides.	No potential to occur. The Project site lacks suitable roosting and foraging habitat. This project will not negatively affect this species because of the limited nature of the work and also because the work will take place in the daylight. Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Eumops perotis californicus	western mastiff bat	SSC	Western mastiff bats are found in a variety of habitats, such as semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban areas. The species' distribution is geomorphically determined. They roost generally under exfoliating rock slabs and rock crevices along cliffs. Western mastiff bats prefer deep crevices that are at least 15 or 20 feet above the ground.	In California, they have been recorded from Butte County southward in the western lowlands through the southern California coastal basins and the western portions of the southeastern desert region. Uncommon resident in southeastern San Joaquin Valley and Coastal Ranges from Monterey County southward through southern California, from the coast eastward to the Mojave and Colorado Deserts.	No potential to occur. The Project site lacks suitable roosting and foraging habitat. This project will not negatively affect this species because of the limited nature of the work and also because the work will take place in the daylight. Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Lasiurus cinereus	hoary bat	ND	The hoary bat is often found near open grassy areas in coniferous and deciduous forest or near lakes. They	The hoary bat may be found at any location in California, although distribution is patchy in southeastern deserts. This	No potential to occur. The Project site lacks suitable roosting and foraging habitat. This

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
			prefer open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Habitats suitable for bearing young include all woodlands and forests with medium to large-size trees and dense foliage. During summer, it roosts alone in the shade of foliage, with an open space beneath the roost so that it can drop into flight. Winter roosts include sides of buildings and tree trunks.	common, solitary species winters along the coast and in southern California, breeding inland and north of the winter range. During migration, it may be found at locations far from the normal range, such as the Channel Islands and the Farallon Islands. Hoary bats have been recorded from sea level to 13,200 feet MSL.	project will not negatively affect this species because of the limited nature of the work and also because the work will take place in the daylight. Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Lasiurus xanthinus	western yellow bat	SSC	The western yellow bat can be found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. This bat roosts in dead palm tree fronds and other trees. It roosts and feeds in, and near, palm oases and riparian habitats. It forages over water and among trees. It is sometimes found in urban areas. This species occurs year-round in California.	The southwestern yellow bat is uncommon in California, known only in Los Angeles and San Bernardino counties south to the Mexican border. This species has been recorded below 2,000 feet MSL.	No potential to occur. The Project site lacks suitable roosting and foraging habitat. This project will not negatively affect this species because of the limited nature of the work and also because the work will take place in the daylight. Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.
Nyctinomops macrotis	big free-tailed bat	SSC			No potential to occur. The Project site lacks suitable roosting and foraging habitat. This project will not negatively affect this species because of the limited nature of the work and also because the work will take place in the daylight. Project impacts are temporary and located within disturbed and developed areas; therefore Project will not affect this species.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
Neotoma lepida intermedia	San Diego desert woodrat	SSC	The San Diego desert woodrat is found in a variety of shrub and desert habitats primarily associated with rock outcroppings, boulders, cacti, or areas of dense undergrowth. Desert woodrats commonly inhabit Joshua tree woodlands, pinyon-juniper woodlands, mixed chaparral, coastal sage scrub, and desert habitats. Desert woodrats actively avoid open areas that do not provide adequate refuge sites. The desert woodrat often is associated with large cactus patches, rocky outcroppings and boulder-covered hillsides. In rocky outcrops, desert woodrats are known to construct dens in the cracks between boulders. Cactus patches are also a favorite den site.	The San Diego desert woodrat occurs in coastal southern California from San Luis Obispo County south through the Transverse and Peninsular Ranges into Baja California. Historic locations of the San Diego desert woodrat on and adjacent to National Forest System lands have been recorded from San Luis Obispo near Los Padres National Forest, San Fernando near Angeles National Forest, Redlands and the San Bernardino Mountains on and near the San Bernardino National Forest, and Julian near the Cleveland National Forest. It elevational range is from sea level to 8,500 feet MSL.	No potential to occur. The Project site is outside of the known range for this species. The project sites are located within disturbed and developed areas outside of this species normal habitat. . The Project would not negatively impact this species because of its confined work area.
Onychomys torridus ramona	southern grasshopper mouse	SSC	The southern grasshopper mouse rangewide is found in low arid scrub and semi-scrub vegetation desert areas, especially scrub habitats with friable soils for digging. It prefers low to moderate shrub cover. It is also found in grasslands and sparse coastal sage scrub habitats. They nest in burrows, and while they may dig their own burrows in sandy or other friable substrates, they often use burrows dug by other rodents.	The subspecies O. t. ramona is restricted to coastal southern California, with marginal records for Mint Canyon west of Palmdale, San Fernando, Riverside, Valle Vista, Warner Pass, La Puerta Valley, Jacumba, Santee Mountains, and the mouth of the Tijuana River Valley.	No potential to occur. The Project site is outside of the known range for this species. The project sites are located within disturbed and developed areas outside of this species normal habitat. . The Project would not negatively impact this species because of its confined work area.
Taxidea taxus	American badger	CDFW_SSC	Badgers occur from alpine meadows to elevations as low as Death Valley, which is below sea level. Essentially the badger is an animal of open places. It shuns forests. In California, badgers occupy a diversity of habitats. The principal requirements seem to be sufficient food, friable soils, and relatively open, uncultivated ground. Grasslands, savannas, openings in desert scrub,	In California, badgers ranged throughout the state except for the humid coastal forests of northwestern California in Del Norte County and the northwestern portion of Humboldt County. No current data exist on the status of badger populations in California, but they have obviously declined or disappeared in large sections of the state, particularly areas west of the Cascade-Sierra Nevada mountain axis and in coastal basins of southern	No potential to occur. The Project site is outside of the known range for this species. The project sites are located within disturbed and developed areas outside of this species normal habitat. . The Project would not negatively impact this species because of its confined work area.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Potential For Occurrence
			and grassy mountain meadows near timberline are preferred. They can also occur in treeless pastures and drained marshes. Badgers are generally associated with dry, open, treeless regions, prairies, parklands, and cold desert areas. They seem to occur primarily in areas of low to moderate slope.	California. The badger's altitudinal range extends from below sea level in Death Valley to over 12,000 feet MSL.	

Federal Status
FE= Federally Endangered: any species that is in danger of extinction throughout all or a significant portion of their range.

FT = Federally Threatened: any species, that is considered likely to become endangered throughout all or a significant portion of its range within the foreseeable future.

FC= Federal Candidate for Listing: any species, that is being considered for listing as endangered or threatened, but for which a proposed regulation has not yet been published.

California State Status
SE= California State Endangered: any species, which is in serious danger of becoming extinct throughout all, or a significant portion, of their range.

ST = California State Threatened: any species that is likely to become an endangered species in the foreseeable future in the absence of special protection.

SCT = California State Candidate Threatened: any species that the Fish and Game Commission (FGC) has formally declared a candidate species.

SSC = Species of Special Concern status applies to animals not listed under the federal Endangered Species Act or the California Endangered Species Act, but which the California Department of Fish and Wildlife have determined 1) are declining at a rate that could result in listing, or 2) historically occurred in low numbers and known threats to their persistence currently exist.

Fully Protected: animal species may not be taken or possessed at any time and no licenses or permits may be issued for their take. .

California Native Plant Society Status
CNPS 1B =California Native Plant Society List 1B plants are native California species, subspecies or varieties that are rare, threatened, or endangered in California and throughout its range.

California Native Plant Society Threat Codes
0.1 means it is seriously endangered in California.
0.2 means it is fairly endangered in California.
0.3 means it is not very endangered in California.

Other
ND = No Designation

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Appendix C
Cultural Resource Reconnaissance Report

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May 1, 2014

Michael P. Donovan, PG, CHg
P S O M A S
Associate/Senior Hydrogeologist, Natural Resources
3 Hutton Centre Drive, #200
Santa Ana, CA 92707

Subject: **Cultural Resource Reconnaissance Report for the City of Burbank Pump Station and Force Main Project City of Burbank, California**

Dear Mr. Donovan,

Attached is the cultural resources analysis for the Burbank Pump Station and Force Main project. The analysis was performed in the format of the CEQA checklists that you had provided.

Please let me know if you have any questions. You can reach me at 714.508.4100, extension 1017, or email me at mhoulihan@brandman.com

Sincerely,

Michael E. Houlihan, AICP
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Enc: Cultural Resources Reconnaissance Report

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DRAFT
Cultural Resources Reconnaissance Report
Pump Station and Force Main Project
City of Burbank, California

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Date: April 30, 2014

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SECTION 1: INTRODUCTION

FirstCarbon Solutions (FCS) cultural resource staff has undertaken a cultural resource analysis of the Burbank Force Main and Pump Station Project, which is located in the south-central portion of the City of Burbank, California. The purpose of this research is to determine whether there will be direct or indirect impacts to sensitive historical and archaeological resources during construction of the project. Because no federal aid or federal permits are required, this report has been written in support of an Initial Study following CEQA Guidelines.

SECTION 2: PROPOSED PROJECT

The City proposes to improve the existing Beachwood Pump Station located in Mountain View Park, and construct a new 24-inch force main line from the Beachwood Pump Station to the Burbank Water Reclamation Plant (BWRP) (see Exhibit 1 and Exhibit 2). The project alignment map is provided as Exhibit 3. Each project component is discussed separately below.

Beachwood Pump Station Upgrade

The Beachwood Pump Station receives wastewater from the southern portion of the City, and pumps the sewage to the BWRP via the Beachwood Force Main. Improvements to the Beachwood Pump Station consist of:

- Replacing three existing 150-horsepower (hp) pumps with three new 150-hp pumps,
- Installing custom fabricated fittings to retrofit new pumps into pipes designed for the old pump dimensions,
- Replacing suction and discharge isolation and check valves,
- Re-coating the existing wet well with a polymer liner,
- Improvements or modifications to existing odor control facilities, and
- Integrating the new pumps with the existing variable frequency drive (VFD) system.

Beachwood Force Main Replacement

The existing Beachwood Force Main currently runs mostly beneath the pavement of Beachwood Drive between Mountain View Park and the BWRP. The Beachwood Force Main Replacement would construct a new force main mostly placed beneath North and South Sparks Street. The new force main alignment (24-inch main) would begin at the Beachwood Pump Station and continue west on West Riverside Drive for approximately 500 feet to North Sparks Street. The new force main would then travel north in North Sparks Street for approximately 8,200 feet to West Chandler Boulevard. From the intersection of North Sparks Street and West Chandler, the new force main would turn east and parallel the existing Beachwood Force Main on West Chandler Boulevard for approximately 4,000 feet. The parallel alignment would continue into the BWRP until it discharges into the BWRP headworks located at the northeast side of the plant. A new magnetic flow meter in an underground vault will be constructed inside the BWRP site similar to the existing Beachwood Force Main discharge.

The construction of the proposed project would involve jacking and boring at the following intersections: Chandler Boulevard/Victory Boulevard, West Magnolia Boulevard/North Sparks Street, West Clark Avenue/North Sparks Street, and Verdugo Avenue/North Sparks Street. Excavation during the jackpit excavation phase could be at a maximum of 20 feet below grade. Boring will occur 10 to 15 feet below grade.

Construction Timing

The construction is anticipated to begin in September 2014, and be completed within approximately 12 months. Site restoration and pump station upgrades will be the final phases of the construction and is anticipated to be completed between August and September 2015.

Source: Census 2000 Data, The CaSIL, MBA GIS 2012.

Michael Brandman Associates

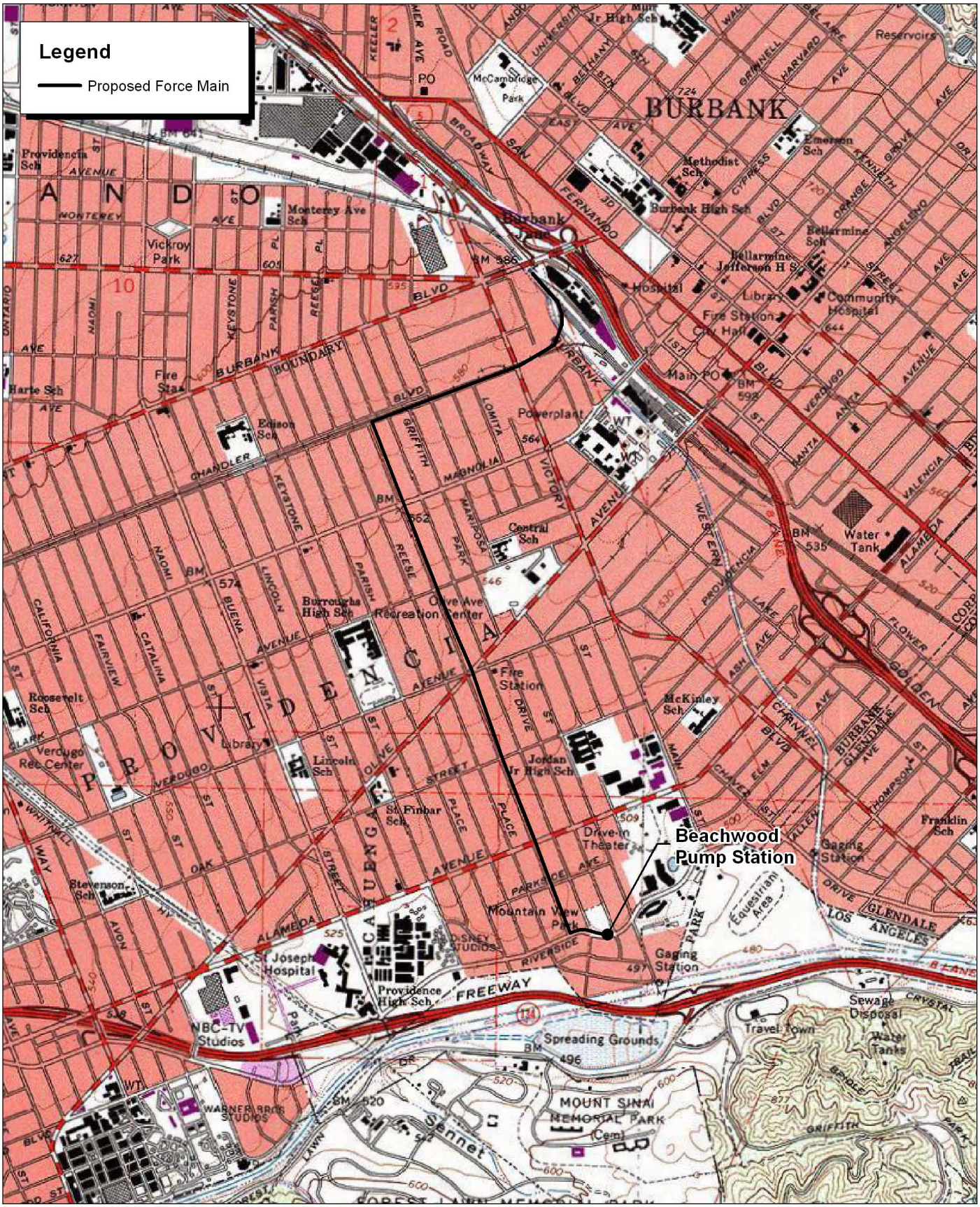
NORTH

5 2.5 0 5 Miles

Exhibit 1
Regional Location Map

09140031 • 08/2012 | 1_regional.mxd

P S O M A S • CITY OF BURBANK PUMP STATION AND FORCE MAIN PROJECT
CULTURAL RESOURCES RECONNAISSANCE REPORT



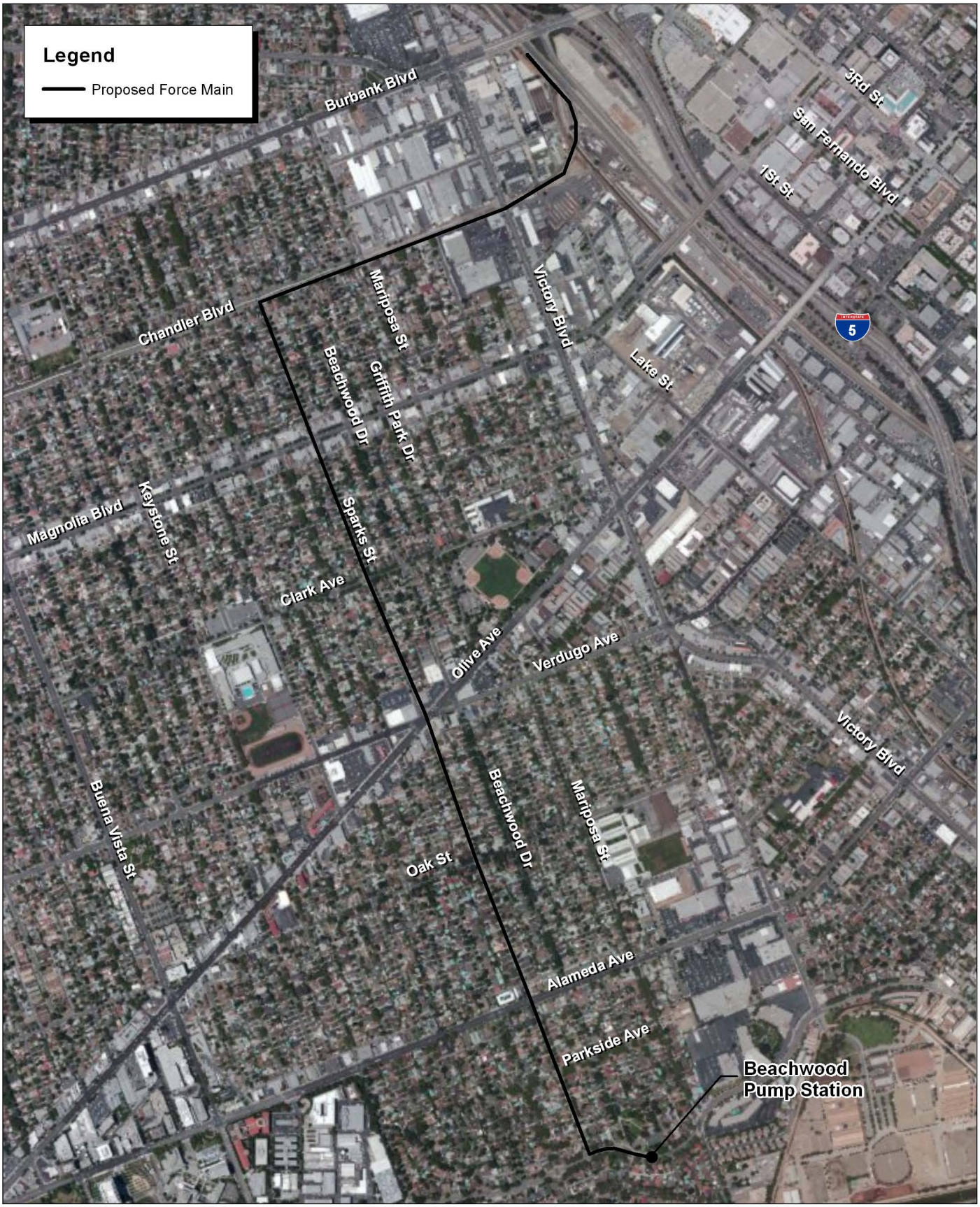
Source: TOPO! USGS Burbank, CA (1991) 7.5' DRG.

NORTH

2,000 1,000 0 2,000 Feet

Michael Brandman Associates

Exhibit 2
Local Vicinity Map
Topographic Base



Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012.

Michael Brandman Associates

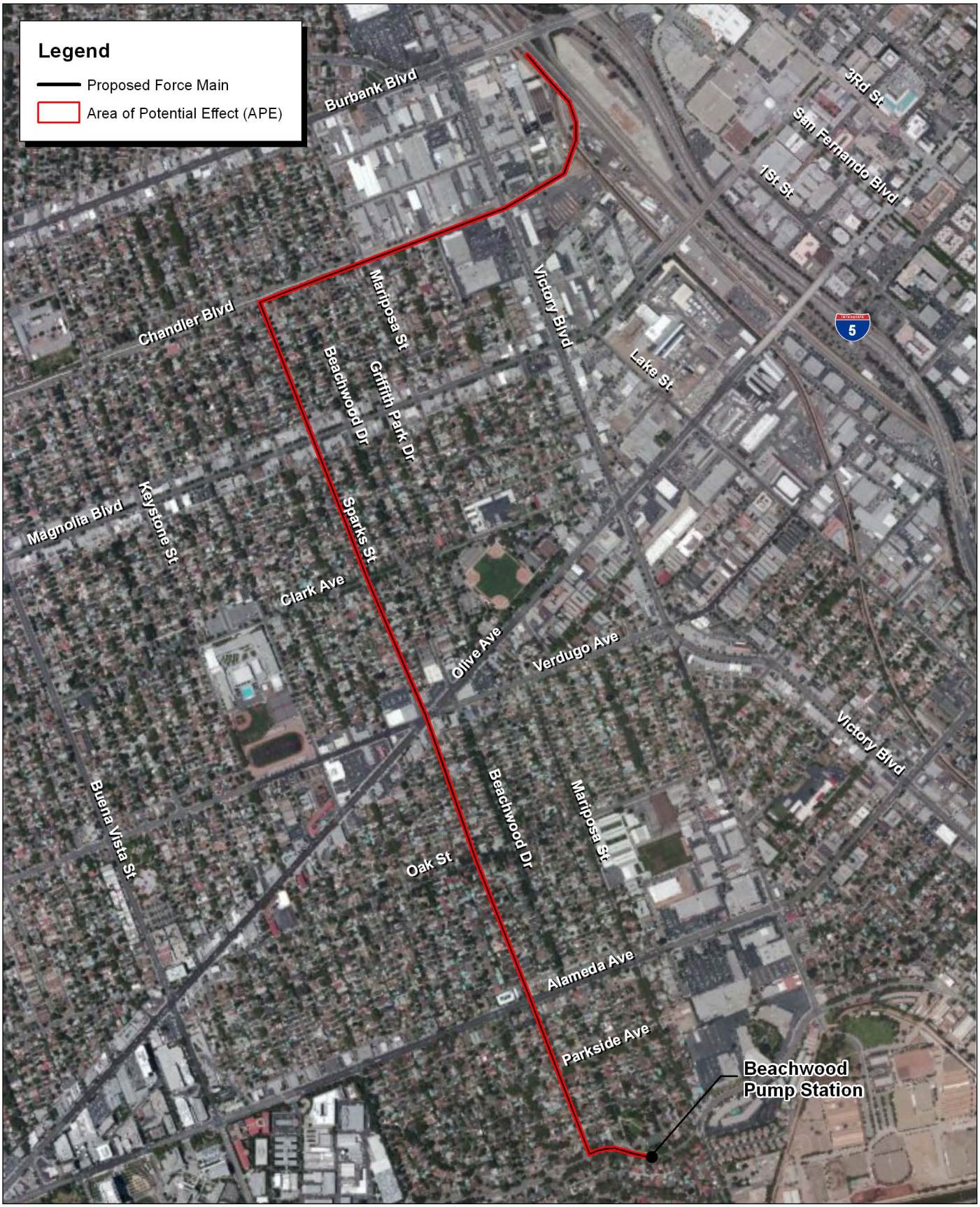
NORTH

1,200 600 0 1,200 Feet

Exhibit 3
Project Alignment Map

SECTION 3: AREA OF POTENTIAL EFFECT

After a field review of the Project, FCS believes there to be no direct impact to any recorded or unrecorded cultural resources along the route. Indirect impacts in the form of vibration effects to existing structures during construction are possible 50 feet or less from the centerline of the force main route. Pipe-jacking (a form of tunneling) will occur at certain intersections. The FCS archaeology observed that a residential sewer line runs beneath the center of North and South Sparks Street, and the new force main will be placed between the centerline of North and South Sparks Street and the east curb. For this reason, the Area of Potential Effect (APE) for this report is the existing buried facility at Mountain View Park, a band of land near and in North and South Sparks Street between Riverside Drive and Chandler Boulevard, and the force main replacement route along Chandler Boulevard to the BWRP (see Exhibit 4).



Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012.

Michael Brandman Associates

NORTH

1,200 600 0 1,200 Feet

Exhibit 4
Area of Potential Effect Map

09140031 • 04/2014 | 4_APE.mxd

SECTION 4: BURBANK DEVELOPMENT HISTORY

Galvin and Taniguchi (GPA 2009) have provided the most recent history of Burbank city development and historical background specifics and can be accessed online (http://www.burbankca.gov). GPA does not recognize any potential historical district in or near the Force Main Project site, but they do list 10 recommended historic districts elsewhere in the City. Because historic architectural significance is subject to reinterpretation as time passes and neighborhoods get older, the potential for more historic districts elsewhere in Burbank is inevitable. A second aspect of the GPA report is that common architectural styles of residential and commercial development are found within the proposed Burbank historical districts: some of these styles can be found in and near the Project site.

During the Depression, manufacturing (aviation) and Hollywood (studio development) brought the comfort of prosperity to a lower to middle-class suburban City that was rare elsewhere on the West Coast. Construction of hundreds of single family homes took place between 1930 and 1938 and the number of residents gained was substantial. Incorporated in 1911 and annexing County land tracts each year, City population stood at 2,913 in 1920 rising to 78,577 in 1950. Within the Project APE alone, over 275 structures were built between 1924 and 1959. Much of the land in the Project site was located on the old Rancho Providencia property, with some land from the Scott Tract near the north end. Residential development of these areas began in the early 1920's and was essentially complete by 1959.

The old sheep ranching lands of the San Fernando Valley, like all properties in Los Angeles County before about 1910, were divided into pieces bearing the names of their owners and/or locally famous Mexican landholders. In the 1900's, Los Angeles County's Tract and Lot system began to appear with Tract numbers being assigned to subdivisions of land recorded at the Assessor's Office. Lots within those Tracts were assigned a series of numbers beginning with Lot 1. This visual method of subdivision left its mark on the official records because each official parcel number (the Assessors Information Number, or AIN) now recorded with the Los Angeles County Assessor bears an official location description based on the older system. The Tracts discussed below are much larger than those sections crossed by the streets in the APE, and discussion of the properties in the APE are limited to those parcels located within 100 feet of the center of the name streets. Maps of each Tract were downloaded from the Los Angeles County Assessor website before the Project site was visited.

GPA lists a series of main structural design styles in their report. Some of the styles observed during the survey included Bungalows, Tudor Revival, Spanish Colonial, Minimal Traditional, and Mid-Century Commercial. Structures lacking distinctive styles were also observed. Ranch homes were nonexistent because the lot sizes along North and South Sparks Street ranged between 45 to 50 feet wide and 130 to 135 feet long. Most of the structures were between 800 and 1300 square feet with detached garages in the rear. The Tracts in this area appear to have been developed by plotting the lots, paving the streets, grading the lots flat. Two or three homes would be built on opposite sides of the street, then the developer would sell the remainder of the lots and new homes would be built one by one, much exhibited a small row of identical homes (see 1511, 1515 and 1519 West Alameda

Avenue) and all of these are Minimalist multi-family structures built in 1944, but this type of structure homogeneity is quite rare in this area.

SECTION 5: RECORDS SEARCH

On July 11, 2012, FCS Project Archaeologist Wayne Bonner, M.S. undertook a cultural resource records search at the South Central Coastal Information Center (SCCIC) located at CSU-Fullerton. Review consisted of examining maps and files for professional cultural resource studies that had taken place within 0.5 mile of the APE. Any recorded cultural resources sites in that zone were copied, as was the Historic Property Data File for the City of Burbank portion of Los Angeles County. This file lists all structures, recorded or not, that had been the subject of Office of Historic Preservation (OHP) review.

The record search showed that no previous studies have ever taken place in the APE. No sites have been recorded for the APE. Three structures have been reviewed by the OHP along North and South Sparks Street: these are 541 North Sparks Street, 118 North Sparks Street, and 548 South Sparks Street. Each were recorded as "6Y" or determined ineligible for the National Register through consensus.

SECTION 6: PREHISTORIC AND HISTORIC CULTURAL SETTING

Four general, but distinctive, cultural periods have been identified by Wallace (1955) for the prehistoric occupation of southern California (Early Hunter; Milling Stone; Intermediate; Late). Despite the date of his research, these temporal stages represent a reasonable interpretation of the prehistoric past in the coastal part of the Los Angeles Basin.

6.1 - Early Hunter Period (before 6500 B.C.)

Early Hunter period sites are characterized by large projectile points, and other stone implements adapted to chase big game animals. The large size and weight of the points suggest that the primary weapon for hunting was the dart, propelled by a spear thrower. Lack of grinding tools, suggest that the inhabitants were not exploiting the plant foods to the extent that later cultures were. They were nomadic in hunters, following the game throughout the seasons. Archaeological sites representing this early period are not common.

6.2 - Milling Stone Period (about 6500 B.C. to 1000 B.C.)

The Milling Stone Period (about 6500 B.C. to 1000 B.C.) represents a long period of time characterized by small, highly mobile groups of Native Americans. These groups probably had a seasonal round of settlement that included both inland and coastal residential bases. They relied primarily on grasses and seeds for food. Characteristic inland sites include numerous manos, metates, and hammerstones. Shell middens are more common at coastal sites.

6.3 - Intermediate Period (about 1000 B.C. to A.D. 750)

Mortars and pestles first appear in the Intermediate Period (about 1000 B.C. to A.D. 750), indicating knowledge of acorn leaching. Use of the acorn probably permitted greater sedentism, especially at inland locations. Large projectile points suggest use of spear throwers rather than the bow and arrow. Settlement patterns during this period are not well understood.

6.4 - Late Period (A.D. 750 to Historic Contact or >1542)

The Late Period (A.D. 750 to Historic Contact or >1542) saw a more semi-sedentary settlement pattern. Smaller project points suggest introduction of the bow and arrow and less or no reliance on the spear thrower. The end of the Late Period is defined by the incursion of the Spanish military and Missionaries into California. Historical documents prove that the Toluca and Lankershim area was part of the territory occupied by the Gabrielino Native American group (Bean and Smith 1978). Their settlement pattern and subsistence were likely an extension of those practiced during the Late Period. Important food resources would have been acorns, agave and mesquite for interior dwellers, and fish for coastal dwellers. Protein would have been provided by hunting game and fishing. Gabrielino villages would have been located near reliable fresh water sources such as the Los Angeles River. Temporary camps would have been utilized during hunting and gathering trips away from the main village.

SECTION 7: RECONNAISSANCE SURVEY

Given that it was uncertain that recorded and/or unrecorded historic properties would be directly affected by construction, FCS undertook a reconnaissance survey of the APE on the morning of July 13, 2012. The archaeologist drove that section of Riverside Drive between Mountain View Park and South Sparks Street, South and North Sparks Street itself, plus the proposed alignment along Chandler Boulevard. Access to the Burbank Water Plant was not attempted. North and South Sparks Street was driven and photographs of main intersections and certain homes were taken. Each Tract discussed below begins at the south end of the APE with discussion of Tracts running to the north.

Within the set of homes facing the project right-of-way, 39 were built in the 1920s; 96 were built in the 1930s; 102 were built in the 1940s; and 36 in the 1950s. No homes were built between 1932 and 1934; none were built in 1943. The greatest number of homes was built in the 1938 and 1939 years: 36 and 37 respectively. One house, located at 127 North Sparks Street was built in 1910 in a Cottage style. This is the oldest known structure within the APE and was probably built as a farmhouse before the lands were subdivided into Tracts. The drive to the house probably extended north from Verdugo Avenue or Olive Avenue, which were streets platted and recorded on the USGS 1892 Burbank, CA. topographic map.

7.1 - Tract 9766 in the APE

This consists of properties facing south on Riverside Drive between Mountain View Park and South Sparks Street. All lots were developed for single-family residences (SFRs) between 1938 and 1951. There are 7 relatively upper end homes built in Bungalow and Minimal Traditional styles. Riverside Drive is quite wide at this point and the street-side landscaping is well-kept with many large original trees.

7.2 - Tract 8488 in the APE

South Sparks Street is located in this Tract between Alameda Avenue south to the edge of Tract 9766 near Riverside Drive. South Sparks Street is listed as 60 feet wide on the AIN maps: this include sidewalks, which reduce the effective curb-to-curb distance to 33 feet. Beginning in 1924 and ending about 1952, 44 SFRs were built on either side of South Sparks Street with a few facing Alameda Avenue. A few appear to be replacement structures. Most of these homes are small Minimal Traditional houses with several among them being completely remodeled. Several Spanish Colonial style homes in well-kept condition and remodeled Bungalows were observed. Original-looking homes can be found at 515 South Sparks Street (1924), 531 South Sparks Street (1925), 541 South Sparks Street (1926) and 548 South Sparks Street (1926). This section of this Tract has some of the oldest homes near the APE, but many houses have been completely remodeled. Some of the homes in this area are slightly run-down, but all foundations are either cinder block or poured concrete walls with crawlspace. 618 South Sparks Street is a Mid-Century Modern remodel in nice condition. The stucco-clad Minimal Traditional style dominates amongst the originals. 1600 West Alameda Avenue is the structure in the Project that is nearest to a the proposed pipeline. The foundation is

located 30 feet from the South Sparks Street/Alameda Avenue pipeline alignment, and the structure is a 3-unit triplex built in 1949 and possibly remodeled in 1951.

7.3 - Tract 10541 in the APE

Located on South Sparks Street north of Alameda Avenue, this Tract ends about halfway up South Sparks Street. There are 24 homes in this Tract that face South Sparks Street, with the earliest built in 1941 and the latest in 1956. Several rebuilds exist. Structures outside the APE and to the west fronting Reese Place are some of the youngest in this section of Town. Historic aerial views (www.historicaerials.com) show that vacant lots along Reese were still available as of 1954. Most of the structures off South Sparks Street are stucco covered Minimal Traditional homes. One Ranch style home on a slab was observed, and some of the houses exhibit Ranch trim elements. This reflects the Post-War trend of larger houses with Ranch being the favored type in new developments.

7.4 - Tract 9298 in the APE

Located on South Sparks Street south of Oak and north of Tract 10541, this Tract exhibits 26 homes with several facing Oak Street. All houses were built between 1927 and 1955. This portion of the Tract exhibits Minimalist, Bungalows and Tudor Revival styles several of which have been heavily remodeled to include Ranch elements and brick facades. Some structures have large setbacks to the far edge of the Lot.

7.5 - Tract 10032 in the APE

Homes facing South Sparks Street in this Tract were mass produced at a good rate. Located between Oak Street and Verdugo Avenue, 1938 and 1939 saw 14 homes built each year with Minimalist, Spanish Colonial, Bungalow, and one Tudor Revival styled structure. Businesses front Verdugo Avenue and Olive Avenue. One business structure appears to have been constructed in a Moderne Style (1947 W. Olive Avenue). The neighborhood retains much of its original charm and appears to this reviewer to have a number of well-kept original homes. Remodels have occurred but many of them have been remodeled with attention to the original elements. A total of 46 homes were built facing South Sparks Street and Olive Avenue between 1928 and 1947. One was rebuilt in 1984.

7.6 - Tract 6462 in the APE

One of the older Tracts facing North and South Sparks Street is located from Olive Avenue north to about halfway from Clark Avenue. There are 17 homes built from 1910 to 1951, with one house rebuilt in 1960 and one in 2008. Businesses front Olive Avenue and Verdugo Avenue. One of these business structures, 1505 W. Olive Avenue, was built in a Mid-century Modern style but was being gutted and remodeled at the time of the site visit. The oldest home in the APE is located at 127 North Sparks Street (built 1910), and appears to represent a Cottage or Bungalow style. Some of these homes are run-down and remodels are rampant. One house at 143 North Sparks Street is a very nice Minimalist structure, which lies just south of a very large 2008 remodel.

7.7 - Tract 9284 in the APE

This Tract front North Sparks Street at Clark Avenue to a point halfway south to meet the north edge of Tract 6462. There are 23 homes in this Tract built 1927-1956. Of particular interest are the two Spanish Colonials at 224 (1928) and 228 (1928), and another at 233 North Sparks Street (1939) with an unusual arched window facing the street.

7.8 - Tract 9507 in the APE

This Tract is located along North Sparks Street from Clark to Magnolia Boulevard. There are 51 homes in the Tract facing North Sparks Street including several businesses facing Magnolia Boulevard. The homes were built between 1928 and 1952. Two structures were built 1977 fronting Magnolia Boulevard. The majority of these homes are in good condition, with well-kept facades and yards. The street is tree-lined with large and probably original tract vegetation. Minimalist and Ranch homes are represented, and there are several remodels. One house, located at 420 N. Parks (built 1928) is a beautiful Spanish Colonial with an unusual arched window facing North Sparks Street. 1600 Magnolia Boulevard is a Streamline Moderne looking structure that, while likely completely refurbished, appears to be in very good condition. Other businesses in this district occur as small well-kept mid-century commercial structures. The run of business buildings along Magnolia Boulevard suggest a future Historic District to this reviewer. Excluding the occasional ugly overly massive remodel, the neighborhood exudes the charm of the pre-War recovery period of the City (1937-1940) in which about half the Tracts' homes were built.

7.9 - Tract 9428 in the APE

Extending along North Sparks Street from Magnolia Boulevard to Chandler Boulevard, this Tract includes businesses fronting Magnolia Boulevard and homes fronting Chandler Boulevard. The tract runs east along Chandler Boulevard to Mariposa, which exhibits original landscaping in the form of massive trees. There are 68 structures in this Tract, with 22 different build years represented. About half of the homes were built between 1937 and 1941, and a wide variety of styles is represented. A few of the homes have undergone total remodeling, but there are a number of original structures that exhibit minimal change. One Spanish Colonial, which is possibly a completely original structure, is located at 521 North Sparks Street (built 1926), and two Tudor Revival structures are represented, one at 531 North Sparks Street (built 1926) and one which retains the original v-less roof line at 615 North Sparks Street. These likely exhibited shakes in the original, but now have asphalt shingles. Overall, the character of the neighborhood is somewhat eclectic because of the wide variety of dates represented.

7.10 - Tracts along Chandler Boulevard to the Burbank Water Plant

The existing force main will remain along this section of the Project, and the proposed force main will parallel the existing force main. Tract 6022 holds an assortment of homes and multi-plexes fronting the old Southern Pacific spur railroad tracks that ran along Chandler Boulevard from about 1890 to 1992. In 1992, the spur was abandoned and the City constructed a landscaped bike path along the centerline. The original railroad grade still exists east from Mariposa. Tract 3419 is located

on the north side of Chandler Boulevard between Mariposa Street and Victory Boulevard. These lots probably served the small businesses that sprouted up along Victory Boulevard, and buildings are known from 1935 to about 1966. One Lot features an original metal Quonset hut. The force main route runs to Victory Boulevard, then runs along the north side of the existing railroad spur and to the access road of the wastewater treatment plant. No formal Tract subdivisions occur east of Victory Boulevard, which suggests that the area was used for business since the very early 1900s.

SECTION 8: INDIRECT VIBRATIONAL EFFECTS TO STRUCTURES NEAR THE PROJECT SITE

Indirect impacts to adjacent historic-era structures are possible during construction of a large-diameter pipeline of the sort proposed for this project because older structures were not built to modern codes, many of which were devised to mitigate for potential damage during earthquakes. The following is based on the vibration evaluation prepared by FCS in the Noise Analysis (2014).

While long-term operations of the proposed project would not generate excessive groundborne vibration or groundborne noise levels, short-term construction could potentially introduce groundborne vibration to the project site and the surrounding area. Construction activities can produce vibration that may be felt by adjacent uses. The construction of the proposed project would involve jacking and boring at the intersections of W. Chandler Boulevard and Victory Boulevard, W. Magnolia Boulevard and North Sparks Street, W. Clark Avenue and North Sparks Street, and W. Verdugo Avenue and North Sparks Street. Jacking and boring would have a similar vibration impact as drilling, 0.089 inch per second peak particle velocity (PPV) at 25 feet, with an approximate vibration level of 87 velocity decibels (VdB). Jacking and boring would occur only at locations where it is necessary to tunnel under main roads. These locations are mostly adjacent to commercial/industrial receptors. The only intersection with residential receptors adjacent to jacking and boring activities is West Clark Avenue and North Sparks Street. The home on the southeastern corner of the intersection is the nearest home to the jacking and boring activities. This home is approximately 30 feet from the point where jacking and boring activities would occur. Although the vibration from the drill could be perceptible at residential boundaries, it would be intermittent, overshadowed by roadway activities, and cease once the pipeline has been installed under the road. According to the Federal Transit Administration (FTA), the construction damage criteria for non-engineered timber and masonry buildings is 0.2 PPV (in/sec), and this threshold is passed when structures are set 14 feet or less from the vibration source. The drilling vibration impact at the nearest residence would be approximately 0.089 PPV, and this residence is the closest residential structure at any point along the route. Therefore, no construction-related vibration damage to homes would occur from construction activities. Impacts from other construction-related equipment along the alignment are anticipated to be similar or less [at 30 feet] than those from jacking and boring.

Unless the foundation of a structure is located 14 feet from an excavation during the project, the effects of vibration on a non-engineered timber and masonry building will be less than 0.2 PPV (in/sec). Because there are no buildings less than 14 feet from any one excavation or boring location, potentially damaging indirect vibrational impacts to nearby structures will not take place during construction or operation of the project.

SECTION 9: NATIVE AMERICAN SACRED LANDS SEARCH

On July 11, 2012, FCS sent a sacred lands search request for the Native American Heritage Commission (NAHC) for the purpose of determining potential impacts to unlisted and possibly sacred Native American use areas or sites. A response was provided to us on July 16, 2012, which indicated that no Native American cultural resources were identified within 0.5 mile of the APE. The NAHC recommended that FCS contact specific tribal authorities that may want to comment on our search request. A letter to the nine listed tribal authorities was sent July 17, 2012. As of the date of this report, no responses from any tribe with regard to our inquiry have been received. Copies of all correspondence have been provided as an attachment in this report.

SECTION 10: PALEONTOLOGICAL REVIEW

According to the Los Angeles, CA. 30 x 60 quadrangle map (http://pubs.usgs.gov/of/2005/1019/la1_map.pdf), the project site is located on San Fernando Valley Holocene-era sediments associated with the decomposition of the nearby Verdugo Avenue and Santa Monica Mountains. At depth, the alluvium may be dated to the Late Pleistocene, which has some potential to preserve fossiliferous resources. Given the historical background of the Project site, fossiliferous Late Pleistocene deposits may be encountered at depths 10 feet below current grade. Once these depths are reached during construction, a qualified paleontologist should monitor all excavations below that depth.

SECTION 11: INITIAL STUDY QUESTIONS

The following are responses to the California Environmental Quality Act (CEQA) Guidelines environmental checklist questions for cultural resources. The responses are based on the information above.

Would the Project	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

11.1 - Responses to Impact Questions

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Less Than Significant Impact. The Project site is fully urbanized, and no direct impacts to any recorded or unrecorded potential historic-era cultural resource will take place during this project. All older structures that might be considered potentially historic structures and which could be affected by vibrations associated with construction, are too far away to be directly affected by construction-related vibrations. As such, less than significant impacts to historical resources are expected. Further analysis of potential impacts associated with historic-era resources is not necessary, and construction-related mitigation measures are not recommended.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less Than Significant Impact With Mitigation Incorporated. The Project site is fully urbanized; no direct impacts to any known recorded or archaeological cultural resource would occur. However, it is always possible that buried archaeological resources could be uncovered during excavation-related

project impacts. To reduce the potential for impacts to unknown archaeological resources, the following mitigation measures are required.

MM CUL-1 A qualified project archaeologist shall be retained by the Applicant and approved by the City to prepare a monitoring mitigation plan. A qualified archaeologist is defined as an archaeologist meeting the Secretary of the Interior Professional Qualification Standards for Archaeology. An archaeological monitor, supervised by the project archaeologist, shall monitor ground-disturbing activities in previously undisturbed soils as designated by the project archaeologist. If archaeological materials are identified during monitoring or unexpectedly during other project activities, all ground-disturbing activity in the vicinity of the find shall cease until the project archaeologist has evaluated the find. If the project archaeologist determines that the find may be significant, the archaeologist will develop a treatment plan. If the find is prehistoric in nature, Native American groups affiliated with the project vicinity as indicated by the Native American Heritage Commission, shall be notified of the find and invited to provide input for the treatment plan within a specified time frame. The project archaeologist shall prepare a report presenting the methods and results of the monitoring. A report on a treatment plan, if any, may be prepared separately. Copies of the reports shall be submitted to the Applicant, the City, and CHRIS-SCCIC. Any artifacts recovered during the monitoring program or treatment plan shall be curated along with copies of the appropriate report at an accredited facility selected by the City. If prehistoric materials are recovered, affiliated Native American groups shall be consulted regarding curation location of these artifacts.

MM CUL-2 The project archaeologist shall review final construction plans and soils information and attend a pre-construction meeting. The archaeologist shall prepare education materials for construction crew indicating the types of buried artifacts and features that may be encountered along the route of the project. For those portions of the project for which it is clearly documented that all excavations will take place in fill or otherwise disturbed soil, no monitoring shall be required. For those portions of the project for which the nature of underlying soils is unknown, the archaeologist shall establish a monitoring schedule. If underlying soils in an unknown area are determined to have been previously disturbed once construction and monitoring begins, the archaeologist may reduce or terminate monitoring for that area with the disturbed soils.

MM CUL-3

Implementation of the above mitigation measures, would reduce potential impacts to unknown archaeological resources to less than significant.

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant Unless Mitigation Incorporated. Fossil-bearing geologic formations are known to exist in the foothills surrounding the San Fernando Valley, and it is possible that such resources will be encountered if construction takes place 10 or more feet below current grade. Once a depth of 10 feet is reached during project-related excavations, a qualified paleontologist must monitor all excavations until the paleontologist determines the potential impact to fossil resources has been reduced to "low." To reduce the potential impacts to paleontological resources, the following mitigation measure is required.

MM CUL-3 If construction takes place 10 or more feet below current grade, a qualified project paleontologist shall be retained by the Applicant and approved by the City to develop a paleontological monitoring plan. A qualified project paleontologist is here defined as a paleontologist meeting the qualifications established by the Society of Vertebrate Paleontologists.

MM CUL-4 The project paleontologist shall attend a pre-grade meeting in order to become familiar with the proposed depths and patterns of grading of the study area. The project paleontologist shall establish a curation agreement with an accredited facility prior to the initiation of ground-disturbing activities.

MM CUL-5 A paleontological monitor (the monitoring archaeologist and the monitoring paleontologist may be the same person), supervised by the project paleontologist, shall monitor ground-disturbing activities identified by the paleontologist as having potential to encounter paleontological resources. Disturbed soils are anticipated not to have potential to contain intact fossils. If soils in a given area are determined to have been previously disturbed once construction and monitoring begins, the project paleontologist may reduce or terminate monitoring for that area with the disturbed soils. If fossils are found during monitoring or other project-related ground-disturbing activities, ground-disturbing shall be halted in order to allow evaluation of the find and determination of appropriate treatment.

MM CUL-6 The project paleontologist shall prepare a final report on the monitoring. If fossils are identified, the report shall contain an appropriate description of the fossils, treatment, and curation. A copy of the report shall be filed with the City of Burbank and shall accompany any curated fossils.

Implementation of the above mitigation measures, would reduce potential impacts to potential paleontological resources to less than significant.

d) Would the project disturb any human remains, including those interred outside of formal cemeteries?

Less than Significant Impact Unless Mitigation Incorporated. There are no existing or known formal cemeteries within or near the boundary of the Project. Therefore, implementation of the Project is not expected to impact known human remains associated with either a formal or informal cemetery. Notwithstanding, in the event that any human remains or related resources are discovered, such resources would be treated in accordance with Federal, State, and local regulations and guidelines for disclosure, recovery, relocation, and preservation, as appropriate, including CEQA Guidelines Section 15064.5(e). The following mitigation measure is required to reduce potential impacts to unknown human remains.

MM CUL-7 If human remains are encountered unexpectedly during construction excavation and grading activities, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the California Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains.

Implementation of the above mitigation measure would reduce potential impacts to unknown human remains to less than significant.

SECTION 12: REFERENCES

Bean, L.J. and C.R. Smith. 1978. Gabrieliño. In Handbook of North American Indians California Volume 8. R.F. Heizer, Editor pp. 538-549 Smithsonian Institution, Washington, D.C.

FirstCarbon Solutions (FCS) 2014. Noise Analysis Letter Report for City of Burbank Pump Station and Force Main Project, Katie Wilson, Author. On file FCS and PSOMAS, Inc.

GPA (Galvin, A. and B. Taniguchi). 2009. City of Burbank Citywide Historic Context Report. Downloaded from Burbank website July 15, 2012. Website: http://www.burbankca.gov/Modules/ShowDocument.aspx?documentid=4393

Wallace, W.J. 1955. A Suggested Chronology for Southern California Coastal Archaeology. Southwestern Journal of Anthropology 11(3):214-230.

Appendix A: Site Photographs

View from Riverside Drive north toward the existing buried sewage pump structures located in Mountain View Park.

View north of the neighborhood at the corner of Sparks and Riverside Drive.

Source: Michael Brandman Associates, 2012.

View north of the neighborhood at the corner of Sparks and Alameda.

View north of the neighborhood at the corner of Sparks and Oak.

Source: Michael Brandman Associates, 2012

Michael Brandman Associates

Appendix A
Site Photographs

View north of the neighborhood at the corner of Sparks and Verdugo.

View of a Bungalow built 1910 located at 127 North Sparks. This is the oldest known structure near the Project.

Source: Michael Brandman Associates, 2012

Michael Brandman Associates

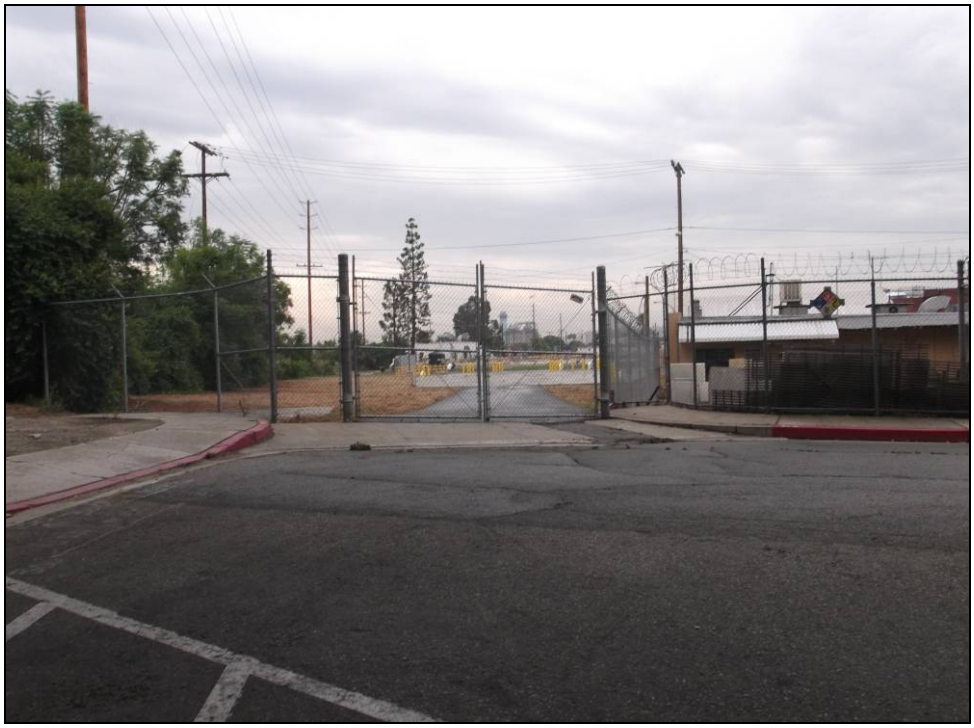
Appendix A
Site Photographs

View north of the intersection of Sparks and Magnolia with a commercial Streamline Moderne ("stripped" per GPA) brick structure to the left.

View of Tudor Revival structure in excellent condition at 615 Sparks.

Source: Michael Brandman Associates, 2012

View west at the corner of Chandler and Mariposa where the old Southern Pacific railroad grade ends and merges with the modern Chandler bikeway.



View south from Burbank Blvd at the new pumping station on the grounds of the Burbank Water Plant. Access not gained for survey.

Source: Michael Brandman Associates, 2012

Appendix B: NAHC Correspondence

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
915 Capitol Mall, RM 364
Sacramento, CA 95814
(916) 653-4082
(916) 657-5390 – Fax
nahc@pacbell.net

Information Below is Required for a Sacred Lands File Search

Project: The Burbank Force Main Project

County: Los Angeles County – City of Burbank (Lead Agency).

USGS Quadrangle Name: Burbank, CA.

Township: 1 North --- Range: 14 West Section(s): unsectioned

Company/Firm/Agency: Michael Brandman Associates

Contact Person: Michael H. Dice, M.A.

Street Address: 621 E. Carnegie Dr. Suite #100 San Bernardino CA. 92408

Cell 714.742.0468 (preferred number)

Office Phone: 909.884.2255

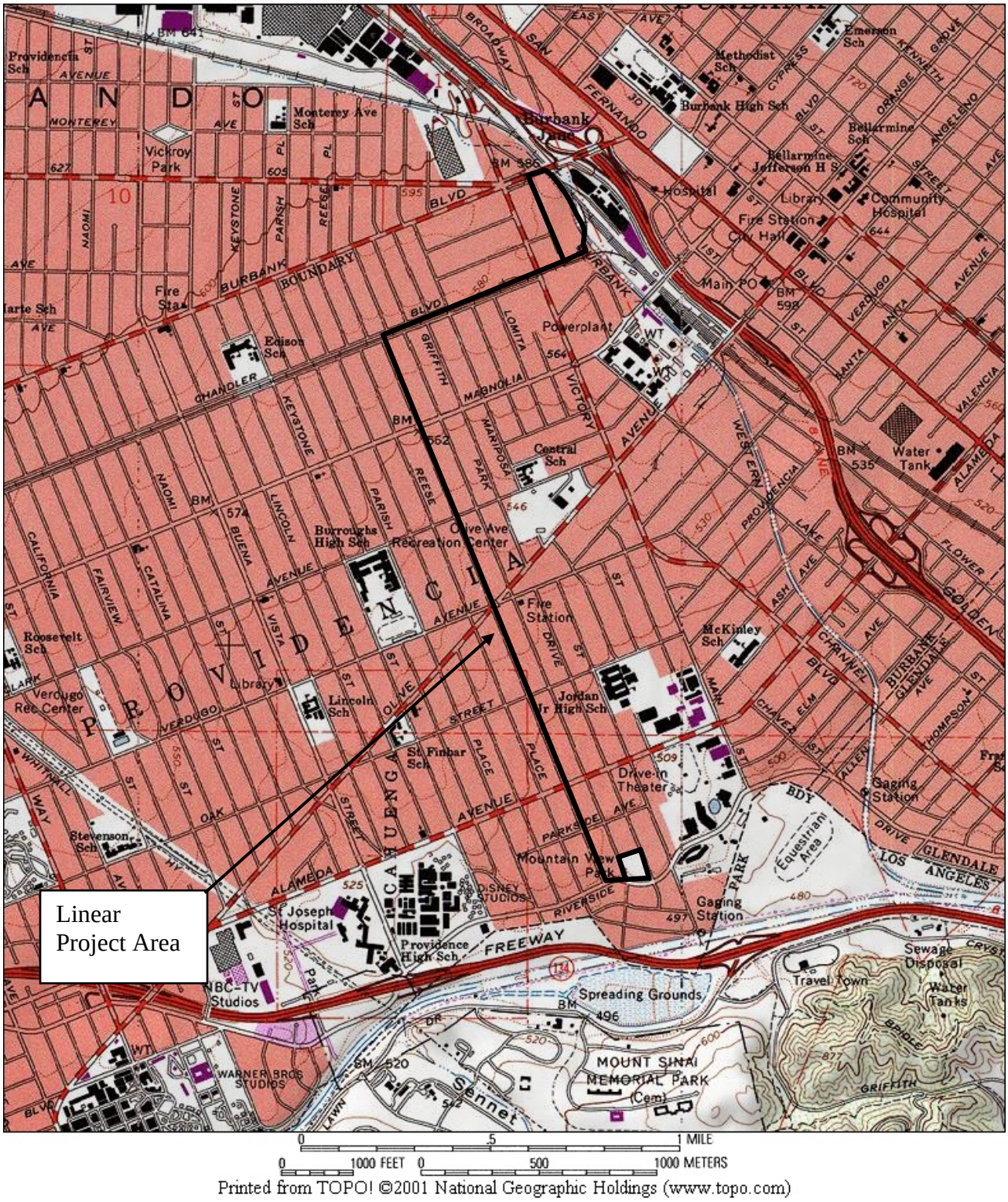
Fax: 909.884.2113 (preferred delivery method)

Email: mdice@brandman.com

SEE ATTACHED MAP

The project consists of the abandonment of an old sewer main located below the pavement of Griffith Park Drive/Chandler Blvd. The main, running between the Burbank Pump Station at the north end and Mountain View Park at the south end, shall be replaced with a new main running beneath the pavement of Sparks Place/Chandler Blvd. Excavations shall be up to 15 feet below current grade. All aspects of the project shall take place below pavement or within disturbed fill of the Pump Station and the Park.

MBA project #0971.0032 - USGS Burbank, CA. 7.5' topographic map



Printed from TOPO! ©2001 National Geographic Holdings (www.topo.com)

Source: Topo! @National Geographic Holdings.

Exhibit 1
Location of Linear Project Area

Michael Brandman Associates

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

July 16, 2012

Mr. Michael H. Dice, M.A., RPA
Michael Brandman Associates
621 E. Carnegie Drive, Suite 100
San Bernardino, CA 92408

Sent by FAX to: 909-884-2113
No. of Pages: 5

Re: Sacred Lands File Search and Native American Contacts list for the proposed **"The Burbank Force Main & Burbank Pump Station Project (abandon old were and replace)**;" located in the Griffith Park area; City of Burbank; Los Angeles County, California

Dear Mr. Dice

The Native American Heritage Commission (NAHC) conducted a Sacred Lands File searches of the 'area of potential effect,' (APE) based on the USGS coordinates provided and **Native American cultural resources were not identified** within one-half mile of the project area of potential effect (e.g. APE): you specified. Also, please note; the NAHC Sacred Lands Inventory is not exhaustive and does not preclude the discovery of cultural resources during any project groundbreaking activity.

California Public Resources Code §§5097.94 (a) and 5097.96 authorize the NAHC to establish a Sacred Land Inventory to record Native American sacred sites and burial sites. These records are exempt from the provisions of the California Public Records Act pursuant to. California Government Code §6254 (r). The purpose of this code is to protect such sites from vandalism, theft and destruction.

In the 1985 Appellate Court decision (170 Cal App 3rd 604), the court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources, impacted by proposed projects including archaeological, places of religious significance to Native Americans and burial sites

The California Environmental Quality Act (CEQA – CA Public Resources Code §§ 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential

effect (APE), and if so, to mitigate that effect. CA Government Code §65040.12(e) defines "environmental justice" provisions and is applicable to the environmental review processes.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Local Native Americans may have knowledge of the religious and cultural significance of the historic properties of the proposed project for the area (e.g. APE). Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). We urge consultation with those tribes and interested Native Americans on the list that the NAHC has provided in order to see if your proposed project might impact Native American cultural resources. Lead agencies should consider avoidance as defined in §15370 of the CEQA Guidelines when significant cultural resources as defined by the CEQA Guidelines §15064.5 (b)(c)(f) may be affected by a proposed project. If so, Section 15382 of the CEQA Guidelines defines a significant impact on the environment as "substantial," and Section 2183.2 which requires documentation, data recovery of cultural resources.

The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

Partnering with local tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 4(f), Section 110 and (k) of the federal NHPA (16 U.S.C. 470 *et seq*), Section 4(f) of the Department of Transportation Act of 1966 (23 CFR 774); 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The NAHC remains concerned about the limitations and methods employed for NHPA Section 106 Consultation.

Also, California Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery', another important reason to have Native American Monitors on board with the project.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. An excellent way to reinforce the relationship between a project and local tribes is to employ Native American Monitors in all phases of proposed projects including the planning phases.

Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APE and possibility threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton

Attachment: Native American Contact List

Native American Contact
Los Angeles County
July 16, 2012

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Nation
Sam Dunlap, Chairperson
P.O. Box 86908 Gabrielino Tongva
Los Angeles , CA 90086
samdunlap@earthlink.net
(909) 262-9351 - cell

Ti'At Society/Inter-Tribal Council of Pimu
Cindi M. Alvitre, Chairwoman-Manisar
3094 Mace Avenue, Apt. B Gabrielino
Costa Mesa, , CA 92626
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrielino Tongva Indians of California Tribal Council
Robert F. Dorame, Tribal Chair/Cultural Resources
P.O. Box 490 Gabrielino Tongva
Bellflower , CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-761-6417- fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
Private Address Gabrielino Tongva
,
tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna
1875 Century Pk East #1500 Gabrielino
Los Angeles , CA 90067
(619) 294-6660-work
(310) 428-5690 - cell
(310) 587-0170 - FAX
bacuna1@gabrieinotribe.org

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 Gabrielino Tongva
San Gabriel , CA 91778
GTTribalcouncil@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 -FAX

Gabrielino-Tongva Tribe
Linda Candelaria, Chairwoman
1875 Century Pk East #1500 Gabrielino
Los Angeles , CA 90067
lcandelaria1@gabrielinoTribe.org
626-676-1184- cell
(310) 587-0170 - FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed The Burbank Force Main Project; located in the Griffith Park area, City of Burbank Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.

Native American Contact
Los Angeles County
July 16, 2012

Gabrieleno Band of Mission Indians
Andrew Salas, Chairperson
P.O. Box 393 Gabrielino
Covina , CA 91723
(626) 926-4131
gabrielenoindians@yahoo.com

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed The Burbank Force Main Project; located in the Griffith Park area, City of Burbank Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.

Michael Brandman Associates

Fresno
559.497.0310

Irvine
714.508.4100

Palm Springs
760.322.8847

Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 17, 2012

Chairperson Andrew Salas
Gabriel Band of Mission Indians
P.O. Box 393
Covina CA 91723

Subject: **Native American Information Request Letter associated with the Burbank Force Main and Pump Station Project, City of Burbank, California. (USGS *Burbank, CA.* topographic quadrangle)**

Dear:Chairperson Andrew Salas:

Michael Brandman Associates has completed a cultural resource reconnaissance survey of the Burbank Force Main Replacement project. As shown in the attached Exhibit, the project will take place mostly beneath City streets in the south-central portion of the City. The City plans to replace an aging sewer main that allows sewage in the central-southern portion of the City to be pumped to the Burbank Water Reclamation Plants, where the sewage is then treated. MBA does not believe that any prehistoric cultural resource, recorded or not, will be harmed during this project, but we are writing you this letter because the NAHC has indicated that you may have knowledge of the project site.

This information request letter is **not associated with the SB18 process**, but is a document that shall be included in our cultural resource survey report. CEQA Guidelines and Section 106 of the National Historic Preservation Act of 1966 (NHPA) must consider the effects a project may have on historic properties. The definition of "historic properties" can include properties of traditional religious and cultural significance to Native American groups. To determine whether the proposed project may impact any historic properties, including traditional cultural properties, MBA has reviewed background information and consulted with entities such as the NAHC. The Native American Heritage Commission indicated that a records search of Native American Cultural Resources **failed to indicate that any cultural resources** are located within or immediately adjacent to the project area.

We wish to ask if you have any information or concerns about this project area, and/or if the proposed project may have an impact on cultural resources that are important to you. Please feel free to contact me at 909.884.2255 ext. 1208 or my cell 714.742.0468 if you have any questions or information, or you may address and mail a response to my attention at the address below.

Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

Enc: USGS *Burbank, CA*. topographic map

Michael Brandman Associates

Fresno
559.497.0310

Irvine
714.508.4100

Palm Springs
760.322.8847

Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 17, 2012

Tribal Secretary Sam Dunlap
Gabrieleno/Tongva Council/Gabrielino Tongva Nation
P.O. Box 86908
Los Angeles CA 90021

Subject: **Native American Information Request Letter associated with the Burbank Force Main and Pump Station Project, City of Burbank, California. (USGS *Burbank, CA.* topographic quadrangle)**

Dear:Tribal Secretary Sam Dunlap:

Michael Brandman Associates has completed a cultural resource reconnaissance survey of the Burbank Force Main Replacement project. As shown in the attached Exhibit, the project will take place mostly beneath City streets in the south-central portion of the City. The City plans to replace an aging sewer main that allows sewage in the central-southern portion of the City to be pumped to the Burbank Water Reclamation Plants, where the sewage is then treated. MBA does not believe that any prehistoric cultural resource, recorded or not, will be harmed during this project, but we are writing you this letter because the NAHC has indicated that you may have knowledge of the project site.

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Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

Enc: USGS *Burbank, CA*. topographic map

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Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 17, 2012

Chairperson Anthony Morales
Gabrieleno/Tongva San Gabriel Band of Mission Indians
P.O. Box 693
San Gabriel CA 91778

Subject: **Native American Information Request Letter associated with the Burbank Force Main and Pump Station Project, City of Burbank, California. (USGS *Burbank, CA.* topographic quadrangle)**

Dear:Chairperson Anthony Morales:

Michael Brandman Associates has completed a cultural resource reconnaissance survey of the Burbank Force Main Replacement project. As shown in the attached Exhibit, the project will take place mostly beneath City streets in the south-central portion of the City. The City plans to replace an aging sewer main that allows sewage in the central-southern portion of the City to be pumped to the Burbank Water Reclamation Plants, where the sewage is then treated. MBA does not believe that any prehistoric cultural resource, recorded or not, will be harmed during this project, but we are writing you this letter because the NAHC has indicated that you may have knowledge of the project site.

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Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

Enc: USGS *Burbank, CA*. topographic map

Michael Brandman Associates

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Palm Springs
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Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 17, 2012

Chairperson Robert F. Dorame
Gabrielino Tongva Indians of California Tribal Council
5450 Slauson Avenue, Suite 151
Culver City CA 90230-6000

Subject: **Native American Information Request Letter associated with the Burbank Force Main and Pump Station Project, City of Burbank, California. (USGS *Burbank, CA.* topographic quadrangle)**

Dear:Chairperson Robert F. Dorame:

Michael Brandman Associates has completed a cultural resource reconnaissance survey of the Burbank Force Main Replacement project. As shown in the attached Exhibit, the project will take place mostly beneath City streets in the south-central portion of the City. The City plans to replace an aging sewer main that allows sewage in the central-southern portion of the City to be pumped to the Burbank Water Reclamation Plants, where the sewage is then treated. MBA does not believe that any prehistoric cultural resource, recorded or not, will be harmed during this project, but we are writing you this letter because the NAHC has indicated that you may have knowledge of the project site.

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Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

Enc: USGS *Burbank, CA*. topographic map

Michael Brandman Associates

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Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 17, 2012

Bernie Acuna
Gabrielino-Tongva Tribe
1875 Century Park East, #1500
Los Angeles CA 90067

Subject: **Native American Information Request Letter associated with the Burbank Force Main and Pump Station Project, City of Burbank, California. (USGS *Burbank, CA.* topographic quadrangle)**

Dear: Bernie Acuna:

Michael Brandman Associates has completed a cultural resource reconnaissance survey of the Burbank Force Main Replacement project. As shown in the attached Exhibit, the project will take place mostly beneath City streets in the south-central portion of the City. The City plans to replace an aging sewer main that allows sewage in the central-southern portion of the City to be pumped to the Burbank Water Reclamation Plants, where the sewage is then treated. MBA does not believe that any prehistoric cultural resource, recorded or not, will be harmed during this project, but we are writing you this letter because the NAHC has indicated that you may have knowledge of the project site.

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Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

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Michael Brandman Associates

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916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 17, 2012

Chairwoman Linda Candelaria
Gabrielino-Tongva Tribe
1875 Century Park East, #1500
Los Angeles CA 90067

Subject: **Native American Information Request Letter associated with the Burbank Force Main and Pump Station Project, City of Burbank, California. (USGS *Burbank, CA.* topographic quadrangle)**

Dear:Chairwoman Linda Candelaria:

Michael Brandman Associates has completed a cultural resource reconnaissance survey of the Burbank Force Main Replacement project. As shown in the attached Exhibit, the project will take place mostly beneath City streets in the south-central portion of the City. The City plans to replace an aging sewer main that allows sewage in the central-southern portion of the City to be pumped to the Burbank Water Reclamation Plants, where the sewage is then treated. MBA does not believe that any prehistoric cultural resource, recorded or not, will be harmed during this project, but we are writing you this letter because the NAHC has indicated that you may have knowledge of the project site.

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Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

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Michael Brandman Associates

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Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 17, 2012

Director Ron Adrade
LA City/County Native American Indian Comm
3175 West 6th Street Rm. 403
Los Angeles CA 90020

Subject: **Native American Information Request Letter associated with the Burbank Force Main and Pump Station Project, City of Burbank, California. (USGS *Burbank, CA.* topographic quadrangle)**

Dear:Director Ron Adrade:

Michael Brandman Associates has completed a cultural resource reconnaissance survey of the Burbank Force Main Replacement project. As shown in the attached Exhibit, the project will take place mostly beneath City streets in the south-central portion of the City. The City plans to replace an aging sewer main that allows sewage in the central-southern portion of the City to be pumped to the Burbank Water Reclamation Plants, where the sewage is then treated. MBA does not believe that any prehistoric cultural resource, recorded or not, will be harmed during this project, but we are writing you this letter because the NAHC has indicated that you may have knowledge of the project site.

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Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

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Michael Brandman Associates

Fresno
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Irvine
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Palm Springs
760.322.8847

Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 17, 2012

Ms. Cindi Alvitre
Ti'At Society
3094 Mace Ave, Apt B
Costa Mesa CA 92626-2545

Subject: **Native American Information Request Letter associated with the Burbank Force Main and Pump Station Project, City of Burbank, California. (USGS *Burbank, CA.* topographic quadrangle)**

Dear:Ms. Cindi Alvitre:

Michael Brandman Associates has completed a cultural resource reconnaissance survey of the Burbank Force Main Replacement project. As shown in the attached Exhibit, the project will take place mostly beneath City streets in the south-central portion of the City. The City plans to replace an aging sewer main that allows sewage in the central-southern portion of the City to be pumped to the Burbank Water Reclamation Plants, where the sewage is then treated. MBA does not believe that any prehistoric cultural resource, recorded or not, will be harmed during this project, but we are writing you this letter because the NAHC has indicated that you may have knowledge of the project site.

This information request letter is **not associated with the SB18 process**, but is a document that shall be included in our cultural resource survey report. CEQA Guidelines and Section 106 of the National Historic Preservation Act of 1966 (NHPA) must consider the effects a project may have on historic properties. The definition of "historic properties" can include properties of traditional religious and cultural significance to Native American groups. To determine whether the proposed project may impact any historic properties, including traditional cultural properties, MBA has reviewed background information and consulted with entities such as the NAHC. The Native American Heritage Commission indicated that a records search of Native American Cultural Resources **failed to indicate that any cultural resources** are located within or immediately adjacent to the project area.

We wish to ask if you have any information or concerns about this project area, and/or if the proposed project may have an impact on cultural resources that are important to you. Please feel free to contact me at 909.884.2255 ext. 1208 or my cell 714.742.0468 if you have any questions or information, or you may address and mail a response to my attention at the address below.

Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

Enc: USGS *Burbank, CA*. topographic map

Appendix D
Report of Geotechnical Investigation

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SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

REPORT OF GEOTECHNICAL INVESTIGATION

Beachwood Pump Station Upgrade and

Force Main Replacement Project

City of Burbank, California

Prepared For:

Lee & Ro, Inc.
1199 South Fullerton Road
City of Industry, California 91748-1232

Project No. 6441.13

March 24, 2014

SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

March 24, 2014
Project No. 6441.13

LEE & RO, INC.
1199 South Fullerton Road
City of Industry, California 91748-1232

Attention: Mr. Michael Guirguis, PE

Subject: REPORT OF PRELIMINARY GEOTECHNICAL INVESTIGATION
Beachwood Pump Station Upgrade and
Force Main Replacement Project
City of Burbank, California

Gentlemen:

Presented herewith is the Report of Preliminary Geotechnical Investigation (i.e. the "Soils Report") prepared by Associated Soils Engineering Inc., (ASE) for the planned Beachwood Pump Station Upgrade and Force Main Replacement Project (the "Upgrade/Replacement Project") along the designated residential and arterial streets located in the City of Burbank, California. The subject investigation was performed in accordance with the scope of work outlined in ASE's Proposal P12-133 dated August 30, 2012, and your subsequent authorization.

The exploration was planned and performed utilizing the information provided by your office, which included a set of project plans, Figures 1 through 5, dated October 25, 2013, indicating planned alignment of the subject Upgrade/Replacement.

ASE has since completed engineering evaluation of subsurface soil conditions on site with regard to the geotechnical aspects of the planned sewer replacement along the designated portions of the subject streets. It is ASE's conclusion that the proposed Upgrade/Replacement construction is geotechnically feasible. The site subsurface soils are deemed suitable in supporting the proposed sewer lines and appurtenant improvements, provided that the pertinent recommendations for 1) site grading and

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geotechnical criteria relevant to the design and construction of the proposed sewer line, including manhole structures, and 2) criteria for trench backfill and bedding material presented in the Soils Report are to be incorporated in the project plans and design, and implemented during construction.

We at ASE appreciate the opportunity to provide our professional services on this important project, and look forward to assisting you during site grading and Upgrade/Replacement construction.

If you have any questions or require additional information, please contact the undersigned.

Respectfully submitted

ASSOCIATED SOILS ENGINEERING, INC.

Gary L. Martin
Project Engineer

Lawrence J.D. Chang, P.E.
Geotechnical Engineer, RGE 2881

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1.0 INTRODUCTION

This Soils Report presents the results of ASE's preliminary geotechnical investigation for the Beachwood Pump Station Upgrade and Force Main Replacement Project (the "Upgrade/Replacement Project") along portions of Riverside Drive, Sparks Street, Chandler Boulevard, and Victory Boulevard, in the City of Burbank. The purpose of this investigation was to evaluate the general subsurface soil conditions at the sites and provide relevant geotechnical recommendations for the design and construction of the proposed Upgrade/Replacement Project. This Soils Report summarizes the data collected and the results of ASE's engineering evaluations/analyses, which the formulation of relevant geotechnical conclusions and recommendations were based upon.

1.1 Project Description

Based on the plans and information provided by the Client's office, the Upgrade/Replacement Project is to consist of improvements to the existing pump station and the replacement of approximately 12,000 linear feet (LF) of sewer pipeline. The proposed alignment begins at the existing pump station within Mountain View Park and runs westerly in Riverside Drive to Sparks Street; then northwesterly in Sparks Street to Chandler Boulevard; then northeasterly in Chandler Boulevard to Victory Boulevard; and then following the Union Pacific Railroad (UPRR) spur to the Burbank Water Reclamation Plant along the southwesterly side of the Los Angeles County Flood Control (LACFC) channel. The proposed sewer rehabilitation will consist of installation of new VCP sewer lines as well as possible construction of new manhole structures along the sewer replacement alignment. Invert elevation for the sewer line is estimated to be between 5 to 15 feet below the existing grades.

1.1.1 Site Conditions:

The area of study (the Site) was limited to the existing sanitary sewer alignment along the street segments outlined above, which are shown in Figure 1, Site Location Map.

Residential developments, consisting primarily of single-family residences, are located on both sides of Riverside Drive and Sparks Street in the area of study (Borings B-1 through B-11), with the exception of Mountain View Park on the northerly side of Riverside Drive in the vicinity of Boring B-1, and commercial developments at the intersections with Verdugo Avenue/Olive Avenue (Boring B-6) and Magnolia Boulevard (B-10). Residential developments consisting primarily of single-family dwellings are on both sides of Chandler Boulevard from Sparks Street to Mariposa Avenue (Boring B-12). Single family residences and apartments are on the southwesterly side of Chandler Boulevard from Mariposa Avenue to Lomita Street, with light industrial/warehouse structures on the northwesterly side of Chandler Boulevard in this segment. Commercial and light industrial/warehouse developments are on both sides of Chandler and Victory Boulevards in the area of study (Borings B-13 and B-14). East of Victory Boulevard the planned alignment follows the

UPRR spur to the LACFC channel with light industrial/warehouse developments and undeveloped property bordering the spur.

The streets are presently paved with asphaltic concrete (AC) pavement that visually appears to be in good condition.

2.0 SCOPE OF WORK

In accomplishing the subject investigation, ASE's staff performed the following geotechnical tasks:

A. Review of readily available background information, including in-house geotechnical data, geotechnical literature, geologic maps, seismic hazard maps, and literature relevant to the subject site.

B. Performance of a geotechnical site reconnaissance to observe the general site conditions and to select boring locations, followed by notification to Underground Service Alert of the planned boring locations 72 hours prior to field exploration and security of the necessary permit from the Public Works Department within the City of Burbank.

C. Execution of field exploration consisting of drilling fourteen (14) exploratory borings to a depth of 20 feet below the existing grades and one (1) boring to a depth of 6 feet 6 inches below the existing grade, field logging of the borings and soil sampling. Locations of the exploratory borings on site are described on the Field Logs of Borings, Plates B-1 through B-15 that are attached in Appendix A in the rear of this report.

D. Provision of traffic control and full-time observations of the drilling operations and obtaining of representative relatively undisturbed and bulk samples of the subsurface soils encountered.

E. Performance of laboratory testing on representative soils samples to aid in the classification of the materials encountered, and to determine the pertinent engineering properties.

F. Performance of engineering analyses based on the collected data covering, but not limited to, the following aspects:

- Evaluation of general subsurface conditions and description of types, distribution, and engineering characteristics of subsurface materials.
- Assessment of geologic/seismic hazards and, if applicable, recommendation of mitigative measures.
- Determination of the seismic design parameters in accordance with Chapter 16 of the California Building Code, 2013 Edition (2013 CBC).
- Evaluation of the suitability of on-site soils for pipeline and foundation support.
- Recommendations for site grading and subgrade preparation, including manhole/conduit installation, trench backfill and bedding material.
- Recommendations for temporary excavation and shoring.

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Consulting Geotechnical Engineers

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Site Location Map

Project Name:	Beachwood Pump Station Upgrade and Force Main Replacement Project - Burbank	
Figure 1	Project No.:	6441.13
	Date:	March, 2014

- Evaluation of Volatile Organic Compounds (VOC) of the on-site materials.
- Development of geotechnical criteria for the design and construction of the sewer line and appurtenant structures.

G. Preparation of this Soils Report presenting the work performed and data acquired, as well as summarizing ASE's conclusions and geotechnical recommendations for the design and construction of the proposed Upgrade/Replacement Project.

Please be reminded that ASE's geotechnical investigation did not include any evaluation or assessment of hazardous or toxic materials which may or may not exist on or beneath the site. ASE does not consult in the field of potential site contamination/mitigation.

3.0 GEOLOGY

3.1 Regional Geologic Setting

The Site is located in the San Fernando Valley within the Northwestern Block of the Los Angeles Basin. The Los Angeles Basin is a large northwest-trending synclinal depression at the northwestern end of the Peninsular Ranges geomorphic Province and at the eastern end of the Transverse Ranges geomorphic Province of California. The Northwestern Block is bounded to the south by the Santa Monica and Raymond Hill Fault Zones, located approximately 5.8 to 9.6 miles (9.4 to 15.5 km) from the Site, and the San Gabriel Mountains to the east and northeast.

3.2 Subsurface Conditions

ASE's subsurface exploration disclosed the presence of artificial fill soils for the full depth of Boring B-15 which, due to site inaccessibility with truck-mounted drilling rig, was drilled with manually operated equipment on the southwesterly side of the Los Angeles County Flood Control channel. Boring B-15 was drilled to a depth of 6 feet 6 inches below grade, at which depth a large unknown obstruction prevented further advancement with manual equipment. Encountered fill soils consist of light olive brown to grayish brown silty fine sands with some gravel and concrete debris.

Native soils immediately beneath the pavement section at the other fourteen (14) exploratory boring locations were found to consist mainly of younger alluvial fan and wash deposits (Qyf2, Qw) up to the maximum explored depth of 20 feet.

In accordance with California Geological Survey (CGS) (1998), soils within the unit of young alluvial fan and wash deposits are of Holocene age, formed by "alluvial" and "wash" deposits associated with the river systems that culminate in the Tujunga and Pacoima Washes. Soils within the unit were found to predominantly consist of unconsolidated sand, silt, and gravel-bearing alluvial/wash materials. In specific,

on-site alluvial/wash soils contain interbedded sand, silty sand, silty sand with clay, sand with silt, sand with gravel, sandy silt, sandy silt with clay, silt, clayey silt, and clayey silt with sand. Figure 2, Local Geologic Map, an excerpt from CGS (1998), shows geologic material distribution in the vicinity of the subject site.

Blow counts recorded from advancing Modified California barrel sampler and Standard Penetration Test (SPT) sampler empirically indicate that on-site granular, sandy strata of alluvial/wash soils are in a very loose to very dense state, whereas on-site, fine-grained cohesive soils (i.e. silts) within the alluvial/wash deposits exhibit a firm to hard consistency.

More detailed descriptions of soils encountered and conditions observed during the subsurface exploration are shown in the Field Logs of Boring in Appendix A, together with information including soil classifications, depths and types of soil samples, blow counts, field dry densities and moisture contents, and corresponding laboratory tests performed. All thickness measurements of asphalt pavements are approximate. Actual thicknesses should be determined by excavation.

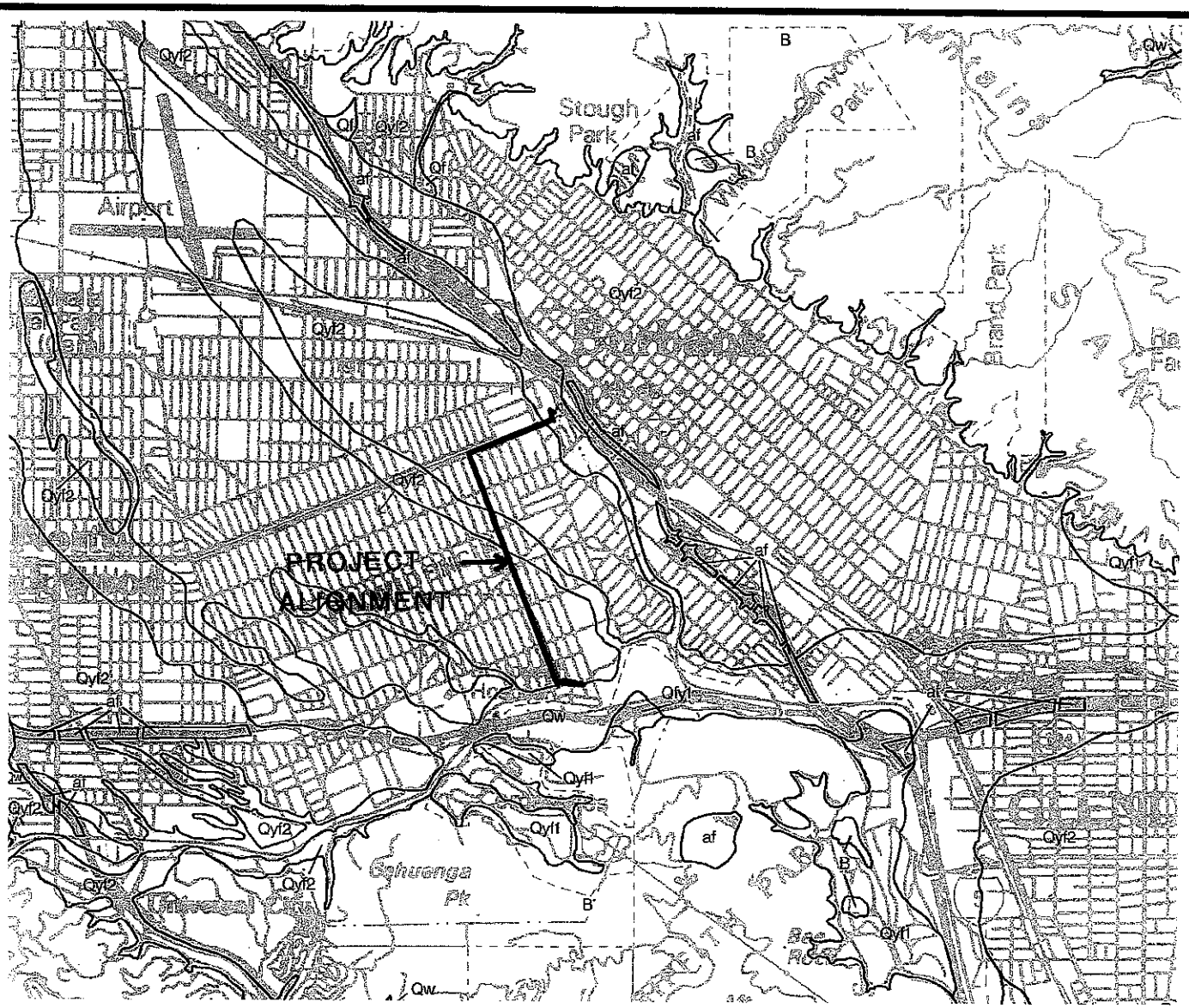
3.3 Groundwater and Caving

While ASE's exploratory borings should not be considered as groundwater measurement wells, during ASE's field exploration groundwater was not encountered to the maximum explored depth of 20 feet from the respective existing grades. Generally, seasonal and long-term fluctuations in the groundwater may occur as a result of variations in subsurface conditions, rainfall, run-off conditions and other factors. Therefore, variations from our observations may occur.

Published data in CGS's Seismic Hazard Zone Report 016 for the Burbank 7.5-Minute Quadrangle, Los Angeles County, California (1998) indicates that the historic high groundwater level in the subject area is approximately 10 to 20 feet below grade, except for the area from Verdugo Avenue to approximately midway between Parkside Avenue and Riverside Drive where the historic high groundwater is shown as approximately 20 to 30 feet below grade.

Information available from the Los Angeles County Public Works Department Hydraulic/Water Conservation Records Division website (www.ladpw.org) indicates that the historic high groundwater level in Well No. 3884XX, close to the southerly portion of the project on the south side of Morningside Drive between Beachwood Drive and Griffith Park Drive, was 25.3 feet below ground surface elevation on May 14, 1996. Ground surface elevation of the well was unknown. The depth to groundwater for the most recent reading in this well (taken January 5, 2010) was 52.3 feet below existing grade.

Additional information available from the same website indicates that the historic high groundwater level in Well No. 3872H, close to the southerly end of the project on Griffith Park Drive between Magnolia Boulevard and Clark Avenue, was 54.6 feet below ground surface elevation on April 16, 1984. Ground



(Partial Excerpt of the Geologic Map of the Burbank 7.5 Quadrangle, California Division of Mines and Geology, Seismic Hazard Zone Report 016, 1998)

LEGEND	Approximate Area of Pump Station & Force Main Replacement Q_{yf2}, Q_w Holocene young alluvial and wash deposits consisting of undivided sand, silt and gravel	ASSOCIATED SOILS ENGINEERING, INC. Consulting Geotechnical Engineers	**Associated Soils Engineering, Inc.** **2860 Walnut Avenue** **Signal Hill, CA 90755** **Tel (562) 426-7990 Fax (562) 426-1842**	Project Name:	**Beachwood Pump Station Upgrade and Force Main Replacement Project - Burbank**	
				Figure 2	**Local Geologic Map**	
				Proj. No.:	**6441.13**	Date: **March, 2014**

surface elevation of the well was also unknown. The depth to groundwater for the most recent reading in this well (taken September 17, 2009) was 80.9 feet below existing grade.

The use of hollow-stem augers during drilling precluded observation of potential caving conditions which may have otherwise occurred in an uncased hole. Caving and/or sloughing on the order of 3 to 5 feet was measured after the extraction of auger stem at the completion of boring operations, with the exception of Boring B-13 in which boring backfilling of 10 feet 6 inches was measured. Caving and/or soil sloughing may be likely in excavations greater in dimension than our test borings, and in excavations deeper than groundwater level.

In addition, subsidence of areas adjacent to trenches may occur if running sand conditions are encountered and excavation sidewalls are not properly shored during construction.

4.0 FAULTING AND SEISMICITY

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

By the definition of the CGS, an active fault is one which has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). The CGS has defined a potentially active fault as any fault which has been active during the Quaternary Period (approximately the last 1,600,000 years). These definitions are used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazard Zones Act of 1972 and as subsequently revised in 1997 a Alquist-Priolo Earthquake Fault Zoning Act and Earthquake Fault Zones. The intent of the act is to require fault investigations on sites located within Special Studies Zones to preclude new construction of certain inhabited structures across the trace of active faults. The Site is not located within the Alquist-Priolo Earthquake Fault Zone. No evidence of active or potentially active faulting was observed during our investigation.

Several sources were researched for information pertaining to site seismicity. The majority of data was obtained from the program, EQFAULT, by Blake (2000) that allows for an estimation of peak horizontal ground acceleration (PGA) using a data file of approximately 150 digitized California faults. This program compiles information including the dominant type of faulting within a particular region, the maximum earthquake magnitude each fault is capable of generating, the estimated slip-rate for each fault, and the approximate location of the fault trace. Printouts of the results of the fault search for the Site are shown as Plates H-1 through H-15 in Appendix B.

The Site is likely to be subject to strong seismic ground shaking during the life of the project. The Verdugo Fault, located approximately 1.6 to 3.0 miles (2.5 to 4.9 km) away is closest to the Site. Other nearby active faults include the Hollywood Fault and the Upper Elysian Park Blind Thrust Fault, located approximately 3.0 to 4.7 miles (4.9 to 7.5 km) and 3.8 to 5.4 miles (6.1 to 8.7 km) away, respectively. Approximately 48 active or potentially active faults have been found within a radius of 62 miles (100 km) from the Site.

4.1 Deterministic Analysis

Based on the referenced literature and deterministic analysis performed with the EQFAULT software, the Verdugo Fault, approximately 1.6 to 3.0 miles (2.5 to 4.9 km) from the Site (with the closest approach near Boring B-15 and the furthest approach near Borings B-1 and B-2), would probably generate the most severe site ground motions. A Maximum Probable Earthquake (MPE), i.e. the maximum earthquake that is considered likely to occur during a 100-year time interval, of 6.9 Mw (moment magnitude as per USGS) has been assessed along the Verdugo Fault. As shown in Appendix B, estimated PGA resulting from a MPE event on the Verdugo Fault is on the order of 0.626g to 0.535g should this event occur at the fault's closest and furthest approaches to the Site, respectively. In sum, approximately 48 active or potentially active faults have been found within 62 miles (100 km) of the Site.

4.2 Probabilistic Analysis

The seismicity of the Site was evaluated utilizing probabilistic analysis available from CGS (www.quake.ca.gov/gmaps/PSHA/psha_interpolator.html). The Maximum Probable Earthquake (MPE) and the Maximum Considered Earthquake (MCE) that carry 10 percent and 2 percent exceedance probabilities, respectively, in 50 years have been considered. Based on a typical damping ratio of 5% and a V_s^{30} value of 280 m/sec, derived from the "Set Site Parameters for Web Services"" function as part of the "Hazard Spectrum Calculator (Local)" application available from the "OPENSHA" website, three spectral acceleration values representing peak ground acceleration (PGA), spectral acceleration for structural period of 0.2 second (Sa – 0.2 sec; typical of low-rise buildings) and spectral acceleration for structural period of 1.0 second (Sa – 1.0 sec; typical of multi-story buildings) have been analyzed and are tabulated below.

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-1					
Latitude	N 34.1576°	**Longitude**	W 118.3156°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**		**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**	
MPE (10% exceedance in 50 years)		0.558	1.187	0.695	
MCE (2% exceedance in 50 years)		0.933	1.975	1.274	

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-2					
Latitude	N 34.1576°	**Longitude**	W 118.3167°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**	**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**		
MPE (10% exceedance in 50 years)	0.557	1.185	0.694		
MCE (2% exceedance in 50 years)	0.931	1.971	1.271		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-3					
Latitude	N 34.1598°	**Longitude**	W 118.3182°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**	**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**		
MPE (10% exceedance in 50 years)	0.556	1.183	0.691		
MCE (2% exceedance in 50 years)	0.926	1.964	1.263		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-4					
Latitude	N 34.1623°	**Longitude**	W 118.3194°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**	**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**		
MPE (10% exceedance in 50 years)	0.554	1.181	0.689		
MCE (2% exceedance in 50 years)	0.921	1.958	1.256		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-5					
Latitude	N 34.1649°	**Longitude**	W 118.3206°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**	**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**		
MPE (10% exceedance in 50 years)	0.551	1.178	0.687		
MCE (2% exceedance in 50 years)	0.915	1.952	1.249		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-6					
Latitude	N 34.1678°	Longitude	W 118.3220°	V_s^{30} (m/sec)	280
Acceleration (g) / Scenario	PGA	Sa – 0.2 sec	Sa – 1.0 sec		
MPE (10% exceedance in 50 years)	0.549	1.176	0.684		
MCE (2% exceedance in 50 years)	0.910	1.943	1.241		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-7					
Latitude	N 34.1704°	Longitude	W 118.3233°	V_s^{30} (m/sec)	280
Acceleration (g) / Scenario	PGA	Sa – 0.2 sec	Sa – 1.0 sec		
MPE (10% exceedance in 50 years)	0.547	1.174	0.681		
MCE (2% exceedance in 50 years)	0.904	1.937	1.234		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-8					
Latitude	N 34.1715°	Longitude	W 118.3238°	V_s^{30} (m/sec)	280
Acceleration (g) / Scenario	PGA	Sa – 0.2 sec	Sa – 1.0 sec		
MPE (10% exceedance in 50 years)	0.547	1.173	0.680		
MCE (2% exceedance in 50 years)	0.903	1.934	1.231		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-9					
Latitude	N 34.1734°	Longitude	W 118.3247°	V_s^{30} (m/sec)	280
Acceleration (g) / Scenario	PGA	Sa – 0.2 sec	Sa – 1.0 sec		
MPE (10% exceedance in 50 years)	0.545	1.172	0.679		
MCE (2% exceedance in 50 years)	0.899	1.929	1.226		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-10					
Latitude	N 34.1752°	**Longitude**	W 118.3256°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**	**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**		
MPE (10% exceedance in 50 years)	0.544	1.170	0.677		
MCE (2% exceedance in 50 years)	0.895	1.925	1.221		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-11					
Latitude	N 34.1778°	**Longitude**	W 118.3268°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**	**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**		
MPE (10% exceedance in 50 years)	0.542	1.168	0.675		
MCE (2% exceedance in 50 years)	0.891	1.918	1.214		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-12					
Latitude	N 34.1792°	**Longitude**	W 118.3248°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**	**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**		
MPE (10% exceedance in 50 years)	0.543	1.171	0.677		
MCE (2% exceedance in 50 years)	0.892	1.923	1.217		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-13					
Latitude	N 34.1802°	**Longitude**	W 118.3302°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**	**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**		
MPE (10% exceedance in 50 years)	0.539	1.164	0.671		
MCE (2% exceedance in 50 years)	0.883	1.907	1.202		

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-14					
Latitude	N 34.1809°	**Longitude**	W 118.3201°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**		**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**	
MPE (10% exceedance in 50 years)		0.546	1.175	0.681	
MCE (2% exceedance in 50 years)		0.897	1.933	1.228	

Seismic Acceleration Values from CGS's Ground Motion Interpolator (2008) – Boring B-15					
Latitude	N 34.1825°	**Longitude**	W 118.3182°	**V_s^{30} (m/sec)**	280
Acceleration (g) / **Scenario**		**PGA**	**Sa – 0.2 sec**	**Sa – 1.0 sec**	
MPE (10% exceedance in 50 years)		0.547	1.177	0.682	
MCE (2% exceedance in 50 years)		0.898	1.936	1.230	

4.3 2013 CBC Seismic Design Parameters

The earthquake design requirements listed in 2013 CBC and other governing standards account for faults classified as "active", in accordance with the most recent fault listing as per the United States Geological Survey (USGS) or the CGS. The seismic design of the proposed structures should be implemented in accordance with the applicable provisions stipulated in 2013 CBC unless otherwise specified by the governing authority having jurisdiction over the project.

The 2013 CBC seismic design criteria for the Site based on a Risk Category III and a scenario of Risk-Targeted Maximum Considered Earthquake (MCE_R) that carries a 2% exceedance probability in 50 years had been determined utilizing the U.S. Seismic Design Maps web-application available from the Seismic Design Maps and Tools webpage on the website of Earthquake Hazard Program of USGS (http://earthquake.usgs.gov/hazards/designmaps/usdesign.php). Summaries of the seismic coefficients for the Site are presented in the following tables, with printouts of detailed derivations of such parameters and pertinent MCE_R and Design Response Spectra from the abovementioned USGS web-application shown as Plates I-1 through I-15 in Appendix B.

2013 CBC SEISMIC DESIGN PARAMETERS – B-1					
Site Latitude:	N 34.1576°	**Site Longitude:**	W 118.3156°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.485g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.809g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.485g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.214g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.657g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.809g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.959g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.959g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-2					
Site Latitude:	N 34.1576°	**Site Longitude:**	W 118.3167°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.484g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.809g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.484g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.213g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.656g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.809g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.959g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.959g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-3					
Site Latitude:	N 34.1598°	**Site Longitude:**	W 118.3182°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.461g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.796g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.461g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.194g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.641g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.796g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.949g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.949g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-4					
Site Latitude:	N 34.1623°	**Site Longitude:**	W 118.3194°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.422g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.786g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.422g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.170g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.615g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.780g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.932g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.932g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-5					
Site Latitude:	N 34.1649°	**Site Longitude:**	W 118.3206°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.379g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.763g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.379g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.145g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.586g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.763g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.913g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.913g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-6					
Site Latitude:	N 34.1678°	**Site Longitude:**	W 118.3220°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.330g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.744g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.330g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.116g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.553g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.744g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.892g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.892g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-7					
Site Latitude:	N 34.1704°	**Site Longitude:**	W 118.3233°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.283g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.732g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.283g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.097g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.522g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.732g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.872g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.872g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-8					
Site Latitude:	N 34.1715°	**Site Longitude:**	W 118.3238°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.259g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.737g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.259g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.106g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.506g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.737g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.862g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.862g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-9					
Site Latitude:	N 34.1734°	**Site Longitude:**	W 118.3247°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.216g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.747g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.216g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.120g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.477g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.747g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.844g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.844g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-10					
Site Latitude:	N 34.1752°	**Site Longitude:**	W 118.3256°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.174g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.755g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.174g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.132g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.449g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.755g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.827g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.827g	
Risk Category			**/I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-11					
Site Latitude:	N 34.1778°	**Site Longitude:**	W 118.3268°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.111g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.765g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.111g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.148g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.407g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.765g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.801g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.801g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-12					
Site Latitude:	N 34.1792°	**Site Longitude:**	W 118.3248°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.093g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.778g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.093g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.167g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.396g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.778g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.793g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.793g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-13					
Site Latitude:	N 34.1802°	**Site Longitude:**	W 118.3302°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.044g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.768g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.044g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.152g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.363g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.768g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.774g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.774g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-14					
Site Latitude:	N 34.1809°	**Site Longitude:**	W 118.3201°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.129g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.807g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.129g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.210g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.420g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.807g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.807g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.807g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

(Footnotes are detailed below the table for Boring B-15.)

2013 CBC SEISMIC DESIGN PARAMETERS – B-15					
Site Latitude:	N 34.1825°	**Site Longitude:**	W 118.3182°	**Risk Category** [a]	III
Seismic Parameter				**Recommended Value**	
Site Class [b]				D	
Soil Profile Name [b]				Stiff Soil Profile	
Site Coefficient, Fa [c]				1.0	
Site Coefficient, Fv [d]				1.5	
0.2-Second Spectral Response Acceleration, S_S [e]				2.181g	
1.0-Second Spectral Response Acceleration, S_1 [f]				0.830g	
Adjusted 0.2-Second Spectral Response Acceleration, S_{MS} [g]				2.181g	
Adjusted 1.0-Second Spectral Response Acceleration, S_{M1} [h]				1.244g	
Design 0.2-Second Spectral Response Acceleration, S_{DS} [i]				1.454g	
Design 1.0-Second Spectral Response Acceleration, S_{D1} [j]				0.830g	
Long -Period Transition Period, T_L [k]				8 sec	
Mapped MCE_G Geometric Mean Peak Ground Acceleration, PGA [l]				0.827g	
Site Coefficient, F_{PGA} [m]				1.0	
MCE_G Peak Ground Acceleration adjusted for Site Class Effect, PGA_M [n]				0.827g	
Risk Category			**I or II or III**		**IV**
Seismic Design Category based on SD_1 [o]			E		F

a Per 2013 CBC Table 1604.5
b Per 2013 CBC Section 1613.3.2
c Per 2013 CBC Table 1613.3.3(1)
d Per 2013 CBC Table 1613.3.3(2)
e Per 2013 CBC Figure 1613.3.1(1)
f Per 2013 CBC Figure 1613.3.1(2)
g Per 2013 CBC Equation 16-37
h Per 2013 CBC Equation 16-38
i Per 2013 CBC Equation 16-39
j Per 2013 CBC Equation 16-40
k Per ASCE 7-10 Figure 22-12
l Per ASCE 7-10 Figure 22-7
m Per ASCE 7-10 Table 11.8-1
n Per ASCE 7-10 Equation 11.8-1 = PGA x F_{PGA}
o Per 2013 CBC Table 1613.3.5(2)

Please note that conformance to the 2013 CBC seismic design criteria does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not take place during the occurrence of a MCE_R event. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive. Following a major earthquake, a building may be damaged beyond repair, yet not collapse. The Structural Consultant should review the pertinent parameters to evaluate the seismic design.

5.0 FIELD WORK

A truck-mounted, rotary drilling rig with 8-inch diameter continuous flight, hollow-stem augers and a soil bit was deployed to drill a total of fourteen (14) exploratory borings as part of the subject investigation. Relatively undisturbed soil samples were obtained within a Modified California barrel sampler with tapered cutting shoe. Additional samples were obtained in a Standard Penetration sampler (SPT) in accordance with ASTM D1586-8a Test Method.

Manually operated drilling equipment was utilized to drill one (1) additional exploratory boring which was inaccessible to the truck-mounted drilling rig. Relatively undisturbed soil samples in this boring were obtained in thin-walled Shelby tubes.

Upon completion of exploratory boring, the bored holes were subsequently backfilled with excavated site soils, with existing pavements patched with cold-patch asphaltic concrete (AC) to a minimum thickness near or greater than the existing AC pavements.

On-site soils encountered were observed to be generally damp to very moist, which was largely consistent with the laboratory measured moisture contents of retrieved soil samples. Wherever appropriate, field notations on moisture content were modified accordingly based on laboratory measurements.

The possible presence of Volatile Organic Compounds (VOC) in subgrade soils and the soil samples were monitored with an appropriate meter during drilling operations. The results of VOC readings are shown on the attached "E" Plates.

6.0 LABORATORY TESTING

Measurements of field moisture contents and densities were conducted on all undisturbed soil samples in accordance with the current edition of ASTM D2216 and ASTM D653 test procedures, respectively. Direct shear tests were performed on selected samples under "quick-drained" test conditions for sandy soil types, and under "quick-undrained" conditions for silty soil types, in accordance with the current edition of ASTM D3080-11 test procedures. The samples selected for direct shear tests were submerged in water a minimum of 24 hours prior to shearing. Sand Equivalent (SE) tests were conducted on selected samples in accordance with the current edition of ASTM D2419-09 test procedures. Particle size analysis tests were performed in accordance with the current edition of ASTM D422-63 (2007) test procedures. Consolidation tests were performed on selected relatively undisturbed soil samples obtained at various elevations in accordance with the latest edition of ASTM D2435-11 test procedures.

Maximum density/optimum moisture content tests were performed on near surface bulk samples obtained from selected boring locations in accordance with ASTM D1557-12 test procedures. Expansion tests were performed on the same bulk samples in accordance with ASTM D4829-08a test procedures.

Tests for soluble sulfate and chloride contents were performed in accordance with California Test Methods 417 and 422, respectively. Resistivity and pH-valve tests were performed in accordance with ASTM G57 Test Method and California Test Method 643, respectively.

Results of laboratory testing are presented in the "Laboratory Testing" section of Appendix A and on the respective attached plates.

While some of the undisturbed soil samples had been used for laboratory testing, the unused bulk soil samples and undisturbed ring samples will be retained by this office for a period of 20 days following the issuance of this Soils Report prior to being discarded.

7.0 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

ASE's evaluations indicated that the major geotechnical considerations affecting the design and construction of the currently planned Upgrade/Replacement construction include the following:

1. Soil disturbances as a result of site demolition, clearing and excavation operations.
2. Presence of soils with varying densities and, thus, degrees of compaction within the extent and depth of Upgrade/Replacement construction.
3. Presence of dry, granular soils at relatively shallow depth that might potentially impact the proceeding and stability of trench excavation.

However, it is ASE's geotechnical opinion that the proposed Upgrade/Replacement construction may be implemented as planned, provided the site grading and foundation criteria recommended in the sections that follow are incorporated into the project plans and specifications and implemented during construction.

7.1 Site Preparation

7.1.1 Existing Improvements:

Prior to grading and excavation operations, it will be necessary to remove designated existing improvements, including any remaining buried obstructions, which may be in the areas of proposed Upgrade/Replacement construction. Structure removal should include, but not be limited to, abandoned foundations, concrete flatwork and asphalt pavements. Concrete and asphalt fragments from site demolition operations should be disposed of off-site, unless they can be stockpiled and reprocessed into materials complying with criteria for Crushed Miscellaneous Base (CMB), Processed Miscellaneous Base (PMB) or Pulverized Miscellaneous Base (PvMB) per Section 200-2.4, 200-2.5 or 200-2.8, respectively, of the latest edition of the "Standard Specifications for Public Works Construction", (i.e. the "Green Book") and reused.

7.1.2 Underground Utilities:

Any underground utilities to be abandoned within the zone of proposed Upgrade/Replacement construction should be cut off a minimum of 5 feet from the area of the future construction. The ends of cut-off lines should be plugged a minimum of 5 feet with concrete exhibiting minimum shrinkage characteristics to prevent water migration to or from hollow lines. Capping of lines may also be required should the plug be subject to any line pressure. Alternatively, deep hollow lines

may be left in place provided they are filled with concrete. No filled line should be permitted closer than two (2) feet from the bottom of future structural footings or manhole foundations.

Local ordinances relative to abandonment of underground utilities, if more restrictive, will supersede the above minimum requirements.

7.2 Excavation, Shoring And Backfill

7.2.1 Excavation Procedures:

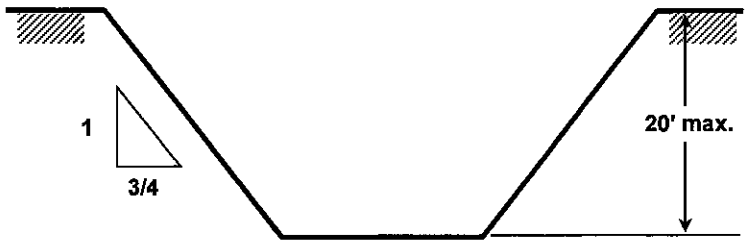
Based on site soil conditions encountered during field exploration, it is ASE's opinion that conventional excavation equipment may be utilized for Upgrade/Replacement construction. Temporary excavations in site soils should be shored or sloped in accordance with updated requirements per Cal OSHA Construction Safety Orders.

7.2.2 Temporary Sloped Excavations:

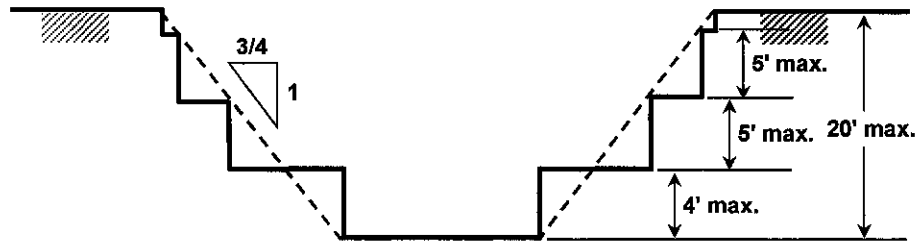
Due to space constraints, open-trench type sloped excavations may not be feasible for this project. However, if temporary sloped excavation is adopted, the guidelines on a boring-by-boring basis as shown in Table 1 below should be followed:

TABLE 1

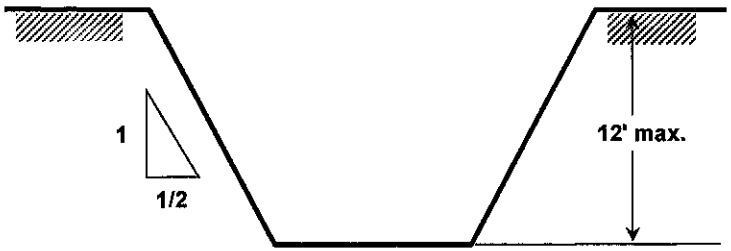
Boring No.	Generalized Soil Profile				Suitable Excavation Configuration (3)
	Depth Zone 1 (ft) (1)	Soil Type (2)	Depth Zone 2 (ft) (1)	Soil Type (2)	
B-1	0.5-20	C	–	–	Figure 5 – Type C Soils
B-2	1-20	C	–	–	Figure 5 – Type C Soils
B-3	0.5-20	C	–	–	Figure 5 – Type C Soils
B-4	0.5-20	C	–	–	Figure 5 – Type C Soils
B-5	0.5-20	C	–	–	Figure 5 – Type C Soils
B-6	0.5-20	C	–	–	Figure 5 – Type C Soils
B-7	0.67-20	C	–	–	Figure 5 – Type C Soils
B-8	0.5-15.5	C	15.5-20	B	Figure 5-Type C Soils over Type B Soils
B-9	0.33-10.5	B	10.5-20	C	Figure 5-Type B Soils over Type C Soils
B-10	1-20	C	–	–	Figure 5 – Type C Soils



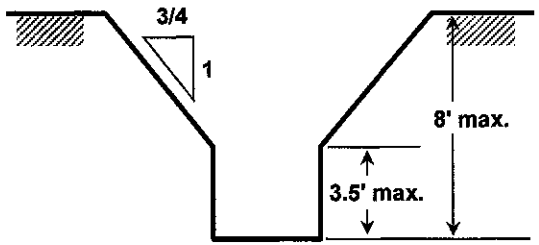
Simple Slope - General



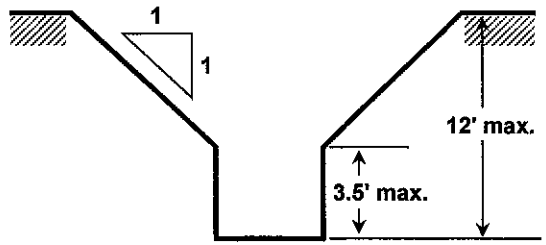
Multiple Bench



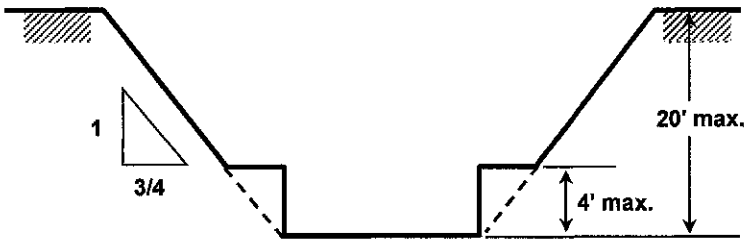
Simple Slope - Short Term (less than 24 hours)



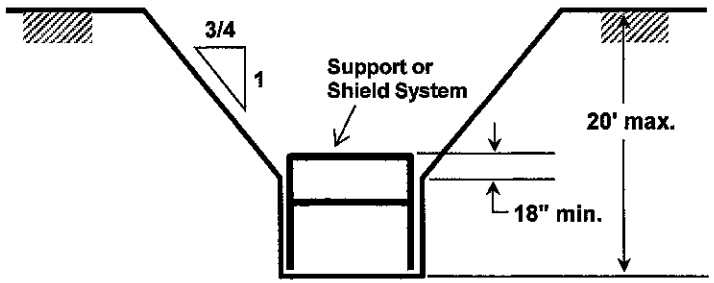
Unsupported Vertically Sided Lower Portion Max. 8' in Depth



Unsupported Vertically Sided Lower Portion Max. 12' in Depth



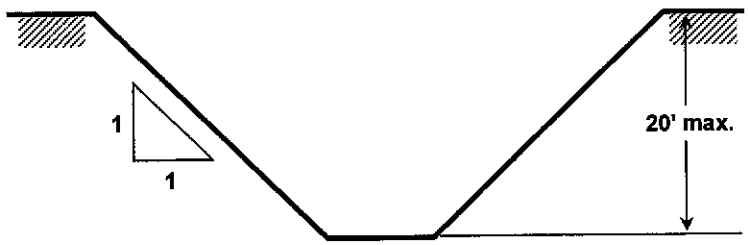
Simple Bench



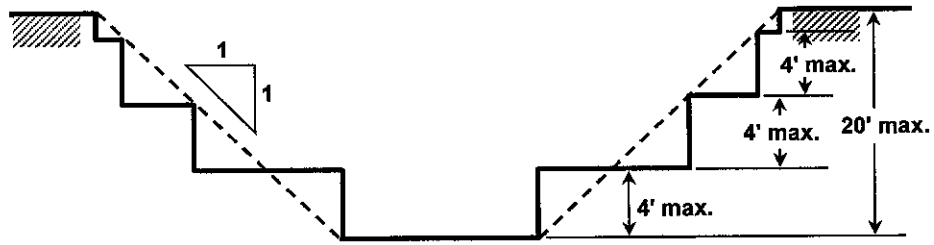
Supported or Shielded Vertically Sided Lower

Schematic Not To Scale

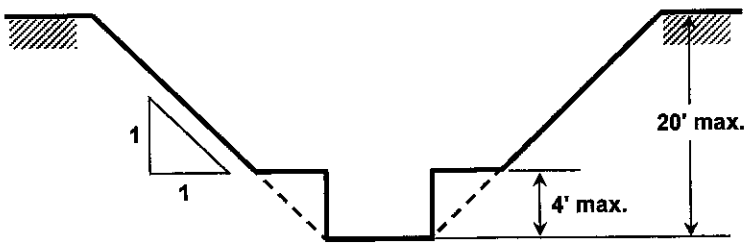
Associated Soils Engineering, Inc. 2860 Walnut Avenue Signal Hill, CA 90755 Tel (562) 426-7990 Fax (562) 426-1842	**Permissible Slope Configuration - Type A Soil**	Project Name:	Beachwood Pump Station Upgrade and Force Main Replacement Project - Burbank
		Project No.:	6441.13
	Figure 3	Date:	March, 2014



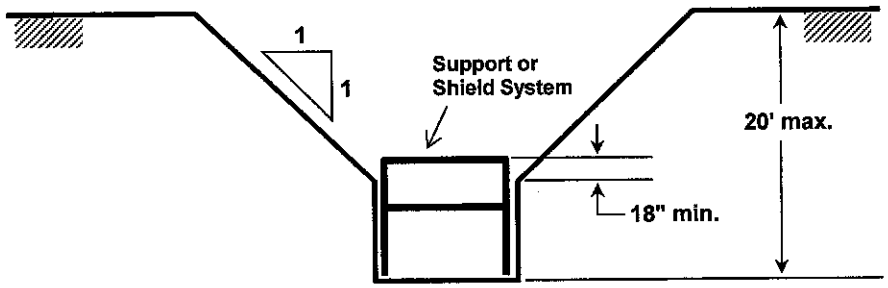
Simple Slope



Multiple Bench - Allowed in Cohesive Soils Only



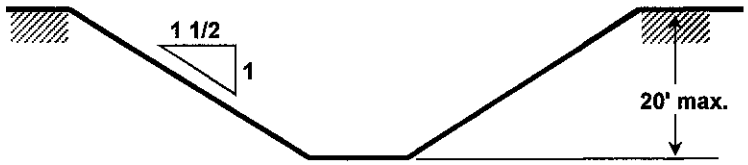
Single Bench - Allowed in Cohesive Soils Only



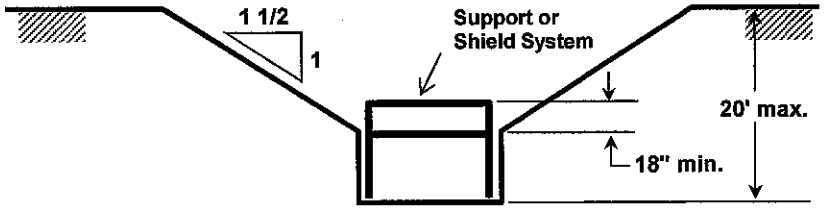
Supported or Shielded Vertically Sided Lower

Schematic Not To Scale

ASSOCIATED SOILS ENGINEERING, INC. Consulting Geotechnical Engineers Associated Soils Engineering, Inc. 2860 Walnut Avenue Signal Hill, CA 90755 Tel (562) 426-7990 Fax (562) 426-1842	**Permissible Slope Configuration - Type B Soil**	Project Name:	Beachwood Pump Station Upgrade and Force Main Replacement Project - Burbank
	Figure 4	Project No.:	6441.13
		Date:	March, 2014

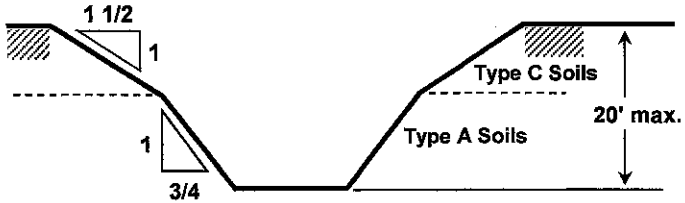


Simple Slope

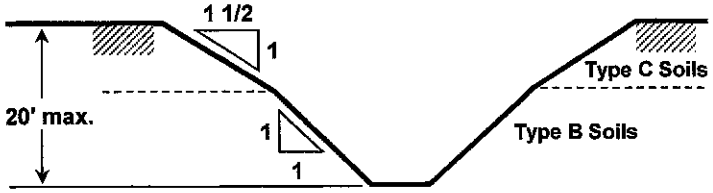


Supported or Shielded Vertically Sided Lower

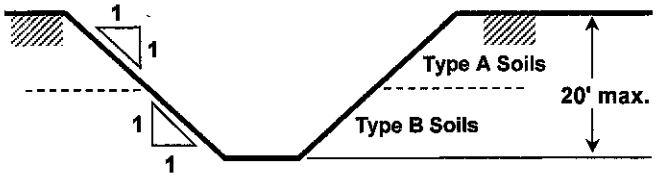
Type C Soils



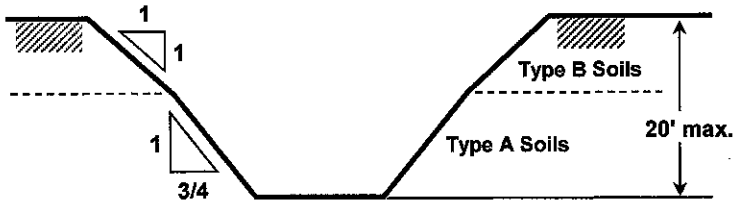
Type C Soils over Type A Soils



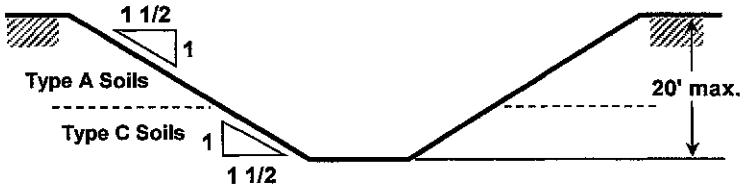
Type C Soils over Type B Soils



Type A Soils over Type B Soils



Type B Soils over Type A Soils



Type A Soils over Type C Soils

Type B Soils over Type C Soils

Schematic Not To Scale

Layered Soils

Associated Soils Engineering, Inc. 2860 Walnut Avenue Signal Hill, CA 90755 Tel (562) 426-7990 Fax (562) 426-1842	**Permissible Slope Configuration - Type C Soil & Layered Soils**	Project Name:	Beachwood Pump Station Upgrade and Force Main Replacement Project - Burbank
		Project No.:	6441.13
	Figure 5	Date:	March, 2014

TABLE 1 (continued)

B-11	0.67-10	C	10-20	B	Figure 5- Type C Soils over Type B Soils
B-12	1-20	C	-	-	Figure 5- Type C Soils
B-13	1-20	C	-	-	Figure 5- Type C Soils
B-14	1.25-20	C	-	-	Figure 5- Type C Soils
B-15	0-6.5	C	-	-	Figure 5- Type C Soils

(1) Based on interpretation of soil stratification presented in respective boring logs taking into account the presence of overlying AC and AB.
(2) Per the definitions of Cal OSHA Construction Safety Orders.
(3) Refer to Figures 3 through 5 for corresponding configurations.

Should running sand conditions be experienced during excavation operations, flattening of cut slope faces, or other special procedures, may be required to maintain excavation stability. It may be necessary that the Geotechnical Consultant should be consulted in a timely manner for site-specific evaluation and mitigation recommendation.

Soil conditions should be reviewed by the Geotechnical Consultant as excavations progress to verify adequacy and stability of temporary slopes. Final temporary cut slope design will be in part dependent upon the actual soil conditions exposed, construction procedures and schedule.

7.2.3 Temporary Shoring:

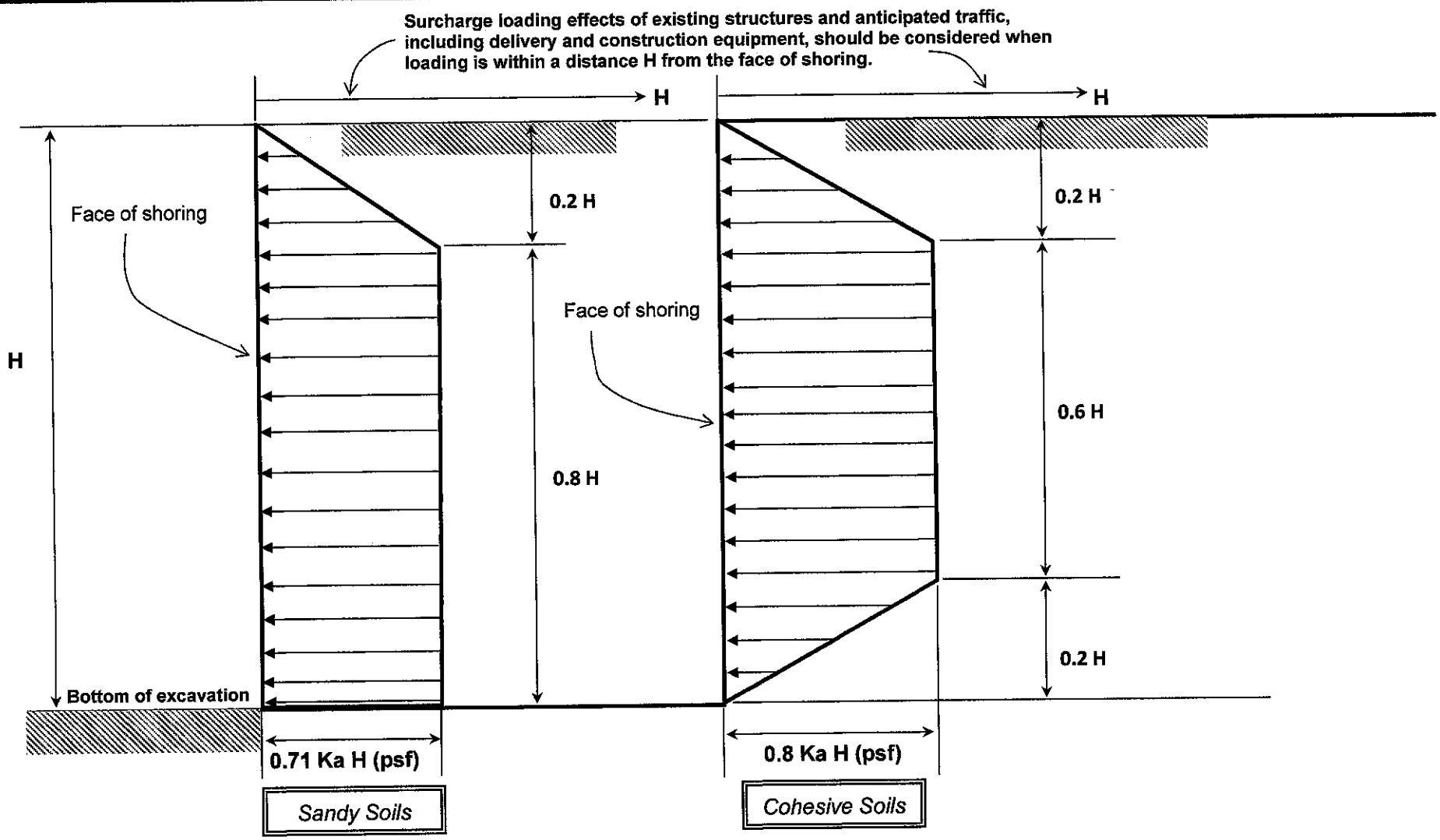
For the design of internally braced shoring system, it is recommended that the pertinent distribution of apparent lateral earth pressure as shown on Figure 6, Apparent Lateral Earth Pressure Diagram, as per recommended in Caltrans (1995), be utilized in conjunction with the soil types/moisture contents and design values tabulated below.

TABLE 2

Soil Type [a]	Ka Value
Sandy Soils	34
Silty Soils	37

a. Soil type for selection of pertinent apparent lateral earth pressure distribution diagram.

When considering the effects of surcharge loading on internally braced/strutted shoring system, a coefficient of lateral contribution from surcharge of 1/2 should be considered for such uniform surcharge loading, and a minimum uniform lateral pressure of 100 pounds per square foot (psf) in the upper ten (10) feet of shoring should also be considered in the design when normal traffic is permitted within ten feet of the shoring.



Note: 1. H: Height of shoring in feet.
2. Ka values are different for different soils and should be as per Soils Report.

Schematic Not To Scale

Associated Soils Engineering, Inc. 2860 Walnut Avenue Signal Hill, CA 90755 Tel (562) 426-7990 Fax (562) 426-1842	**Apparent Lateral Earth Pressure Diagram**	Project Name:	Beachwood Pump Station Upgrade and Force Main Replacement Project - Burbank
		Project No.:	6441.13
	Figure 6	Date:	March, 2014

Temporary cantilever shoring, if used, should be designed to resist active earth pressures equivalent to the corresponding Ka values shown in the above Table 2 expressed in pounds per cubic foot (pcf) equivalent fluid pressure (EFP) on a soil type/soil condition basis. The active lateral earth pressure should be designed with a triangular distribution for level ground conditions behind shoring. The design of cantilevered shoring should also include surcharge loading effects of existing structures and anticipated traffic, including delivery and construction equipment, when loading is within a distance from the shoring equal to the depth of excavation. The coefficient of lateral contribution for such uniform surcharge load is 1/3 for cantilevered shoring design. In addition, a minimum uniform lateral pressure of 100 pounds per square foot in the upper ten (10) feet of shoring should be incorporated in the design when normal traffic is permitted within ten (10) feet of the shoring. The resultant lateral deflection of shoring element and surficial settlement immediately behind cantilevered shoring could be up to 1 to 1.5 percent of the shored excavation depth. Should this ground deformation be intolerable to the existing improvements, internal bracing/strutting that is more capable of limiting ground movement associated with excavation should be installed, as per recommended above.

The above recommended lateral earth pressure values are applicable to level soil conditions behind shoring system. Should a combination of slope embankment and shoring be used, the lateral earth pressure values will be greater and must be evaluated for actual condition.

7.2.4 Backfilling and Compaction Requirements:

Site soils are considered suitable for reuse as trench backfill provided they are 1) free of debris, organic matter, or other deleterious materials, and 2) are at a suitable moisture condition for achieving the required compaction. The maximum allowable particle size in trench backfill should be limited to 3-inches. No nesting of large particles (1.5 to 3-inch sizes) would be permitted during backfilling operations.

Trench backfill should be placed from one foot above the top of the pipe to the surface. Any soft and/or unstable material encountered at pipe invert should be removed and replaced with a properly compacted fill or an adequate bedding material.

During ASE's field exploration, site sandy granular soils and silty soils were found to exhibit moisture contents ranging from 1.0 to 22.0 percent, with soils at or below 15 feet depth exhibiting moisture contents ranging from 24.7 to 29.9 percent in Borings B-1, B-4 and B-8. With the relatively high moisture contents measured in some deeper site soils, if these soils are to be used for trench backfill, special blending with suitable dry soils and/or air drying, or other alternatives, will be required to achieve acceptable soil moisture content near optimum moisture content to permit recompaction of these soils to a minimum 90 percent relative compaction. Unless otherwise stated,

the measurement of relative compaction in this report should always refer to the latest edition of ASTM D-1557 test procedures.

Sand Equivalent (S.E.) tests (ASTM D2419-09) performed on selected sandy soil samples retrieved at various elevations in the borings show a range between 13 and 87, with an average S.E. value of 38. The sandy soils tested generally exhibit an average value above the minimum S.E. value of 30 specified in Section 306-1.2.1 of the Green Book, however, ten (10) of the fifteen (15) samples tested exhibit an S.E. value below 30 and are therefore considered unsuitable for reuse as bedding material or shading of utilities. Site blended and imported materials for this purpose should consist of non-expansive granular soils having S.E. values greater than 30.

Approved trench backfill materials should be placed in horizontal lifts not exceeding 8-inches in loose thickness, moisture conditioned to a minimum of one (1) percentage point above corresponding optimum moisture content for granular soils, and a minimum of two (2) percentage points above corresponding optimum moisture content for silty soils (if present), and compacted to a minimum of 90 percent relative compaction.

Bedding placed below invert elevations should be firmly tamped in-place prior to installation of the line. The balance of bedding placed adjacent to the sides of the pipe, and up to within one (1) foot over the pipe may be placed utilizing mechanical compaction methods or jetting and/or flooding procedures in areas where granular sandy soils are present. Jetting and/or flooding would be prohibited if confining site silty soils are present which would inhibit free water drainage.

Should pumping and heaving conditions be encountered during site excavation and grading operations, the grading contractor should consider utilizing track-mounted equipment in lieu of rubber tire mounted, where possible. If pumping and heaving conditions are present during street subgrade restoration/preparation, it may be necessary to overexcavate exposed wet and pumping soils under the observation and evaluation of the Geotechnical Consultant's representative, and replace with 1" open-graded rocks, a geotextile fabric (Mirafi 140N or equivalent) or a combination of both in order to provide a firm subgrade to facilitate subsequent fill placement. Should the subgrade soils be observed to be extremely soft and yielding, in addition to the aforementioned mitigation measure, a reinforcing geogrid (such as Tensar BX-1100, Mirafi BXG11, or equivalent), may need to laid atop the crushed rock layer to provide additional subgrade strengthening prior to resuming backfill or subgrade preparation operation. The 1" open-graded rocks should be rammed tightly to provide the desired "bridging" effect over the soft soils. Alternatively, site-specific recommendations for stabilization of excavation bottoms under the observation and evaluation of the Geotechnical Consultant's representative can be provided based on a review of soil conditions exposed during site grading.

7.2.5 Imported Soil:

Any imported soil required to complete grading operations should consist of "Very Low" expansive, granular material exhibiting an Expansion Index ("E.I." per ASTM D4829-08a Test Method) less than 20. Bedding material should also exhibit a minimum S.E. Value of 30.

7.2.6 Tests and Observations:

All grading, compaction and backfill operations should be performed under the observations of and testing by the Geotechnical Consultant's field representative. An adequate number of field density tests should be taken to ensure compliance with this report and local ordinances. If it is determined during grading that site soils require overexcavation to greater depths for obtaining proper support for the proposed sewer line, this additional work should be performed in accordance with the recommendations of the Geotechnical Consultant.

Imported fill soils should be examined by a representative of the Geotechnical Consultant, and tested as necessary for evaluating their suitability for use as fill prior to being hauled to the site. However, final acceptance of any imported soils will be based upon review of the soils actually delivered to the site.

7.3 Manhole Structures

Presented below are the recommended geotechnical criteria for the design of manholes and associated sewer line structures.

7.3.1 Minimum Foundation Dimension and Reinforcement:

In order to mobilize sufficient soils bearing capacity supporting the proposed manhole structures or other sewer improvements, it is recommended that minimum foundation/footing embedment and width should be 18 inches below lowest adjacent finish soil grade and 15 inches, respectively. From geotechnical consideration, all foundations/footings should be minimally reinforced with one (1) No. 4 reinforcing bar placed near the top and one (1) No. 4 reinforcing bar placed near the bottom. For isolated pad foundations, the minimum reinforcement should be applied bi-axially.

Foundation design details such as concrete strength, reinforcements, etc. should be established by the Structural Consultant.

7.3.2 Allowable Soils Bearing Capacities:

For foundations complying with the minimum dimension requirements stipulated in Section 7.3.1 above, an allowable soils bearing capacity inclusive of both dead and live loads on the order of 2000

psf may be used in the design, when supported on undisturbed natural silty soils and granular sandy soils. The value may be increased by 400 psf for each additional 12-inch increment of foundation depth, and 150 psf for each additional 12-inch increment in width into site soils, to a maximum aggregate design value not to exceed 3000 psf. The above values may also be used for foundation supported by approved compacted fill.

The above allowable bearing capacities may be increased by one-third (1/3) when subject to short-term, transient loading induced by wind or seismic activities.

7.3.3 Uplift Resistance:

The uplift resistance for manhole structures may be taken as the full weight of the structure and the soils overlaying atop.

Should a greater magnitude of uplift resistance is required beyond the combination of manhole dead weight and soil surcharge loading, alternatives such as thickening of manhole base and wall with increased dead weight or installation of uplift-resistance ground anchors may be considered. The Geotechnical Consultant should be requested to provide the pertinent design and construction recommendations if the later approach is being considered.

7.3.4 Settlements:

The weight of soil removed during required excavations is expected to be more than the imposed structural loading from manhole and conduit construction. As such, total and differential settlements for the proposed manholes and underground conduits are anticipated to be negligible.

7.3.5 Lateral Resistance:

Resistance to lateral loads can be assumed to be provided by passive earth pressure and by friction acting on structural components in permanent contact with the subgrade soils.

Lateral resistance on the sides of thrust blocks, manholes or footings may be computed using pertinent passive lateral earth pressure values (i.e. Kp-Value) listed in Table 3 below based on site-specific soil type and soil condition, subject to a maximum of ten (10) times of the corresponding Kp-value.

TABLE 3

Soil Type	Kp-Value (pcf EFP)
Native Sandy Soils or Compacted Granular Fill	225
Native Silty Soils	220

An ultimate coefficient of friction of 0.4 may be assumed with dead load forces between concrete and the supporting granular sandy soils. The above passive lateral earth pressure may be used in conjunction with the ultimate coefficient of friction in calculating composite lateral resistance, provided the passive lateral earth pressure value is reduced by one-third (1/3).

7.3.6 Earth Retaining Walls/Substructure Walls:

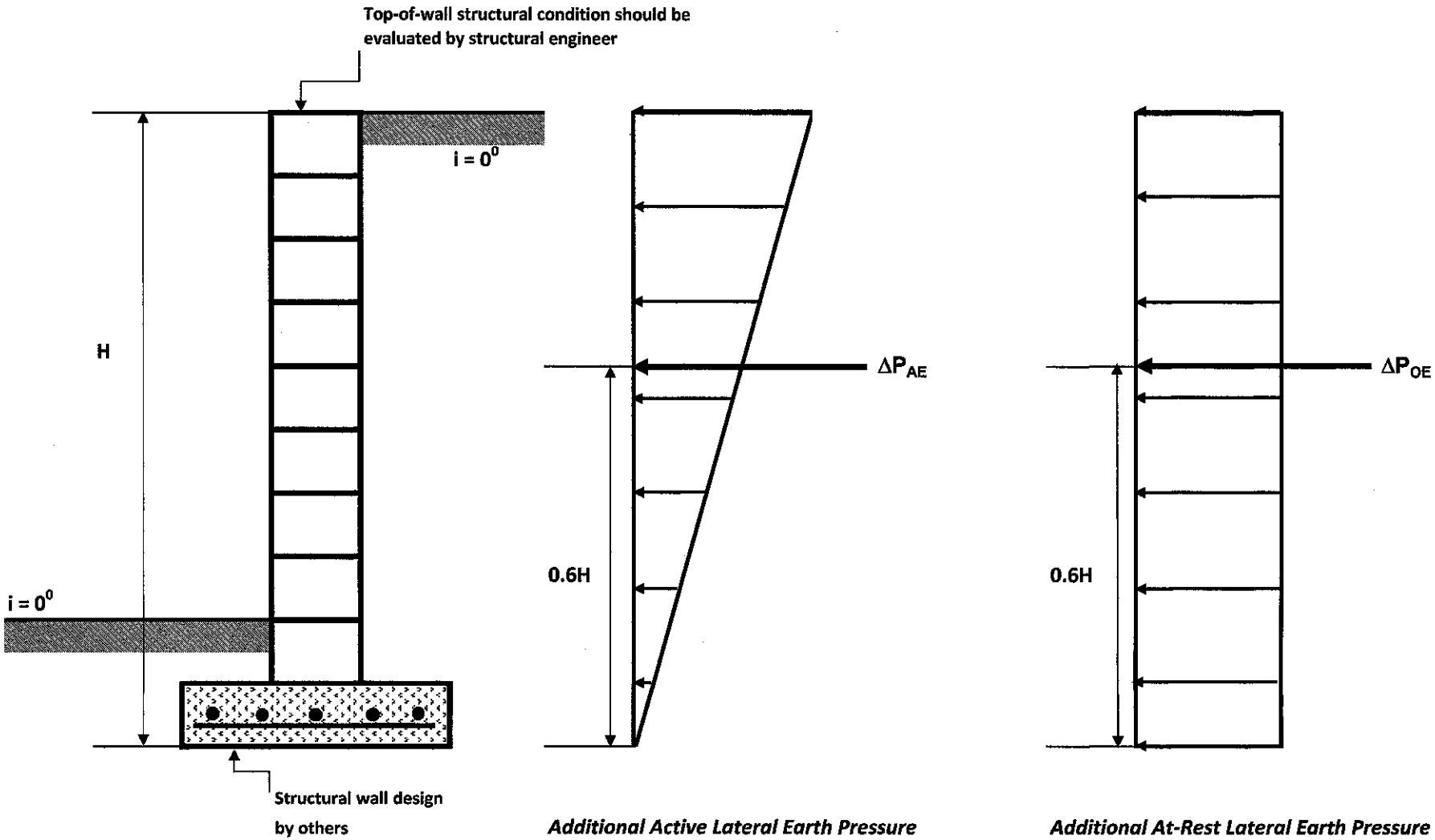
Manhole and/or substructure walls should be adequately designed to resist the lateral earth pressures and the anticipated construction and service loadings. The earth pressure acting on substructure walls depends primarily on allowable wall movement, type of backfill materials, backfill slopes, wall inclination, surcharges, and any hydrostatic pressure. Cantilevered earth retaining walls or substructure walls with on-site soil backfill and level conditions should be designed to resist "active" lateral earth pressure values on an in-place soil type/moisture content basis shown in the following Tables 4 and 5. Corresponding values of "at-rest" lateral earth pressure should be used for design of top-restrained earth retaining walls or substructure walls.

For transient seismic loading based on 50% of a PGA of 0.959g, additional lateral earth pressures corresponding to 2 different wall fixity conditions on in-place soil type/moisture content basis as shown in the following Tables 4 and 5, as well as Figure 7, Seismically-Induced Lateral Earth Pressure Diagram, should be considered for earth retaining walls or substructure walls exceeding 12 feet in height. The Structural Consultant should verify whether an acceptable factor of safety exists with the retaining wall structural design upon the impact of additional lateral earth pressure induced by the seismic loading.

TABLE 4 Earth Retaining Wall/Substructure Wall Design Parameters – Sandy Soils

Design Parameter	Values
Allowable Soils Bearing Capacity	2000 psf(1)
Increase in Bearing Capacity for each 12-inch increment in Footing Depth / Width	400 psf / 150 psf(1)
Active Pressure (level backfill with on-site soils)	33 pcf EFP (2)
At-rest Pressure (level backfill with on-site soils)	51 pcf EFP (2)
Passive Pressure (per foot of depth)	225 pcf EFP (3)
Seismic Loading (active), ΔP_{AE} (4)	33 H^2 (5)
Seismic Loading (at-rest), ΔP_{OE} (6)	35 H^2 (5)
Coefficient of Friction	0.4(7)
Minimum Footing Depth	18 inches
Minimum Footing Width	15 inches
Minimum Footing Reinforcement	2 No. 4 rebar; 1 near top and 1 near bottom

(Details of footnotes below Table 5)



Schematic Not To Scale

Associated Soils Engineering, Inc. 2860 Walnut Avenue Signal Hill, CA 90755 Tel (562) 426-7990 Fax (562) 426-1842	**Seismically-Induced Lateral Earth Pressure Diagram**	Project Name:	Beachwood Pump Station Upgrade and Force Main Replacement Project - Burbank
		Project No.:	6441.13
	Figure 7	Date:	March, 2014

TABLE 5 Earth Retaining Wall/Substructure Wall Design Parameters – Silty Soils

Design Parameter	Values
Allowable Soils Bearing Capacity	2000 psf(1)
Increase in Bearing Capacity for each 12-inch increment in Footing Depth / Width	400 psf / 150 psf(1)
Active Pressure (level backfill with on-site soils)	37 pcf EFP (2)
At-rest Pressure (level backfill with on-site soils)	56 pcf EFP (2)
Passive Pressure (per foot of depth)	220 pcf EFP (3)
Seismic Loading (active), ΔP_{AE} (4)	37 H^2 (5)
Seismic Loading (at-rest), ΔP_{OE} (6)	38 H^2 (5)
Coefficient of Friction	0.4(7)
Minimum Footing Depth	18 inches
Minimum Footing Width	15 inches
Minimum Footing Reinforcement	2 No. 4 rebar; 1 near top and 1 near bottom

(1) Based on compliance with earthwork recommendations in Section 7.2.4;
(2) Design values assuming a drained condition within the backfill zone and no surcharge loading conditions;
(3) Subject to maximum ceiling value not exceeding ten (10) times the corresponding passive pressure value;
(4) Based on 50% of a PGA of 0.959g and the Mononobe-Okabe equation. See Figure 7 for pressure distribution diagram;
(5) Height of retaining wall measured from the bottom of retaining wall footing;
(6) Based on 50% of a PGA of 0.959g and the NAVFAC (1986) equation. See Figure 7 for pressure distribution diagram;
(7) Passive lateral resistance may be combined with frictional resistance provided the passive lateral resistance value is reduced by one-third (1/3).

Cantilevered and top-restrained earth retaining walls or substructure walls subject to uniform surcharge loads should be designed for an additional uniform lateral pressure equal to one-third (1/3) and one-half (1/2) of the anticipated surcharge pressure, respectively. Foundations should be reinforced as recommended by the Structural Consultant with appropriate back drainage provided to avoid excessive build-up of hydrostatic wall pressures.

Resistance to lateral loads can be assumed to be provided by passive earth pressure and by friction acting on structural components in permanent contact with the subgrade soils. Lateral resistance on the sides of foundations may be computed based on the soil types and pertinent values shown in Tables 4 and 5, subject to a maximum value not exceeding ten (10) times the corresponding value for granular sandy soils and silty soils. Ultimate coefficient of friction as shown in Tables 4 and 5 may also be assumed with structural dead load between concrete and the supporting soils. The passive lateral earth pressure value may be used in conjunction with corresponding ultimate coefficient of friction in calculating composite lateral resistance, provided the passive lateral earth pressure value is reduced by one-third (1/3).

It is preferred that backfill of earth retaining walls or substructure walls should consist of approved very low-expansive material (i.e. E.I. of 20 or less) and should be compacted to a minimum relative compaction of 90 percent. Flooding or jetting of backfill should not be permitted. Granular backfill should be capped with 18 inches (minimum) of relatively impervious fill to seal the backfill and prevent saturation. Figure 8, Nearby Building Surcharge Consideration & Retaining Wall Drainage Details, illustrates the general configuration and requirements for retaining wall drainage. Other retaining wall drainage alternatives such as CONTECH C-Drain system or MIRADRAIN may be considered but should first be reviewed and approved by the Geotechnical Consultant prior to implementation.

Should the space behind the new earth retaining walls or substructure walls be too tight to implement the above recommended backfill effort, as an alternative, 1.5-sack control density fill may be used in lieu of regular soil backfill, provided that the integrity and functionality of wall backdrain is protected and maintained. The Geotechnical Consultant should be on-site during slope cutting and retaining wall construction to inspect the exposed slope conditions, to evaluate the stability of slope cuts and, if necessary, to provide additional remedial or mitigative recommendations.

It should be noted that the use of heavy compaction equipment in close proximity to retaining structures can result in wall pressures exceeding design values and corresponding wall movement greater than that normally associated with the development of active or at-rest conditions. In this regard, the contractor should take appropriate precautions during the backfill placement.

7.3.7 Foundation Observations:

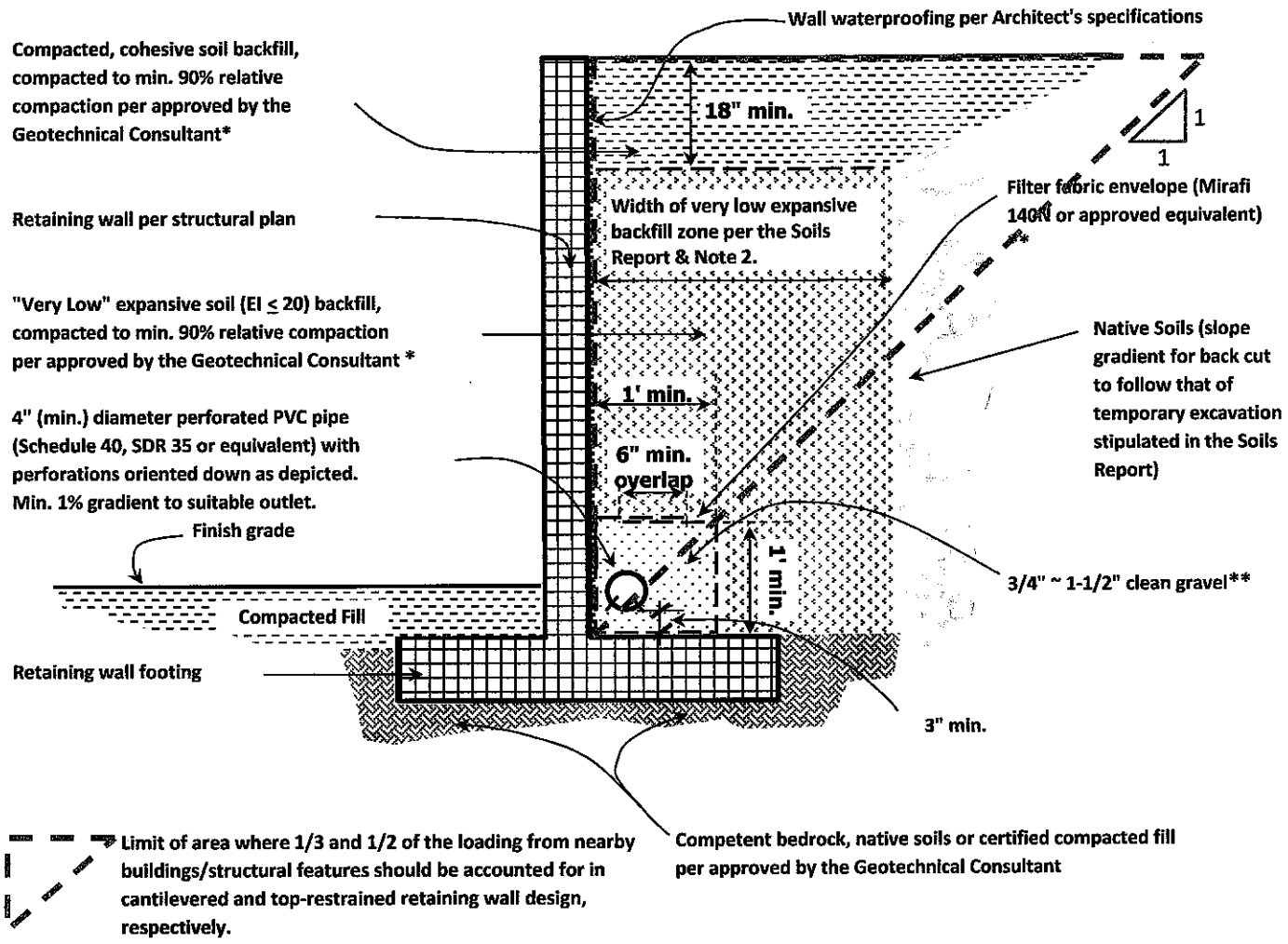
All manhole and/or foundation excavations should be observed by the Geotechnical Consultant's representative to verify minimum embedment depths and competency of bearing soils. Such observations should be made prior to placement of any reinforcing steel or concrete.

7.4 Soil Corrosivity Evaluation

Soil corrosivity tests were performed on representative samples of site soil. These tests were meant to determine the corrosive potential of on-site soils to proposed concrete foundations and underground metal conduits. The soils corrosivity test results are presented in Appendix A.

7.4.1 Concrete Corrosion:

Disintegration of concrete may be attributed to the chemical reaction of soil sulfates and hydrated lime and calcium aluminate within the cement. The severity of the reaction resulting in expansion and disruption of the cement is primarily a function of the concentration of the soluble sulfates and the water-cement ratio of the concrete.



SPECIFICATIONS FOR CALTRANS CLASS II PERMEABLE MATERIAL	
U.S. STANDARD SIEVE SIZE	% PASSING
1"	100
3/4"	90 ~ 100
3/8"	40 ~ 100
No. 4	25 ~ 40
No. 8	18 ~ 33
No. 30	5 ~ 15
No. 50	0 ~ 7
No. 200	0 ~ 3
Sand Equivalent > 75	

* Based on ASTM D-1557-02

** If Caltrans Class II permeable material (see gradation to left) is used in place of 3/4" ~ 1-1/2" gravel, filter fabric may be deleted. Caltrans Class 2 permeable material should be compacted to minimum 90 percent relative compaction. Unless otherwise specified, a minimum of 1 cubic foot of gravel should be used for each 1 foot run of drain.

Note 1: Composite drainage products such as Contech C-Drain, Miradrain or J-Drain may be used as alternative to gravel or Class II. Installation should be performed in accordance with manufacturer's specifications.

Note 2: Width of " Very Low" expansion backfill equals 1/2 of retained height, or distance from back of wall to heel of footing, whichever is greater.

Schematic Not To Scale

Associated Soils Engineering, Inc.

2860 Walnut Avenue

Signal Hill, CA 90755

Tel (562) 426-7990 Fax (562) 426-1842

Project:	Beachwood Pump Station Upgrade and Force Main Replacement Project - Burbank		
Figure 8	Nearby Building Surcharge Consideration & Retaining Wall Drainage Details		
Proj. No.:	6441.13	Date:	March, 2014

Soluble sulfate contents of 0.00% to 0.024% by weight have been recorded from corrosivity testing conducted on on-site soils at selected locations along the Upgrade/Replacement alignment. Per Table 4.2.1 of ACI 318-08, soils exhibiting soluble sulfate content less than 0.1% by weight are classified as having "Not Applicable" sulfate exposure and "S0" sulfate exposure category. As such, for structural features to be in direct contact with on-site soils, the tested "S0" sulfate exposure category indicates that there should be no special geotechnical restriction on the type of Portland cement or water-cement ratio to be used, as per stipulated in Table 4.3.1 of ACI 318-08.

7.4.2 Metal Corrosion:

In the evaluation of soil corrosivity to metal, the hydrogen ion concentrates (pH) and the electrical resistivity of the site and backfill soils are the principal variables in determining the service life of ferrous metal conduit. The pH of soil and water is a measure of acidity or alkalinity, while the resistivity is a measure of the soils resistance to the flow of electrical current.

Currently available design charts indicate that corrosion rates decrease with increasing resistivities and increasing alkalinities. It can also be noted that for alkaline soils, the corrosion rate is more influenced by resistivity than by pH.

The resistivity values of 1,860 to 11,710 ohm-cm, as well as pH-values of 7.95 to 8.75, as shown in Appendix A, classify the on-site soils tested to be corrosive (1 location), moderately corrosive (5 locations), and non-corrosive (1 location) to buried ferrous metals. Based on California Test 643, the year to perforation for 18-gauge steel in contact with soils of similar resistivity and pH-values is approximately 32 to 47 years for the corrosive to moderately corrosive soils, and in excess of 50 years for the non-corrosive soils. In lieu of additional testing, alternative piping materials, i.e. plastic piping, may be used instead of metal if longer service life is desired or required. The low resistivity values of on-site soils may also have implications to other building materials and depths of embedment for steel reinforcement etc. it might be desirable that a qualified corrosion consultant be engaged to review the building/sewer plans.

Soluble chloride contents of 42 to 147 ppm recorded in out limited laboratory tests are considered low to marginal to the threshold values of 100 and 200 ppm per Federal Highway Administration Standards (FHWA), 2002 and Caltrans Standards, 1999, respectively. Therefore, special measure in terms of rebar protection against chloride corrosion under Exposure Class "C1" stipulated in Tables 4.2.1 and 4.3.1 of ACI 318-08 may be required as a result of the marginal soluble chloride content tested at one (1) location (Boring B-9) on North Sparks Avenue. However, at the other six (6) locations tested, special measure in terms of rebar protection against chloride corrosion under Exposure Class "CO" stipulated in Tables 4.2.1 and 4.3.1 of ACI 318-08 is applicable as a result of the low soluble chloride tested.

8.0 CLOSURE

This report has been prepared for the exclusive use of Lee & Ro, Inc. and its design consultants relative to the design and construction of the proposed Upgrade/Replacement project. No portion of this report may be used by other parties or for other purposes.

The City/Owner or its representatives should make sure that the information and recommendations contained in this report are brought to the attention of the project engineers and incorporated into the plans, and that the necessary steps are taken to confirm that the contractors carry out such recommendations in the field.

This office should be notified should any of the following, pertaining to the final site development, occur:

1. Final plans for site development indicating utilization of areas not originally proposed for construction.
2. Structural loading conditions differ significantly, say, ten (10) percent, from those utilized for evaluation and preparation of this report.
3. The site grading/construction does not start within 12 months following the date of this report.

Should any of the above occur, this office should be notified and provided with finalized plans of site development for our review to enable us to provide the necessary recommendations for additional work and/or updating of the report. Any charges for such review and necessary recommendations would be at the prevailing rate at the time of performing review work.

The findings contained in this report are based upon our evaluation and interpretation of the information obtained for the limited number of test borings and the results of the laboratory testing and engineering analysis. As part of the engineering analysis it has been assumed, and is expected, that the geotechnical conditions which exist across the site are similar to those encountered in the test excavations. However, no warranty is expressed or implied as to the conditions at locations or depths other than those excavated. Should any conditions encountered during construction differ from those described herein, this office should be contacted immediately for recommendations prior to continuation of work.

Our findings and recommendations were obtained in accordance with generally accepted current professional principles and local practice in geotechnical engineering and reflect our best professional judgment. We make no other warranty, either express or implied.

These findings and recommendations are, however, dependent on the above assumption of uniformity and upon proper quality control of fill placed and utilities/foundations installed. Geotechnical observations and testing should be provided on a continuous basis during excavation/grading at the site to confirm design

assumptions and to verify conformance with the intent of our recommendations. If parties other than Associated Soils Engineering, Inc. are engaged to provide services during construction they must be informed that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the recommendations in this report or providing alternative recommendations.

This concludes our scope of services as indicated in our proposal dated August 30, 2012, however, our report is subject to review by the controlling authorities for the project. Any further geotechnical services that may be required of our office to respond to questions/comments of the controlling authorities after their review of the report will be performed on a time and expense basis as per our current fee schedule. We would not proceed with any response to report review comments/questions without authorization from your office.

APPENDIX A – RECORD OF FIELD EXPLORATION AND LABORATORY TESTING

The following Appendix A presents 1) the loggings of subsurface soils encountered, and 2) substantiating data and laboratory test results, both which have been used for the performance of engineering evaluations and assembly of recommendations stipulated in this report.

Record Of Field Exploration

A total of fourteen (14) exploratory borings were drilled on behalf of ASE by Martini Drilling Corporation for the Pump Station Upgrade/Force Main Replacement Project with approximate locations indicated on the Field Logs of Boring, Plates B-1 through B-14. The borings were extended to a depth of twenty (20) feet from the corresponding existing grades.

One (1) additional exploratory boring, which was inaccessible to the truck-mounted drilling rig, was drilled by ASE personnel with manually operated drilling equipment with the approximate location indicated on the Field Log of Boring, Plate B-15. The boring extended to a depth of 6 feet 6 inches from the existing grade at which point an obstruction was encountered which was impenetrable with the manually operated equipment.

Continuous observations of the materials encountered in the exploratory borings were recorded in the field. The soils were classified in the field by visual and textural examination, and were further examined/re-classified in ASE's laboratory with bulk soil samples obtained from the field. Relatively undisturbed samples of soils were extracted in exploratory borings with Modified California barrel sampler and in thin-walled Shelby tubes. Additional samples were obtained in a Standard Penetration sampler in accordance with specifications outlined in ASTM D1586-8a Test Method. All samples were secured timely in moisture-resistant bags to minimize the loss of field moisture, followed by prompt delivery to the laboratory for ensuing testing.

Detailed descriptions of the soils encountered and conditions observed during the subsurface exploration are shown in the attached Field Logs of Boring B-1 through B-15 (Plates B-1 through B-15). The boring logs also present the USCS classifications of soils encountered, depths and types of soil samples, field dry densities and moisture contents, the corresponding laboratory tests performed, as well as Modified California barrel sampler and Standard Penetration Test ("N" Values) blow counts.

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-1

Sheet 1 of 2

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***Riverside Drive,Burbank*** | Project No. ***6441.13***

Dates(s) Drilled:	**2/7/2014**	Logged By:	**Gary L. Martin**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**500.0**

Comments: Groundwater not encountered. Boring backfills to 16' 5".

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	500						ASPHALTIC CONCRETE PAVEMENT: 6.0"				
						SM	SILTY SAND: Olive,moist,fine-grained sand				MAX DENSITY, EXPANSION, CORROSIVITY TESTS
				8/6"(Ring)				106.3	10.1		
				9/6"(Ring)		SM	SILTY SAND: Olive to olive gray,damp to moist,fine-grained sand	107.3	7.5		GRAIN SIZE
				9(Ring)		SM	same as above	108.9	8.7		CONSOL,SHEAR
5	495										
						SP	SAND: Light olive gray,damp,fine to medium-grained sand,with layer of Silty Fine to Medium Sand at 7.5 feet				
				5(SPT)			Sand Equivalent Value= 74 at 7 feet		5.3		SAND EQUIVALENT
10	490			9/6"(Ring)		SM	SILTY SAND: Olive gray,damp,fine-grained sand	121.0	4.3		
				10/6" (Ring)		SP		107.8	2.4		
							SAND WITH GRAVEL: Light gray,dry,fine to coarse-grained sand				
15	485			4/6"(SPT)		SM	SILTY SAND: Olive gray,trace brownish yellow,very moist,fine-grained sand		25.0		
				5/6"(SPT)		ML			28.2		
						SM	SANDY SILT: Dark gray,very moist,fine-grained sand		24.7		
							SILTY SAND: Gray,very moist,fine-grained sand				

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B - 1

Sheet 2 of 2

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***Riverside Drive,Burbank*** | Project No. ***6441.13***

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
						SP	SAND: Pale yellow and dark gray,damp,fine to medium-grained sand				
				30/6" (Ring)				104.5	5.6		
				50/5" (Ring)		SP	SAND WITH GRAVEL: Light yellowish brown,damp,fine to coarse-grained sand	113.0	5.8		
20	480						NOTE:Boring located on north side of Riverside Drive at approximately 150 feet east of South Beachwood Drive.				

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-2

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***1516 Riverside Dr.,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/7/2014**	Logged By:	**Gary L. Martin**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet 6 Inches**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**501.0**

Comments: Groundwater not encountered. Boring backfills to 15.0'.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0						ASPHALTIC CONCRETE PAVEMENT: 9.0" (2 layers-2.5" on 6.5")				
	500		27(Ring)		SM	SILTY SAND: Grayish brown,damp to moist,fine-grained sand	115.9	5.8		
			5(SPT)		SM	same as above		7.0		
5										
	495				SP	SAND: Light brownish gray,dry,fine to coarse-grained sand	102.6	2.7		
			7/6"(Ring)				102.1	11.4		SHEAR
			8/6"(Ring)		SM	SILTY SAND: Grayish brown,moist,fine to medium-grained sand				
10			4(SPT)		SM	SILTY SAND: Olive,moist,fine to coarse-grained sand,with thin layer Silty Fine Sand at 10.5 feet Sand Equivalent Value= 19 at 10 feet		9.9		GRAIN SIZE, SAND EQUIVALENT
	490									
					SM	SILTY SAND: Olive,damp to moist,fine-grained sand,with large gravel particle at 15.5 feet	102.7	7.5		CONSOL
15			15/6" (Ring)							
	485				SP	SAND: Light olive brown with yellowish brown,moist,fine to medium-grained sand,with thin layer Olive Gray Silty Fine Sand at 19 feet				
			+		SP	+moisture sample from upper 6" of SPT		15.6		
20			23(SPT)		SP	SAND: Light gray to pale yellow,damp,fine-grained sand		4.7		

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-3

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***542 S. Sparks Street,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/4/2014**	Logged By:	**Ted Riddell**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 in.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**516.0**

Comments: Groundwater not encountered. Boring backfills to 15.0'.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	515					SM	ASPHALTIC CONCRETE PAVEMENT: 5.0" layers-2.5" on 2.5")				
				22(Ring)			SILTY SAND: Light gray to pale yellow,damp,fine-grained sand	107.1	4.2		MAX DENSITY, EXPANSION, CORROSIVITY TESTS
				24(Ring)		SP	SAND WITH GRAVEL: Light gray to white,dry,fine to medium-grained sand	106.6	1.0		SHEAR
5	510			12(SPT)		SP	same as above Sand Equivalent Value= 87 at 7 feet		1.0		SAND EQUIVALENT
10				15/6" (Ring)		SP	same as above *insufficient sample for density	*	1.6		
	505			20/6" (Ring)		SM	SILTY SAND: Pale olive,damp,fine-grained sand	123.3	5.7		CONSOL
15	500			10(SPT)		SP	SAND: Light olive gray,damp,fine-grained sand		3.1		GRAIN SIZE
						SP	SAND: Light gray,dry,fine to medium-grained sand,trace gravel				
				19/6" (Ring)				103.6	1.7		
20	495			27/6" (Ring)		SP	SAND: Light gray to white,dry,fine-grained sand	106.1	1.7		

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-4

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***420 S. Sparks Street,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/4/2014**	Logged By:	**Ted Riddell**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet 6 Inches**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 in.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**521.0**

Comments: Groundwater not encountered. Boring backfills to 16.0'.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS (BULK / DRIVE / TYPE, "N" or (Blows/ft.))	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0				SM	ASPHALTIC CONCRETE PAVEMENT: 5.0"				
	520				SILTY SAND: Olive,moist,fine-grained sand	93.7	11.6		
		8/6"(Ring)							
		9/6"(Ring)		SM	SILTY SAND: Grayish brown,damp,fine-grained sand	110.4	6.8		
		3(SPT)		SM	same as above,becoming light olive gray Sand Equivalent Value= 22 at 4 feet		7.5		SAND EQUIVALENT
5									
	515								
		19(Ring)		SM	same as above,becoming olive,moist	110.2	8.7		SHEAR, GRAIN SIZE
10		4(SPT)		SM	SILTY SAND: Olive,moist,fine-grained sand		16.3		
	510								
				ML	SANDY SILT: Olive,very moist,fine-grained sand				
15		10/6" (Ring)				95.8	27.3		CONSOL
		17/6" (Ring)		SM	SILTY SAND: Pale olive,trace brownish yellow,moist,fine-grained sand	108.1	12.1		
	505			SP	SAND: Light gray,damp,fine to medium-grained sand,with some gravel				
		34(SPT)					3.1		
20									

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-5

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***246 S. Sparks Street,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/4/2014**	Logged By:	**Ted Riddell**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**530.0**

Comments: Groundwater not encountered. Boring backfills to 16.0'.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	530					SM	ASPHALTIC CONCRETE PAVEMENT: 5.0"				
						SP	SILTY SAND: Light olive brown,moist,fine-grained sand				MAX DENSITY, EXPANSION, CORROSIVITY TESTS
				17(Ring)			SAND: Light gray,dry,fine-grained sand Sand Equivalent Value= 56 at 2 feet	101.1	1.5		SAND EQUIVALENT
				13(Ring)		SP	same as above	98.0	1.0		GRAIN SIZE
5	525										
				7(SPT)		SP	SAND: Pale olive,damp,fine-grained sand		4.7		
10	520			32(Ring)		SP	SAND: Light olive gray,dry,fine-grained sand	105.6	1.5		CONSOL,SHEAR
15	515			17(SPT)		SM	SILTY SAND: Pale olive to light olive gray,damp to moist,fine-grained sand		7.5		
						SP	SAND: Pale olive,dry,fine-grained sand				
				57(Ring)				107.1	2.0		
20	510										

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-6

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***South Sparks Street,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/4/2014**	Logged By:	**Ted Riddell**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet 6 Inches**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**541.0**

Comments: Groundwater not encountered. Boring backfills to 16.0'.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0						SM	ASPHALTIC CONCRETE PAVEMENT: 3.75' (2 layers-1.75" on 2.0")				
	540			15Ring)		SM	SILTY SAND: Grayish brown,damp,fine-grained sand	108.0	3.1		
				4(SPT)		SM	same as above Sand Equivalent Value= 21 at 4 feet		4.7		SAND EQUIVALENT
5	535			20(Ring)		SM	same as above	112.6	7.5		CONSOL,SHEAR
10	530			10(SPT)		SM	SILTY SAND: Olive,damp to moist,fine-grained sand		8.1		GRAIN SIZE
15	525			47(Ring)		SM	same as above	118.2	7.8		
				26(SPT)		SP	SAND: Olive,damp,fine to medium-grained sand		4.2		
20	520						NOTE:Boring located on east side of South Sparks Street at approximately 100 feet south of Olive Avenue.				

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-7

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***214 N. Sparks Street,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/4/2014**	Logged By:	**Ted Riddell**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**546.0**

Comments: Groundwater not encountered. Boring backfills to 15' 6".

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	545				SM	ASPHALTIC CONCRETE PAVEMENT: 3.0"				
						AGGREGATE BASE MATERIAL: 5.0"				
			6(Ring)			SILTY SAND: Olive gray,moist,fine-grained sand	87.9	14.3		
			13(Ring)		SP	SAND: Light gray,dry,fine to medium-grained sand Sand Equivalent Value= 78 at 4 feet	106.1	2.0		SAND EQUIVALENT
5	540		9(SPT)		SP	same as above		2.0		GRAIN SIZE
10	535		24(Ring)		SP	SAND: Light gray,dry,fine-grained sand	99.1	2.6		SHEAR
15	530		11(SPT)		SM	SILTY SAND: Light olive gray,damp,fine-grained sand,with trace gravel		4.2		
					SP	SAND: Light gray,dry,fine to medium-grained sand,with gravel from 16.5 to 17.5 feet depth				
20			44(Ring)		SP		106.9	2.6		CONSOL

PLATE B-7

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-8

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***241 N. Sparks Street,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/4/2014**	Logged By:	**Ted Riddell**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet 6 Inches**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**550.0**

Comments: Groundwater not encountered. Boring backfills to 17.0'.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS (BULK / DRIVE) TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	550				ASPHALTIC CONCRETE PAVEMENT: 6.5"				
				SM	SILTY SAND: Light brownish gray,moist,fine-grained sand				
		17(Ring)				80.4	8.7		
		4(SPT)		SM	same as above,damp		5.3		GRAIN SIZE
5	545								
		25(Ring)		SM	same as above,becoming grayish brown	107.2	4.7		SHEAR
10	540	5(SPT)		SM	SILTY SAND: Olive,moist,fine-grained sand Sand Equivalent Value= 17 at 10 feet		10.5		SAND EQUIVALENT
				SM	SILTY SAND: Light gray,trace olive yellow,damp,fine-grained sand				
15	535	6/6"(Ring)				104.0	5.3		
		9/6"(Ring)		ML	SILT: Grayish brown with brownish yellow,moist to very moist	91.6	24.2		CONSOL
		5(SPT)		ML	same as above		29.9		
20	530								

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-9

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***352 N. Sparks Street,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/4/2014**	Logged By:	**Ted Riddell**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**530.0**

Comments: Groundwater not encountered. Boring backfills to 17.0'.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0						ML	ASPHALTIC CONCRETE PAVEMENT: 4.0"				
	555			13(Ring)			CLAYEY SILT WITH SAND: Dark grayish brown,moist,fine-grained sand	98.4	23.4		MAX DENSITY, EXPANSION, CORROSIVITY TESTS GRAIN SIZE
				9/6"(Ring)		SM	SILTY SAND: Light olive brown,damp to moist,fine-grained sand	101.9	7.5		
5				12/6" (Ring)		ML	CLAYEY SILT: Very dark grayish brown,moist	111.0	16.7		SHEAR
	550			5(SPT)		ML	SANDY SILT: Olive,moist,fine-grained sand,with thin layer Very Dark Grayish Brown Silt with Fine Sand and Clay at 8.5 feet depth		22.0		
10				7/6"(Ring)		ML	CLAYEY SILT WITH SAND: Very dark grayish brown,moist,fine-grained sand	101.5	16.9		CONSOL
				11/6" (Ring)		SM	SILTY SAND WITH CLAY: Dark grayish brown,moist,fine-grained sand Sand Equivalent Value= 14 at 10.5 feet	124.8	9.7		SAND EQUIVALENT
	545										
15				12(SPT)		SM	SILTY SAND: Pale olive,moist,fine-grained sand		13.0		
	540					SP	SAND: Light gray,dry,fine-grained sand				
				27/6" (Ring)				114.5	2.2		
20				21/6" (Ring)		SP-SM	SAND WITH SILT: Light gray to pale yellow,damp,fine to medium-grained sand	115.7	3.3		

SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-10

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***North Sparks Street,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/5/2014**	Logged By:	**Gary L. Martin**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet 6 Inches**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**500.0**

Comments: Groundwater not encountered. Boring backfills to 16.0'.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	565				ML	ASPHALTIC CONCRETE PAVEMENT: 3.5" layers -1.5" on 2.0")				MAX DENSITY, EXPANSION, CORROSIVITY TESTS
			10/6" (Ring)			AGGREGATE BASE MATERIAL: 5.0"	84.5	6.1		
			16/6" (Ring)		ML	SANDY SILT: Olive to grayish brown,damp,fine-grained sand	108.6	3.2		SHEAR
			12(SPT)		ML	SANDY SILT: Light brownish gray to pale olive,dry,fine-grained sand		6.4		GRAIN SIZE
5	560									
			22/6" (Ring)		ML	same as above	92.5	6.8		CONSOL
			26/6" (Ring)		SM	SILTY SAND: Light brownish gray,damp,fine-grained sand	110.2	4.7		
10	555		15(SPT)		SM	Sand Equivalent Value= 22 at 10 feet		5.8		SAND EQUIVALENT
15	550		21/6" (Ring)		SM	same as above,becoming light yellowish brown to pale olive	96.8	3.8		
			26/6" (Ring)		ML	SANDY SILT: Grayish brown,damp,fine-grained sand	127.0	6.5		
			25(SPT)		SP	SAND: Light gray to pale yellow,dry,fine to medium-grained sand		1.0		
20	545					NOTE:Boring located on east side of North Sparks Street at approximately 50 feet north of West Magnolia Boulevard.				

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-11

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***626 N. Sparks Street,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/5/2014**	Logged By:	**Gary L. Martin**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 in.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**576.0**

Comments: Groundwater not encountered. Boring backfills to 16' 5".

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS (BULK / DRIVE / TYPE, "N" or (Blows/ft.))	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	575			ML	ASPHALTIC CONCRETE PAVEMENT: 3.0"				
					AGGREGATE BASE MATERIAL: 4.0"				
		11(Ring)			SANDY SILT: Olive brown,moist,fine-grained sand	98.8	16.3		
		7/6"(Ring)		ML	same as above,becoming grayish brown	99.4	9.4		SHEAR
5	570	12/6" (Ring)		SM	SILTY SAND: Light brownish gray,damp,fine-grained sand	110.3	3.8		
		5(SPT)		SM	SILTY SAND: Grayish brown,damp to moist,fine-grained sand,with layer Light Gray Fine Sand at 7.5 feet Sand Equivalent Value= 19 at 7 feet		7.5		SAND EQUIVALENT
10	565	15/6" (Ring)		ML	SANDY SILT: Olive,trace yellowish brown,damp,fine-grained sand	65.5	6.9		
		17/6" (Ring)		ML		117.2	9.8		CONSOL
					SANDY SILT: Olive,moist,fine-grained sand				
15	560	4(SPT)		ML	SANDY SILT WITH CLAY: Olive,moist,fine-grained sand		14.9		GRAIN SIZE
20		70(Ring)		ML	SANDY SILT: Light gray and pale olive,moist,fine-grained sand	115.1	11.1		

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-12

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***1314 Chandler Blvd.,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/5/2014**	Logged By:	**Gary L. Martin**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet 6 Inches**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**579.0**

Comments: Groundwater not encountered. Boring backfills to 16' 5".

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0						ASPHALTIC CONCRETE PAVEMENT: 4.75' (11.5" AC on east side of hole)				
					SM	AGGREGATE BASE MATERIAL: 5.5"				MAX DENSITY, EXPANSION, CORROSIVITY TESTS
			7(Ring)		ML	SILTY SAND: Olive,moist,fine-grained sand	95.2	14.9		
	575		2/6"(SPT)		ML	SANDY SILT: Dark grayish brown,moist,fine-grained sand		17.0		GRAIN SIZE
5			2/6"(SPT)		SM	SILTY SAND: Grayish brown,moist,fine-grained sand		9.3		
			6/6"(Ring)		SM	same as above,becoming light brownish gray,damp	99.5	5.9		
			8/6"(Ring)		ML	SANDY SILT: Dark grayish brown,moist,fine-grained sand	105.6	15.5		
	570				SM	SILTY SAND: Olive,moist,fine-grained sand		9.3		SAND EQUIVALENT
10			6(SPT)			Sand Equivalent Value= 20 at 10 feet				
	565									
15			17(Ring)		ML	SANDY SILT: Olive to olive gray,moist,fine-grained sand,with calcareous concretions	110.6	14.9		CONSOL,SHEAR
					SM	SILTY SAND: Olive,moist,fine-grained sand				
	560		8(SPT)					9.3		
20										

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-13

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***Chandler Boulevard,Burbank*** Project No. ***6441.13***

Dates(s) Drilled:	**2/5/2014**	Logged By:	**Gary L. Martin**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**580.0**

Comments: Groundwater not encountered. Boring backfills to 9' 6".

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	580					ASPHALTIC CONCRETE PAVEMENT: 5.0"				
					SM	AGGREGATE BASE MATERIAL: 5.0"				
			1/6"(Ring)			SILTY SAND: Olive gray,damp,fine-grained sand,with some gravel and medium sand	97.0	5.3		
			1/6"(Ring)		SM		99.6	5.0		
					SM	SILTY SAND: Olive,damp,fine-grained sand,with some medium sand				
			2/6"(Ring)				101.5	4.7		
			7/6"(Ring)		SP		102.0	1.7		SAND EQUIVALENT
5	575					SILTY SAND: Olive,damp,fine to medium-grained sand				
			17(SPT)		SP	SAND: Light gray,dry,fine to medium-grained sand,with some gravel Sand Equivalent Value= 87 at 4.5 feet		1.0		
10	570		30(Ring)		SP	same as above,becoming light olive gray	106.9	4.2		GRAIN SIZE, CONSOL,SHEAR
15	565		22(SPT)		SP	same as above,becoming olive gray		5.8		
					SP	SAND WITH GRAVEL: Light olive gray,dry,fine to coarse-grained sand,with gravel layer at 16.5 feet depth				
			67/11.5" (Ring)		SP		118.2	1.5		
20	560					NOTE:Boring located on north side of Chandler Boulevard at approximately 100 feet east of Lomita Street.				

FIELD LOG OF BORING B-14

Sheet 1 of 1

SOILS ENGINEERING, INC.

Project:	*Beachwood Pump Station Upgrade & Force Main Replace*
Location:	*Victory Boulevard,Burbank*
Project No.	*6441.13*

Dates(s) Drilled:	**2/7/2014**	Logged By:	**Gary L. Martin**
Drilled By:	**Martini Drilling Corporation**	Total Depth:	**20 Feet 6 Inches**
Rig Make/Model:	**CME 75**	Hammer Type:	**Automatic**
Drilling Method:	**Hollow-stem Auger**	Hammer Weight/Drop:	**140 Lb./±30 In.**
Hole Diameter:	**8 Inches**	Surface Elevation:	**580.0**

Comments: Groundwater not encountered. Boring backfills to 17.0'.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	580					ASPHALTIC CONCRETE PAVEMENT: 8.75' (petrofabric at 2-inches from surface)				
					SM	CONCRETE: 5.5"				
			11(Ring)			SILTY SAND: Olive gray,damp,fine-grained sand	94.3	6.4		MAX DENSITY, EXPANSION, CORROSIVITY TESTS GRAIN SIZE @ 2 feet
			2/6"(SPT)		SM	same as above		5.8		
5	575		1/6"(SPT)		SM	SILTY SAND: Olive,moist,fine-grained sand		16.3		
			5/6"(Ring)		SM	same as above	94.9	11.7		SHEAR
			7/6"(Ring)		ML	SANDY SILT: Dark grayish brown,moist,fine-grained sand	108.5	12.4		CONSOL
10	570		5(SPT)		SM	SILTY SAND: Olive,moist,fine-grained sand Sand Equivalent Value= 13 at 10 feet		12.4		SAND EQUIVALENT
15	565		12/6" (Ring)		SM	same as above *insufficient sample for density	*	13.1		
			17/6" (Ring)		SP	SAND: Light gray,trace brownish yellow,damp,fine-grained sand,with some gravel	106.1	6.4		
					SP	SAND: Light gray,dry,fine to medium-grained sand,with some gravel				
			36(SPT)		SP	same as above		2.0		
20	560					NOTE:Boring located in center median of Victory Boulevard at approximately 50 feet north of Chandler Boulevard.				

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-15

Sheet 1 of 1

Project: ***Beachwood Pump Station Upgrade & Force Main Replace***

Location: ***Burbank (See NOTE below)*** | Project No. ***6441.13***

Dates(s) Drilled:	**12/20/2013**	Logged By:	**Grant Zike**
Drilled By:	**Associated Soils Engineering,Inc.**	Total Depth:	**6 Feet 6 Inches**
Rig Make/Model:	**N/A**	Hammer Type:	**N/A**
Drilling Method:	**Hand Auger**	Hammer Weight/Drop:	**N/A**
Hole Diameter:	**3 and 6 Inches**	Surface Elevation:	**577.0**

Comments: Groundwater not encountered. No caving.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0						SM	SILTY SAND: FILL-Light olive brown to grayish brown,damp,fine-grained sand,with some gravel				
							with large concrete piece at 1.5 feet depth				
	575					SM		136.0	3.1		
							same as above				
							same as above,becoming grayish brown,with concrete pieces	125.3	4.2		CONSOL, SAND EQUIVALENT SHEAR
5						SM	Sand Equivalent Value= 15 at 5 feet				
						SM	same as above	115.9	4.2		
	570						DRILLING NOTE:Boring was not accessible with truck mounted drilling rig, therefore boring was excavated utilizing manually operated drilling equipment. An obstruction (i.e. possible large rock or backfill debris) was encountered at a depth of 6 feet 6 inches in the initiall location of Boring B-15 which was impenetrable with the available manually operated equipment. A second location was attempted to advance Boring B-15, however similar obstruction was encountered at 4 feet depth at this location. Boring terminated.				
10											
	565						NOTE:Boring located near Station No. 130+00 which is located on the southwesterly side of the Los Angeles County Flood Control channel approximately midway between the easterly terminus of Chestnut Street and the Union Pacific Railroad spur.				
15											

Laboratory Testing

After samples were visually classified in the laboratory, a testing program aiming at providing sufficient data for the ensuing engineering evaluation and analysis was established, which consisted of:

- Moisture Content and Density Tests

Relatively undisturbed soil samples retained within 2.416-inch inside diameter (I.D.) by one-inch high rings within the Modified California barrel sampler and in the 2.5-inch thin-walled Shelby tubes were tested in the laboratory to determine their respective in-place dry densities and moisture contents. The results are presented on the respective Field Logs of Boring, Plates B-1 through B-15.

- Consolidation Tests

Consolidation (ASTM D2435-11) tests were performed on selected relatively undisturbed samples to determine the settlement characteristics for various soil samples at various elevations. The results of these tests are shown graphically on Plates C-1 through C-15.

- Direct Shear Tests

In order to determine shear strength parameters of representative soil samples, direct shear tests were performed on relatively undisturbed ring samples in accordance with ASTM D3080-11. The test results are presented on Plates D-1 through D-15, as well as the table below.

Boring No.	Sample Depth, (Ft)	Soil Type	Filed Wet Density (Pcf)	Ultimate Shear Strength Parameters	
				Friction Angle (Degree)	Cohesion (Psf)
B-1	4.0	Silty Fine Sand	118.4	34.5	0
B-2	7.5	Silty Fine to Medium Sand	113.7	32	45
B-3	4.0	Fine to Medium Sand	107.6	32	60
B-4	7.0	Silty Fine Sand	119.8	30.5	80
B-5	10.0	Fine Sand	107.2	34	15
B-6	7.0	Silty Fine Sand	121.0	33	25
B-7	10.0	Fine Sand	101.7	32	60
B-8	7.0	Silty Fine Sand	112.2	31	70
B-9	4.5	Clayey Silt	129.5	33	110
B-10	2.5	Fine Sandy Silt	112.1	33.5	0
B-11	4.0	Fine Sandy Silt	108.7	32	35
B-12	15.0	Fine Sandy Silt	127.1	34	5
B-13	10.0	Fine to Medium Sand	111.4	34	15
B-14	7.0	Silty Fine Sand	106.2	34	5
B-15	6.0	Silty Fine Sand with some Gravel	120.7	37	0

Laboratory Testing – continued

- Volatile Organic Compounds (VOC) Tests

The possible presence of Volatile Organic Compounds (VOC) in subgrade soils and the soil samples were monitored with an appropriate meter during drilling operations. The results of VOC readings are shown on the attached Plates E-1 through E-14.

- Sand Equivalent Tests

Sand Equivalent ("S.E.") tests based on current edition of ASTM D2419-09 test procedures were performed on selected samples of the sandy soils encountered in the borings. The test results are presented on the table below.

Boring No.	Sample Depth, (ft)	Soil Type	Sand Equivalent Value
B-1	7.0	Fine to Medium Sand	74
B-2	10.0	Silty Fine to Coarse Sand	19
B-3	7.0	Fine to Medium Sand with Gravel	87
B-4	4.0	Silty Fine Sand	22
B-5	2.0	Fine Sand	56
B-6	4.0	Silty Fine Sand	21
B-7	4.0	Fine to Medium Sand	78
B-8	10.0	Silty Fine Sand	17
B-9	10.5	Silty Fine Sand with Clay	14
B-10	10.0	Silty Fine Sand	22
B-11	7.0	Silty Fine Sand	19
B-12	10.0	Silty Fine Sand	20
B-13	4.5	Fine to Medium Sand	87
B-14	10.0	Silty Fine Sand	13
B-15	5.0	Silty Fine Sand	15

- Particle Size Analysis Tests

Particle size analysis tests were performed in accordance with ASTM D422-63 (2007) test specifications on selected soils to determine the particle size distribution of various soils sampled. The results of these tests are shown graphically on the attached "G" Plates.

Laboratory Testing – continued

- Maximum Density Tests

The following maximum density tests were conducted in accordance with ASTM D1557-12, Method A, using 5 equal layers, 25 blows each layer 10-pound hammer, 18 inch drop in a 1/30 cubic foot mold. The results are as follows:

Boring No.	Depth, Feet	Maximum Dry Density, Pcf	Optimum Moisture Content, %	Material Classification
B-1	1-5	129.0	9.5	SM
B-3	1-5	124.5	10.5	SM
B-5	1-5	123.5	10.0	SP-SM
B-9	1-5	121.0	11.5	ML
B-10	1-5	126.5	10.5	ML
B-12	1-5	125.0	12.5	ML
B-14	1.5-5	122.0	11.5	SM

- Expansion Tests

Expansion tests were performed on soil samples to determine the swell characteristics. The expansion tests were conducted in accordance with ASTM D4829-08a Test Method. The expansion samples were remolded to approximately 90 percent relative compaction at near optimum moisture content subjected to 144 pounds per square foot surcharge load and was saturated.

Location	Max. Dry Dens., Pcf	Opt. Moist. Content, %	Molded Dry Density, Pcf	Molded Moist. Content, %	% Saturation	Expansion Index	Expansion Classification
B-1 @ 1'-5'	129.0	9.5	116.9	8.9	54.4	0	Very Low
B-3 @ 1'-5'	124.5	10.5	112.1	8.7	46.5	0	Very Low
B-5 @ 1'-5'	123.5	10.0	111.9	9.4	50.1	0	Very Low
B-9 @ 1'-5'	121.0	11.5	109.2	11.6	57.4	43	Low
B-10 @ 1'-5'	126.5	10.5	112.8	9.4	53.8	18	Very Low
B-12 @ 1'-5'	125.0	12.5	113.6	12.6	70.4	12	Very Low
B-14 @ 1.5'-5'	122.0	11.5	112.9	10.6	57.8	1	Very Low

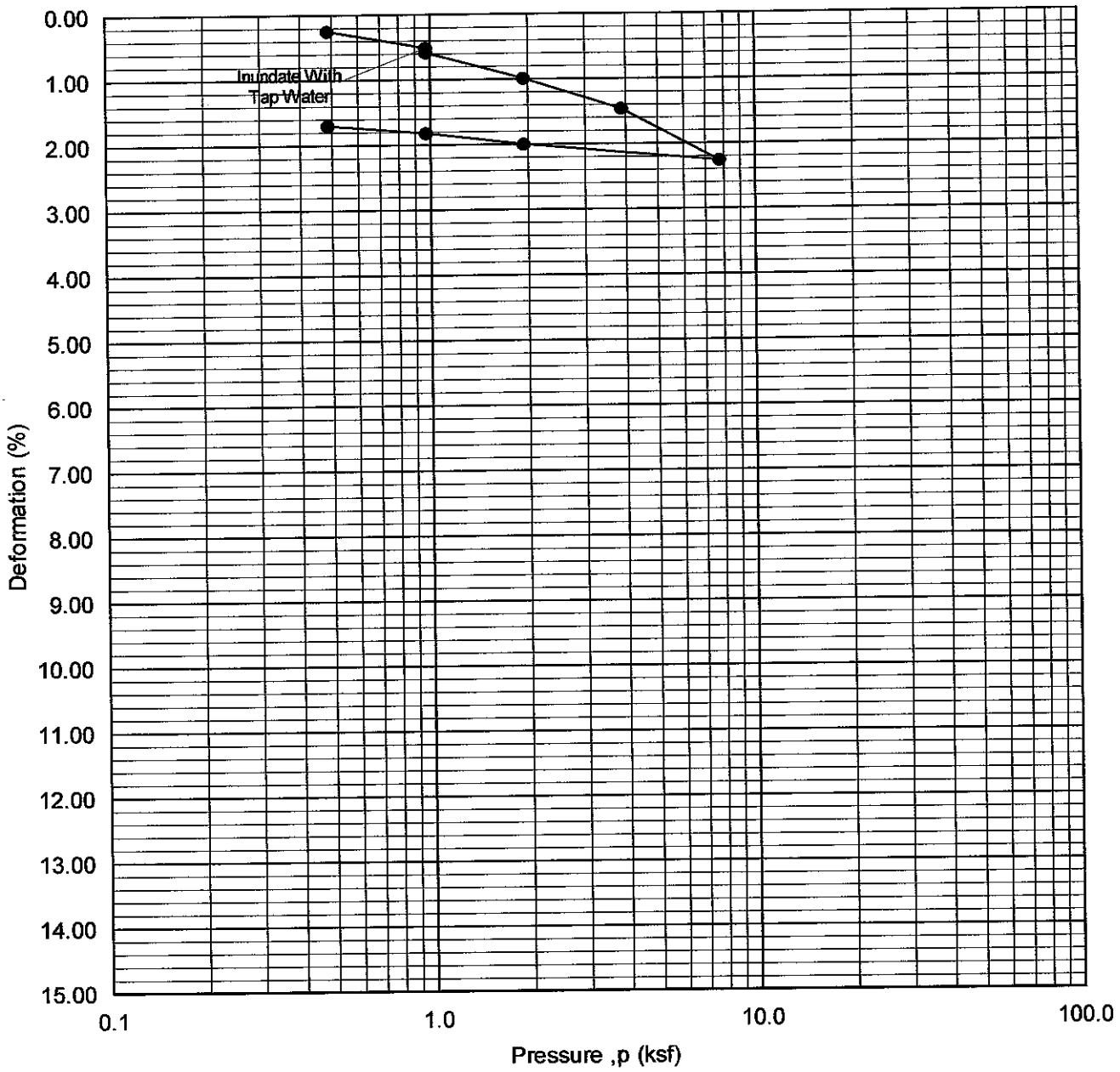
Laboratory Testing – continued

- Soil Corrosivity Tests

Tests of soluble sulfate and chloride contents were performed in accordance with California Test Methods 417 and 422, respectively, to assess the degree of corrosivity of the subgrade soils with regard to concrete and normal grade steel. Resistivity and pH-value tests were performed in accordance with California Test Method 643 to assess the degree of corrosivity of the subgrade soils with regard to ferrous metal piping. The test results are shown below.

Sample Location	Sulfate Content [a] (%) / Degree of Corrosivity	Chloride Content [b] (ppm) / Degree of Corrosivity	Resistivity [c] (OHM-cm)/ Degree of Corrosivity	pH-Value [d]
B-1 @ 1'-5'	0.003/Not Applicable	85/Not Applicable	11,710/Non-corrosive	8.37
B-3 @ 1'-5'	0.024/Not Applicable	78/Not Applicable	1,860/ Corrosive	8.34
B-5 @ 1'-5'	0.00/Not Applicable	45/Not Applicable	4,820/Moderately Corrosive	7.95
B-9 @ 1'-5'	0.017/Not Applicable	147/Moderate	2,360/ Moderately Corrosive	8.34
B-10 @ 1'-5'	0.009/Not Applicable	53/Not Applicable	3,350/ Moderately Corrosive	8.38
B-12 @ 1'-5'	0.003/Not Applicable	42/Not Applicable	3,320/ Moderately Corrosive	8.75
B-14 @ 1.5'-5'	0.002/Not Applicable	85/Not Applicable	4,370/ Moderately Corrosive	8.67

a California Test Method 417
b California Test Method 422
c ASTM G57 Test Method
d California Test Method 643

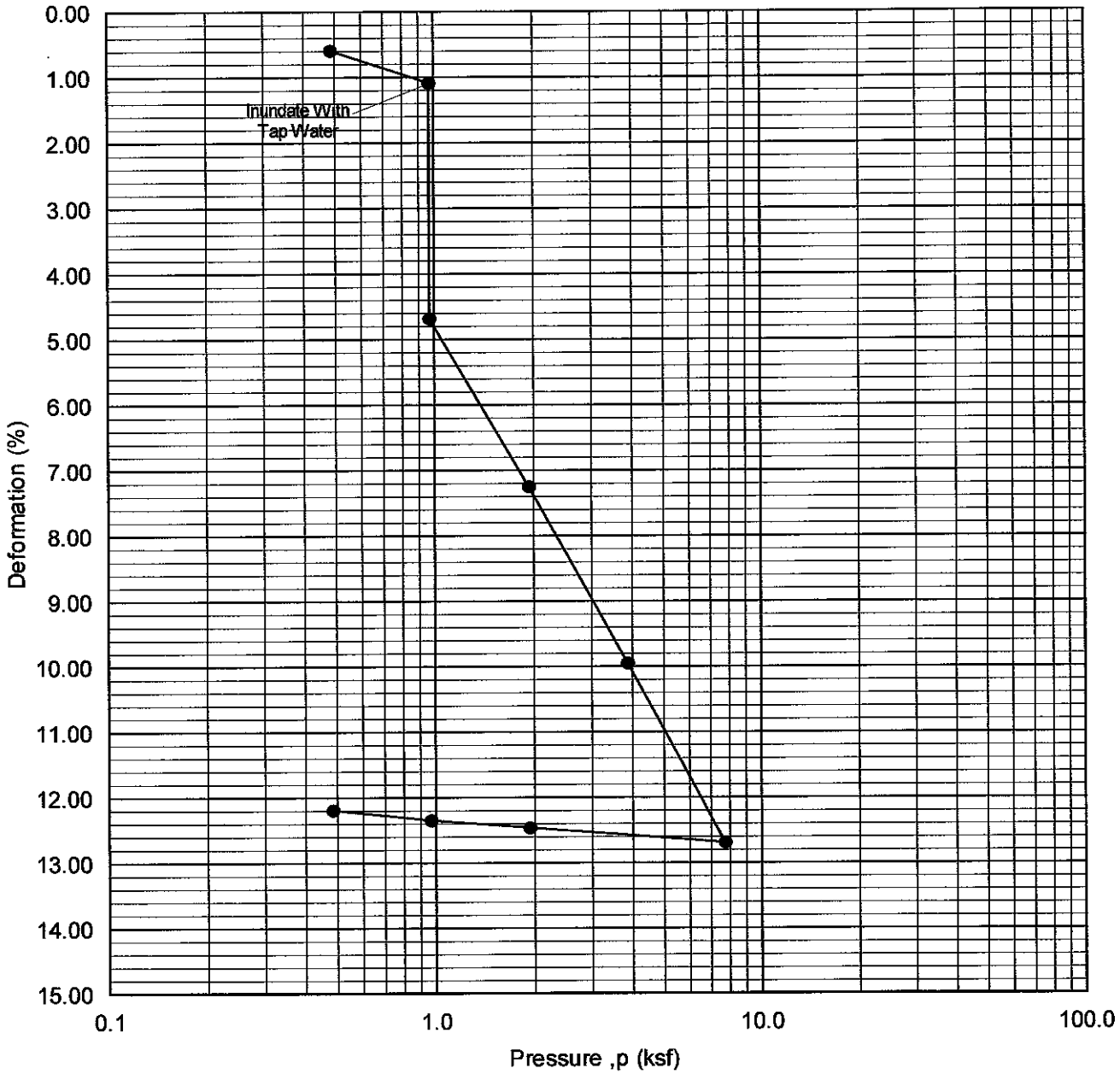


Boring No. : B-1
Depth (ft.) : 4.0
Sample Type: Silty Fine Sand with some Medium Sand

Dry Density (pcf) = 108.9
Moisture (%) = 8.7

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-1

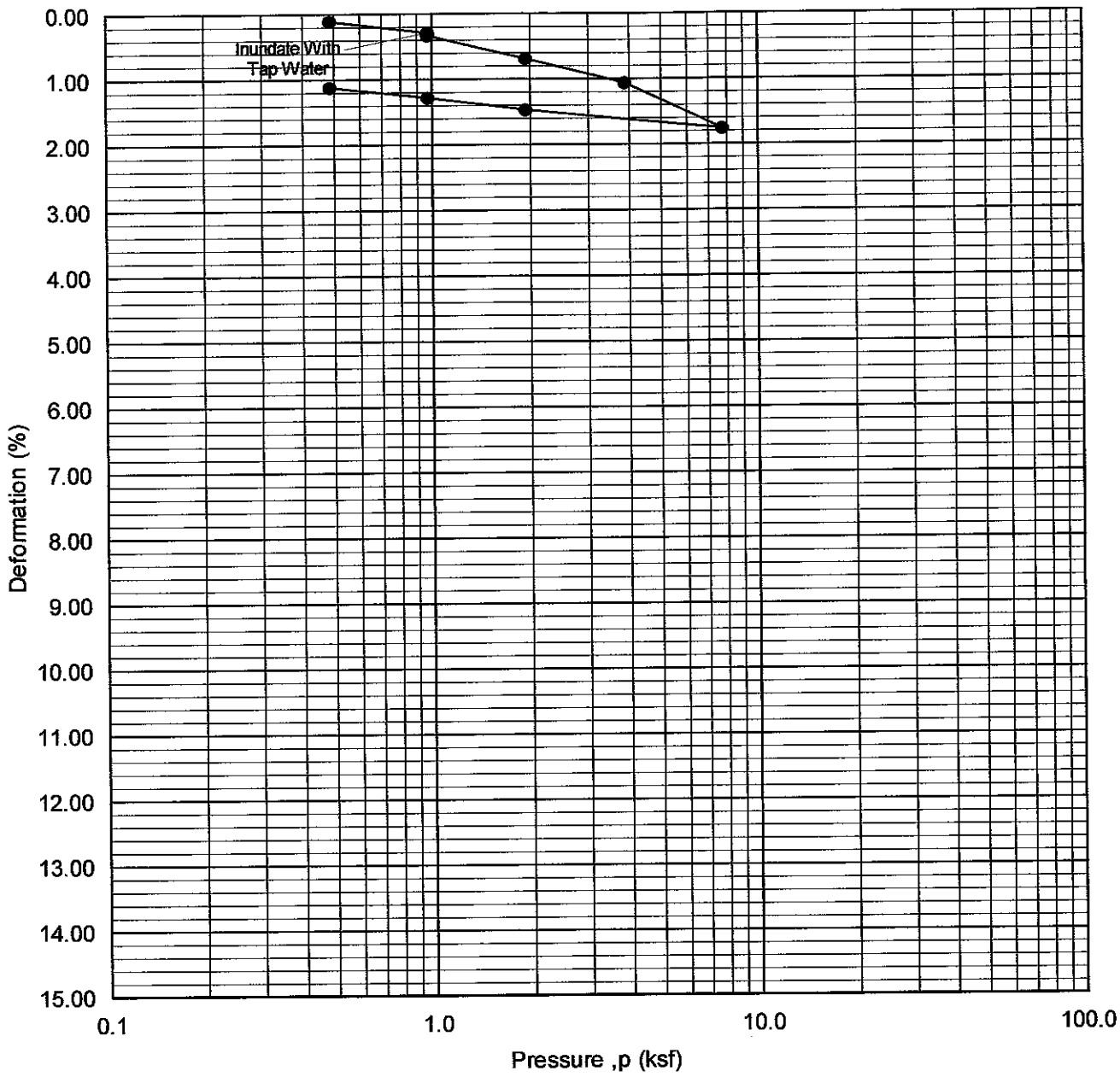


Boring No. : B-2
Depth (ft.) : 15.0
Sample Type: Silty Fine Sand

Dry Density (pcf) = 102.7
Moisture (%) = 7.5

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-2

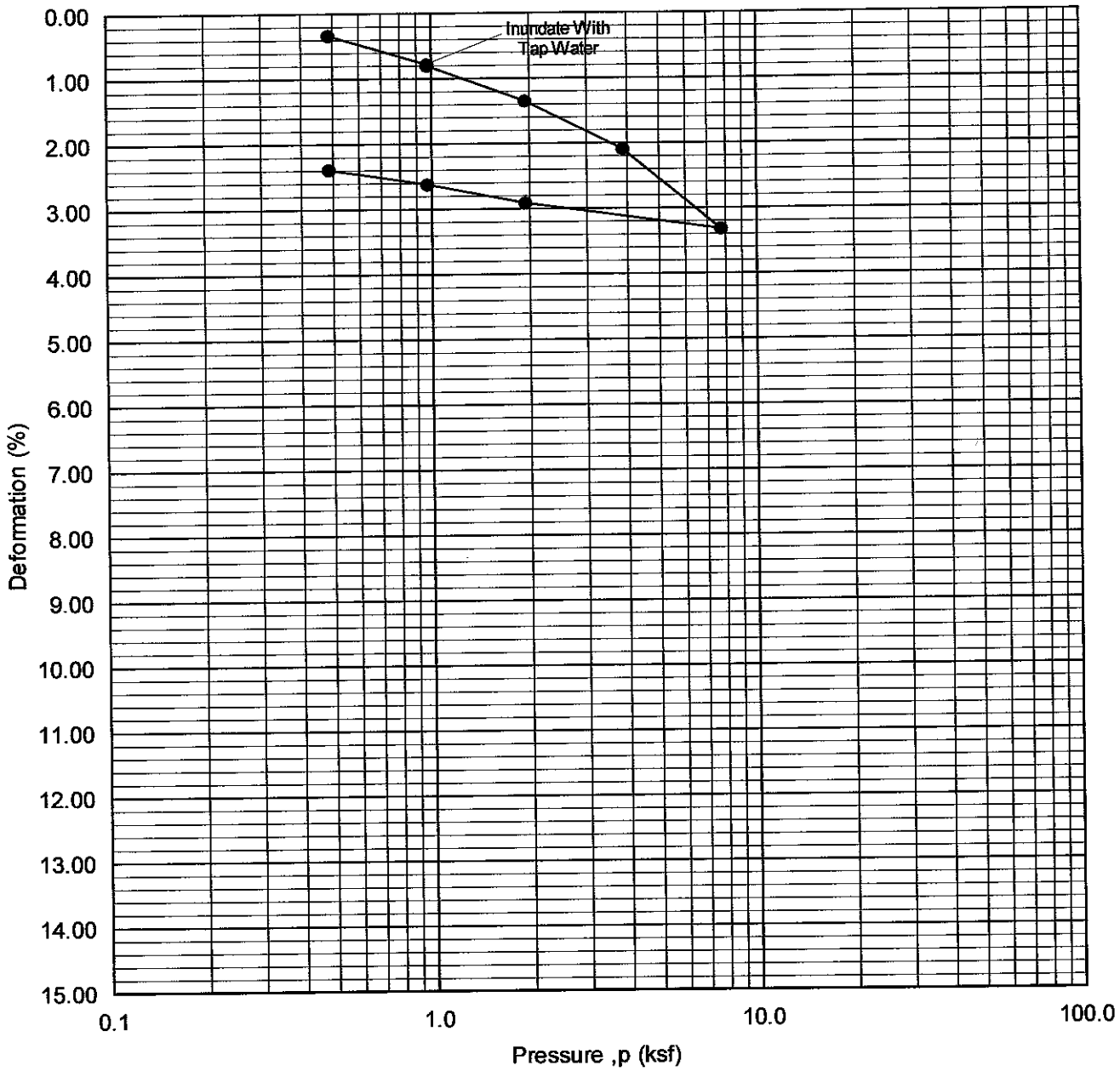


Boring No. : B-3
Depth (ft.) : 10.5
Sample Type: Silty Fine Sand

Dry Density (pcf) = 123.3
Moisture (%) = 5.7

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-3

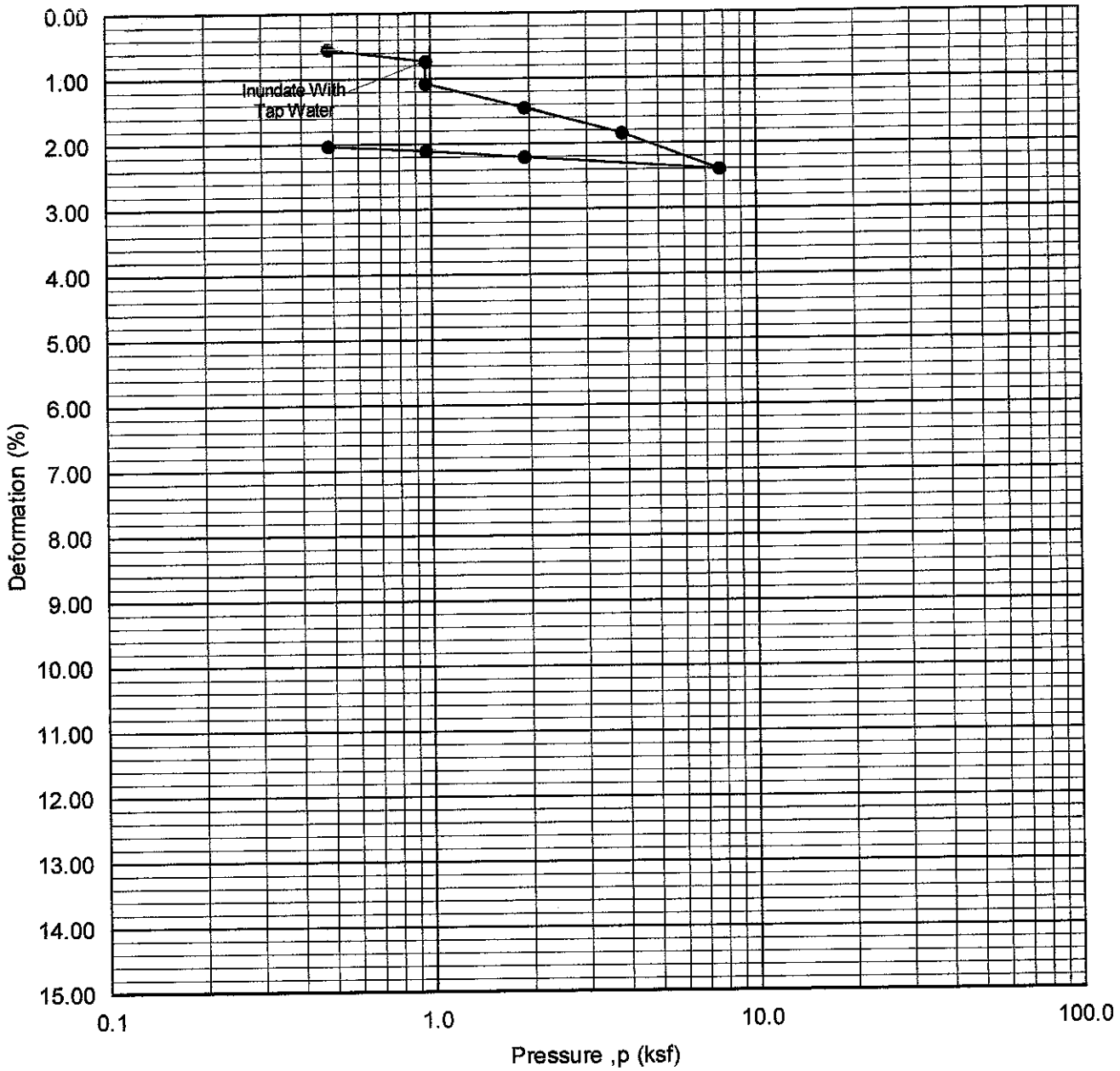


Boring No. : B-4
Depth (ft.) : 15.0
Sample Type: Fine Sandy Silt

Dry Density (pcf) = 95.8
Moisture (%) = 27.3

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-4

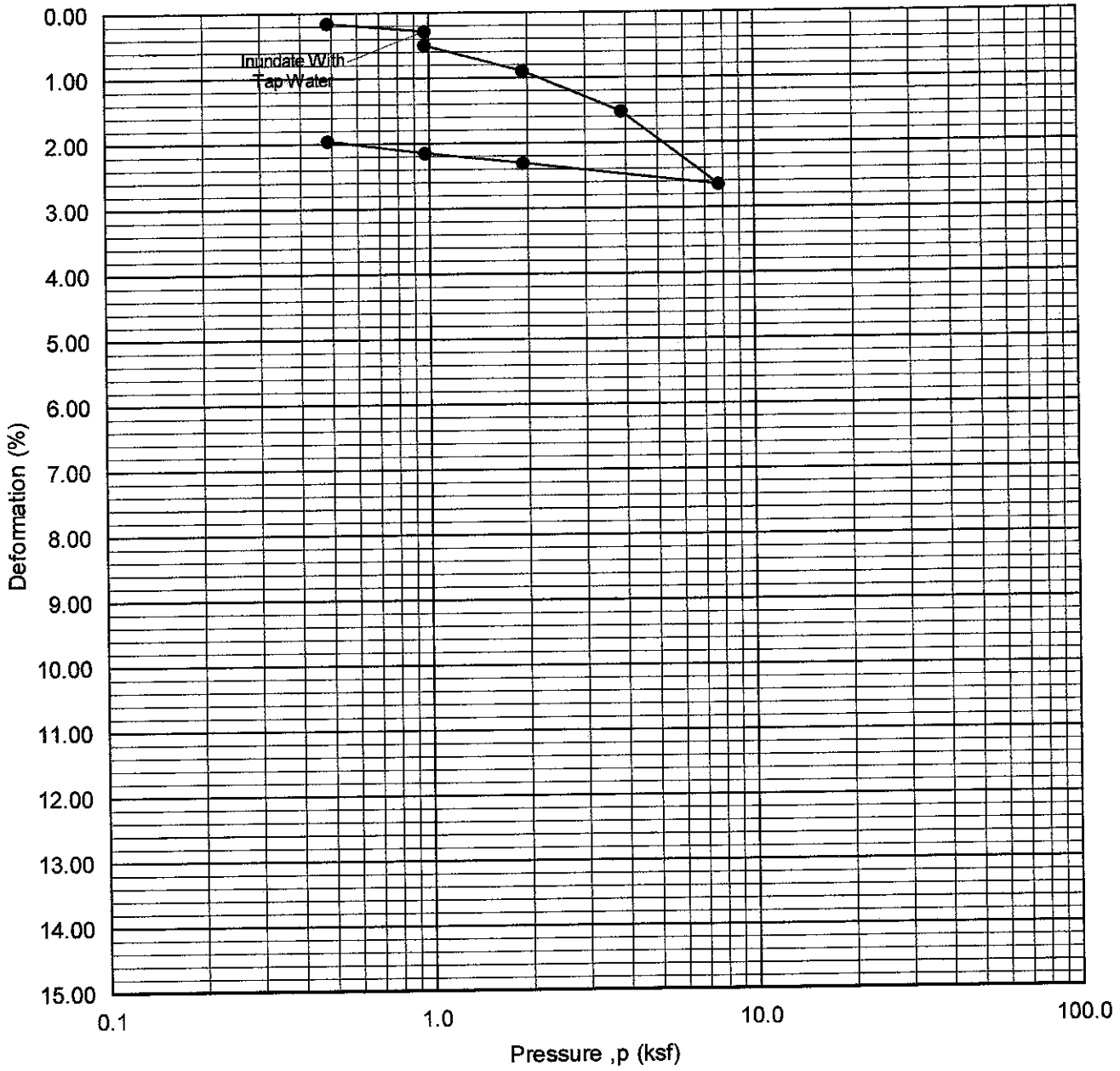


Boring No. : B-5
Depth (ft.) : 10.0
Sample Type: Fine Sand

Dry Density (pcf) = 105.6
Moisture (%) = 1.5

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-5

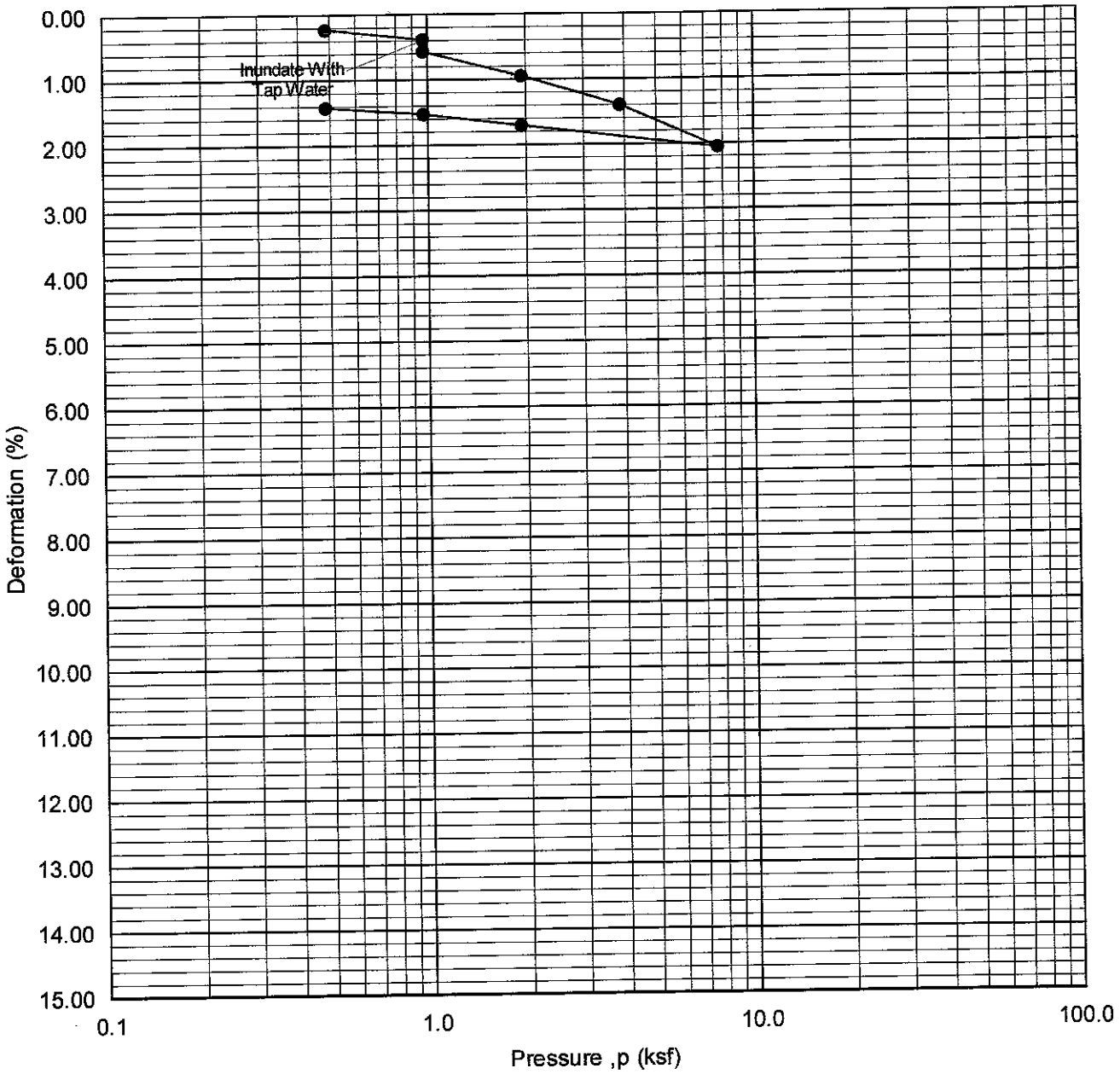


Boring No. : B-6
Depth (ft.) : 7.0
Sample Type: Silty Fine Sand

Dry Density (pcf) = 112.6
Moisture (%) = 7.5

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-6

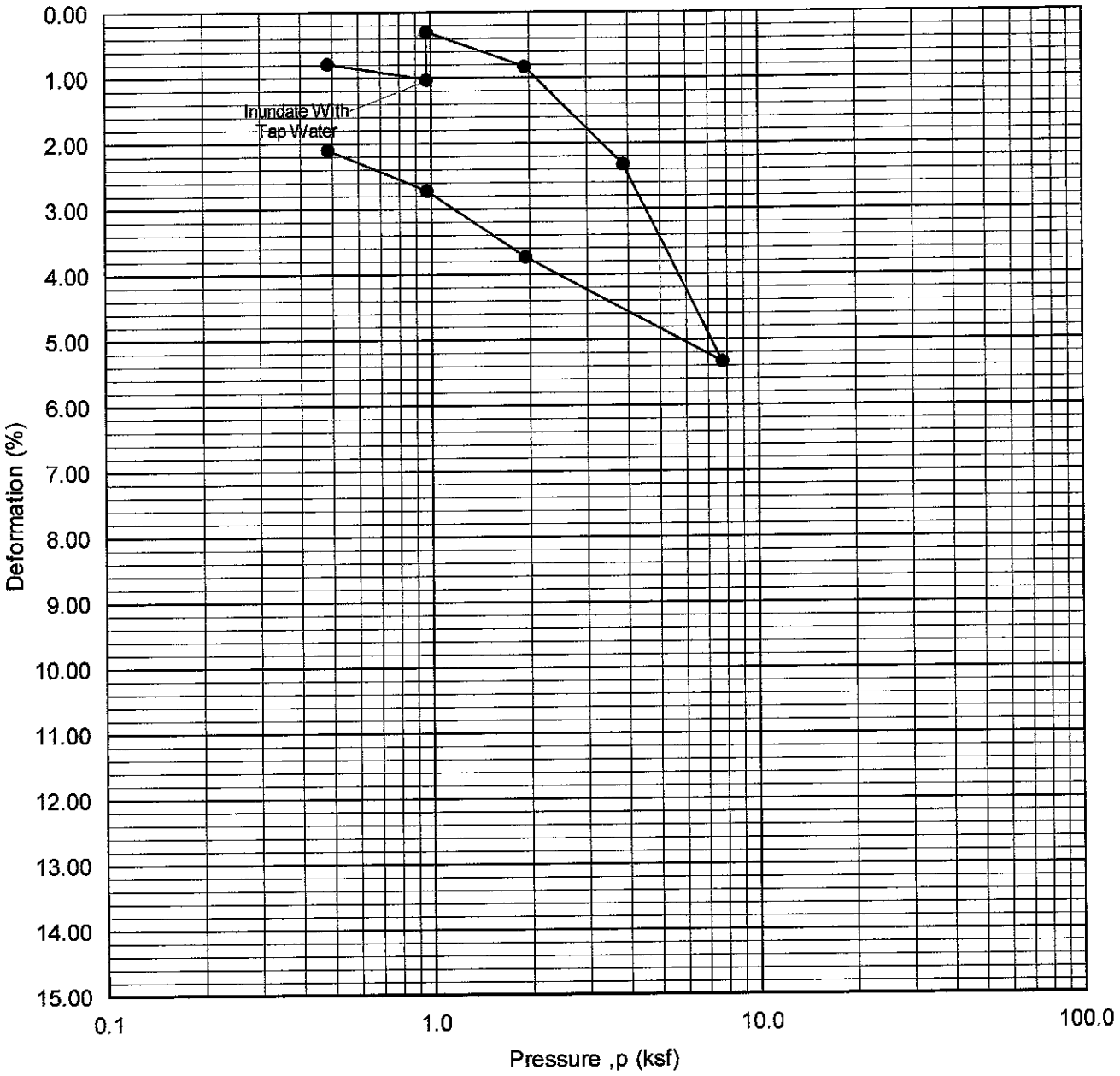


Boring No. : B-7
Depth (ft.) : 19.0
Sample Type: Fine to Medium Sand

Dry Density (pcf) = 106.9
Moisture (%) = 2.6

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-7

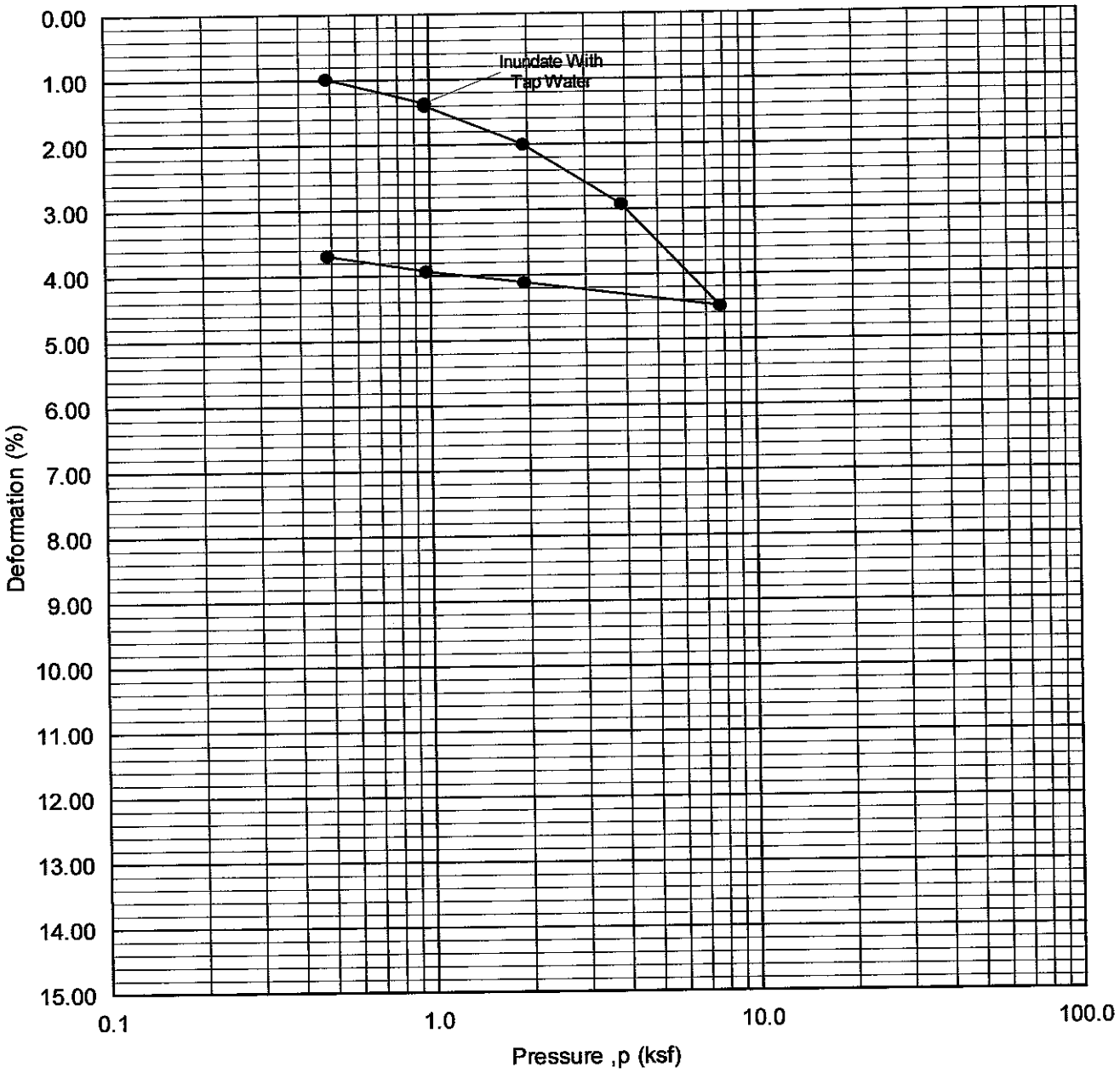


Boring No. : B-8
Depth (ft.) : 15.5
Sample Type: Silt

Dry Density (pcf) = 91.6
Moisture (%) = 24.2

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-8

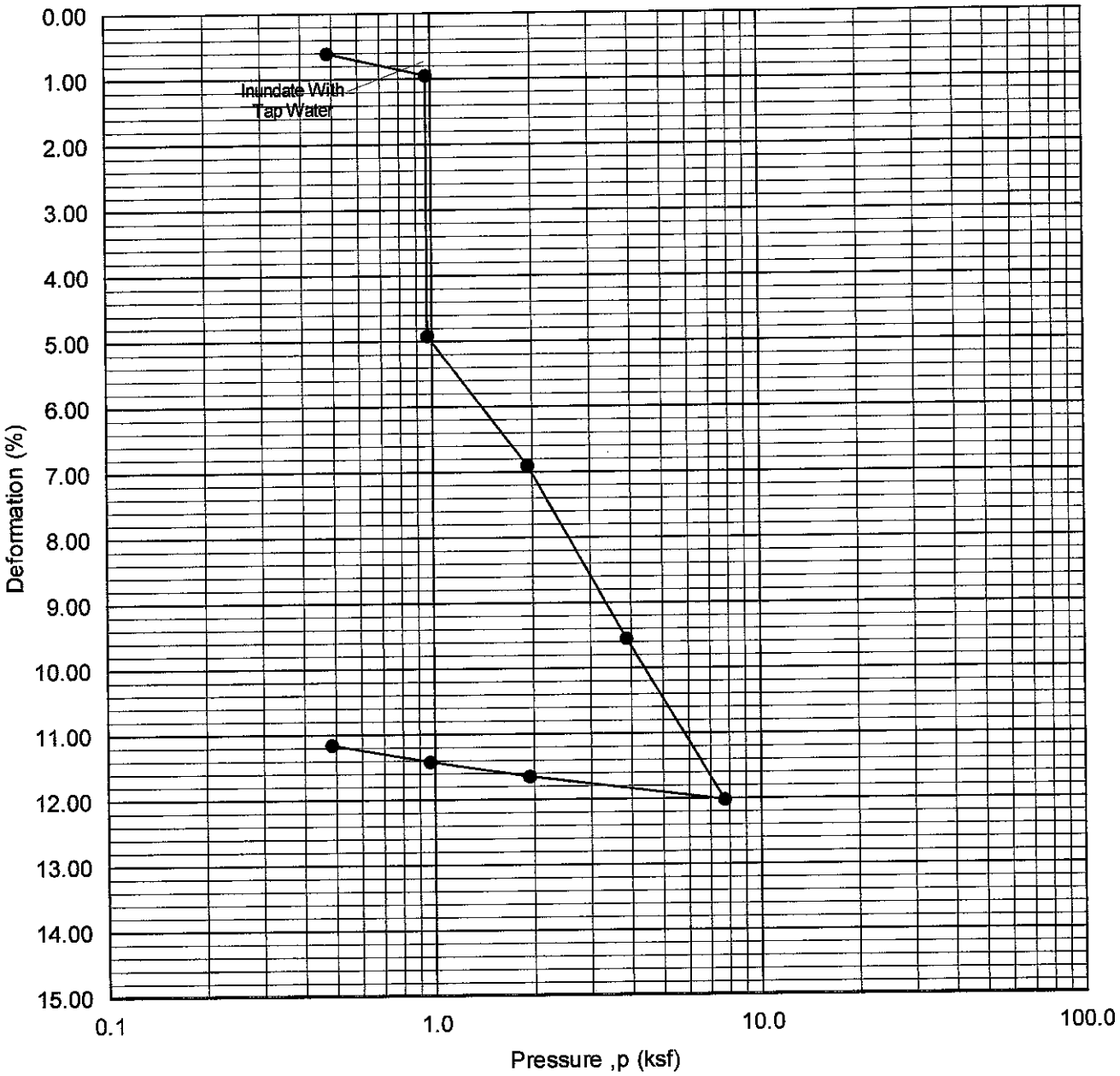


Boring No. : B-9
Depth (ft.) : 10.0
Sample Type: Clayey Silt with Fine Sand

Dry Density (pcf) = 101.5
Moisture (%) = 16.9

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-9

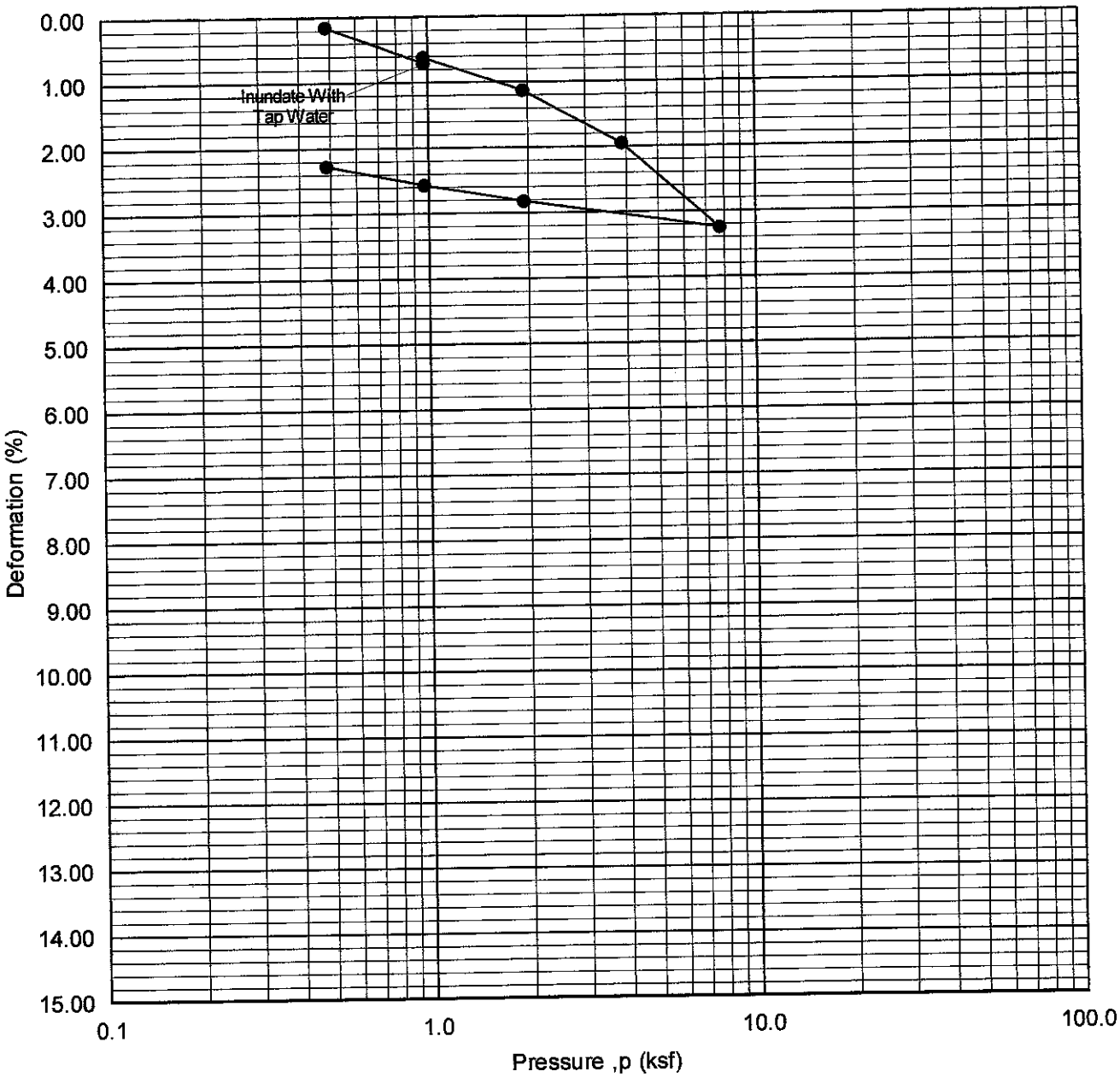


Boring No. : B-10
Depth (ft.) : 7.0
Sample Type: Fine Sandy Silt

Dry Density (pcf) = 92.5
Moisture (%) = 6.8

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-10

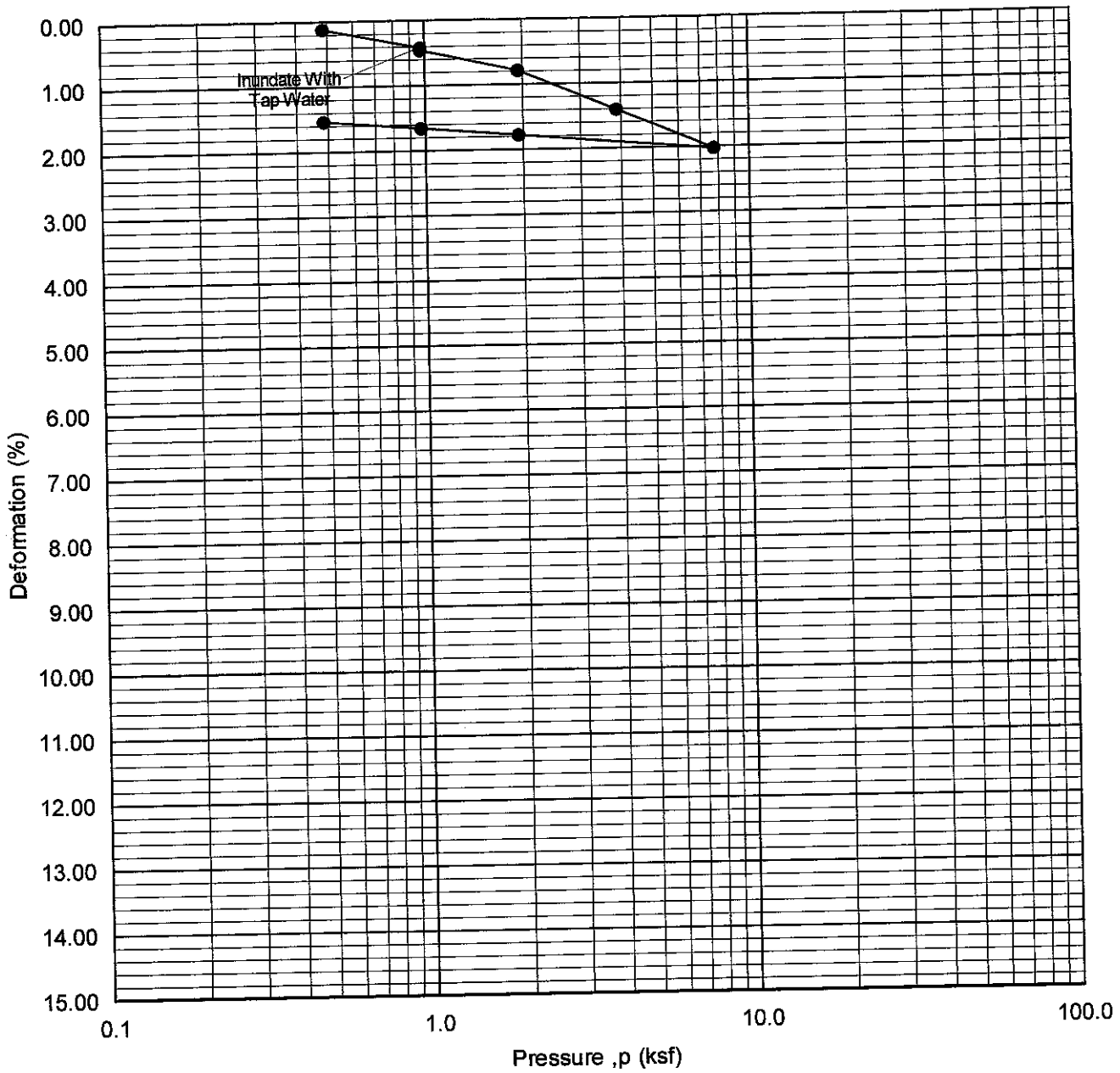


Boring No. : B-11
Depth (ft.) : 10.5
Sample Type: Fine Sandy Silt

Dry Density (pcf) = 117.2
Moisture (%) = 9.8

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-11

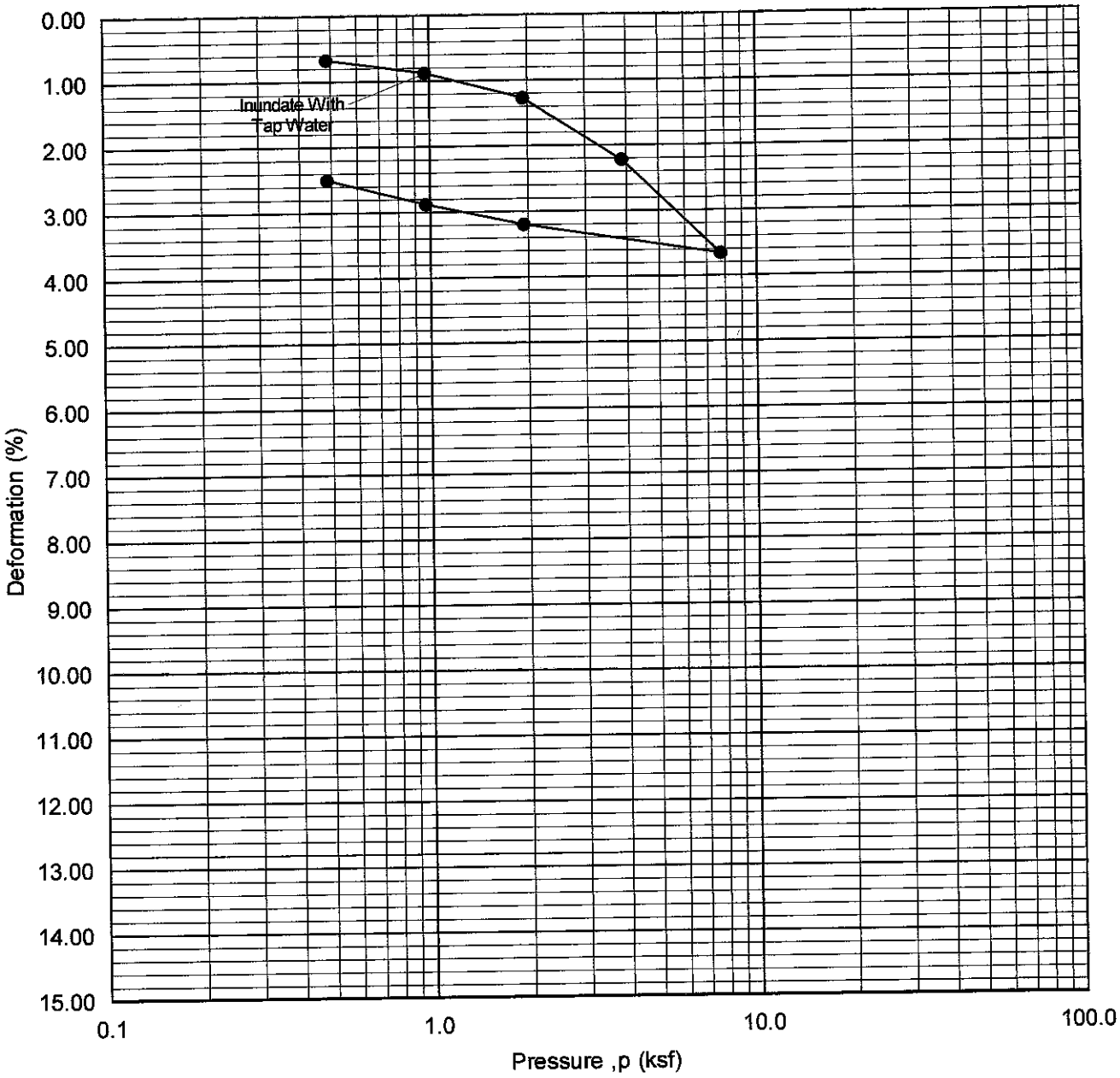


Boring No. : B-12
Depth (ft.) : 15.0
Sample Type: Fine Sandy Silt

Dry Density (pcf) = 110.6
Moisture (%) = 14.9

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-12

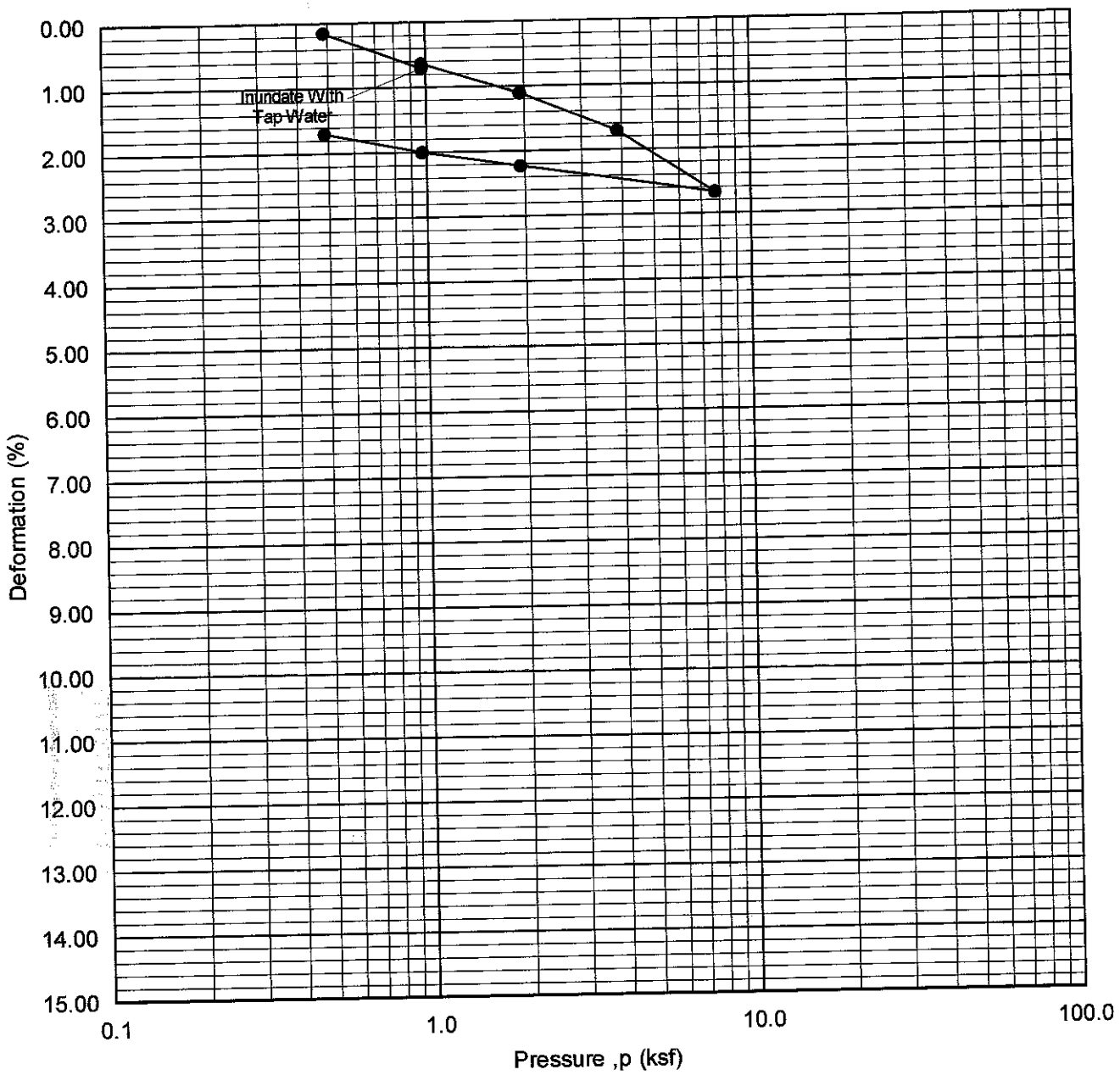


Boring No. : B-13
Depth (ft.) : 10.0
Sample Type: Fine to Medium Sand

Dry Density (pcf) = 106.9
Moisture (%) = 4.2

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-13

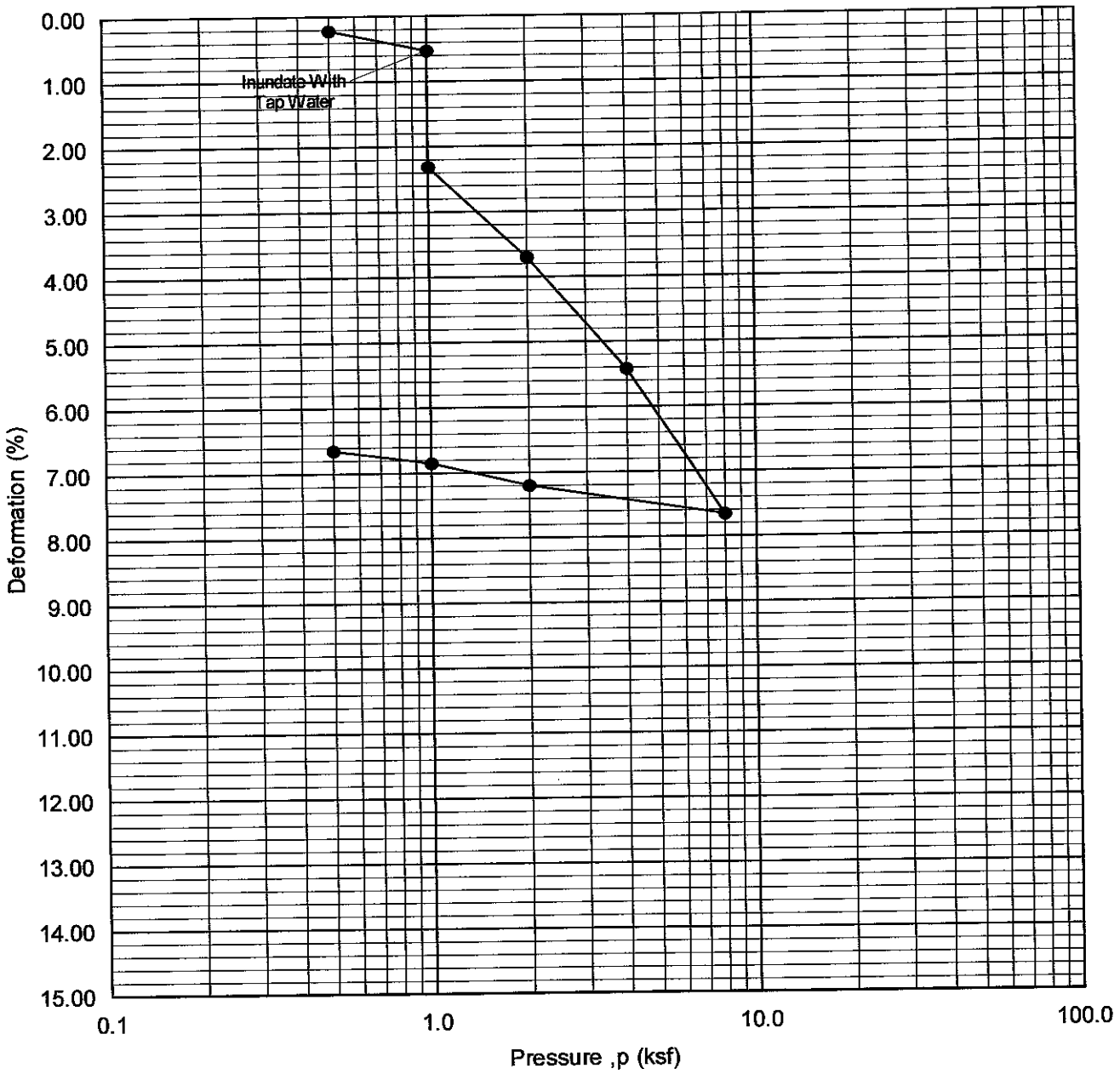


Boring No. : B-14
Depth (ft.) : 7.5
Sample Type: Fine Sandy Silt

Dry Density (pcf) = 108.5
Moisture (%) = 12.4

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-14

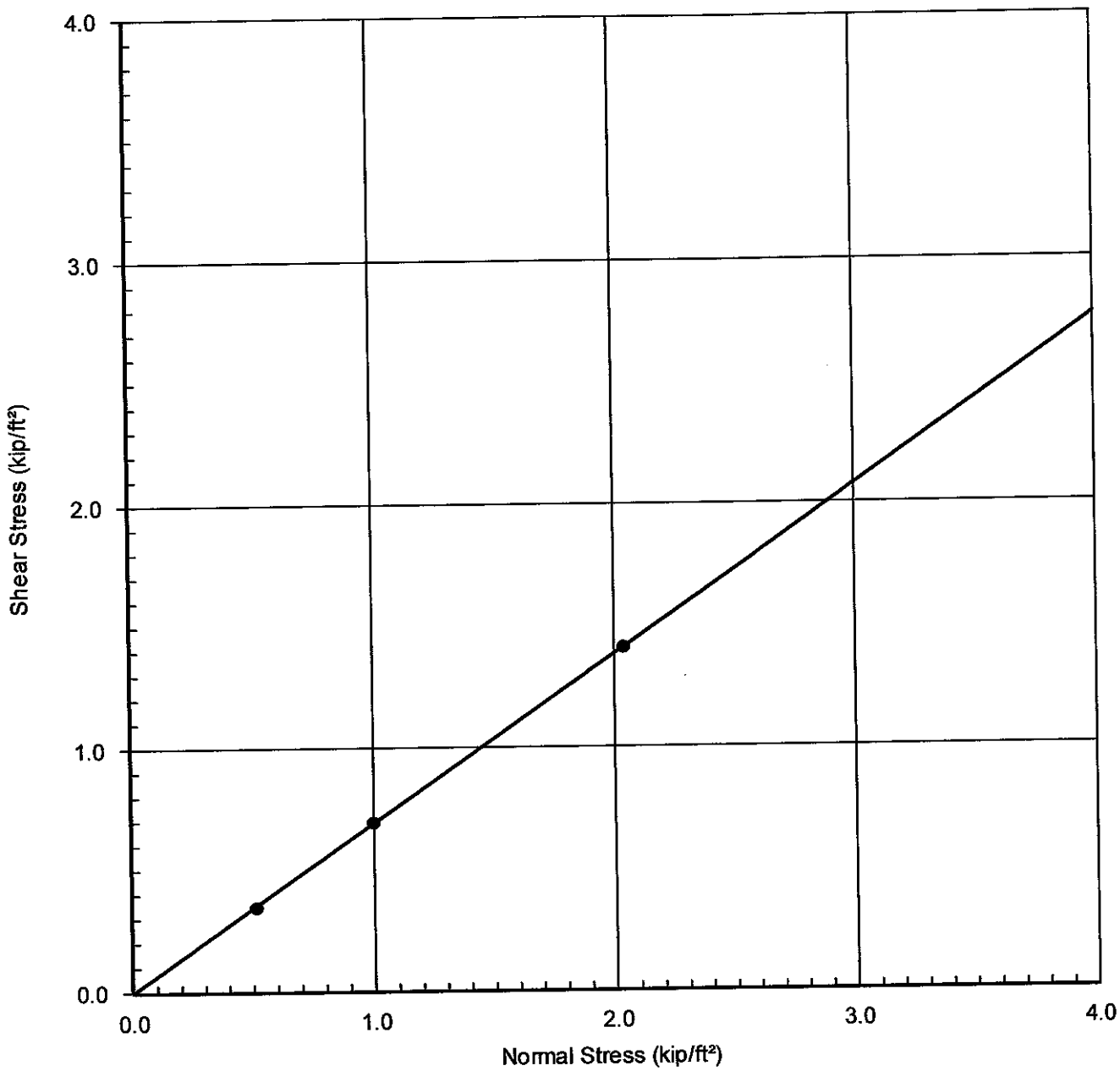


Boring No. : B-15
Depth (ft.) : 5.0
Sample Type: Silty Fine Sand with some Gravel

Dry Density (pcf) = 125.3
Moisture (%) = 4.2

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-15

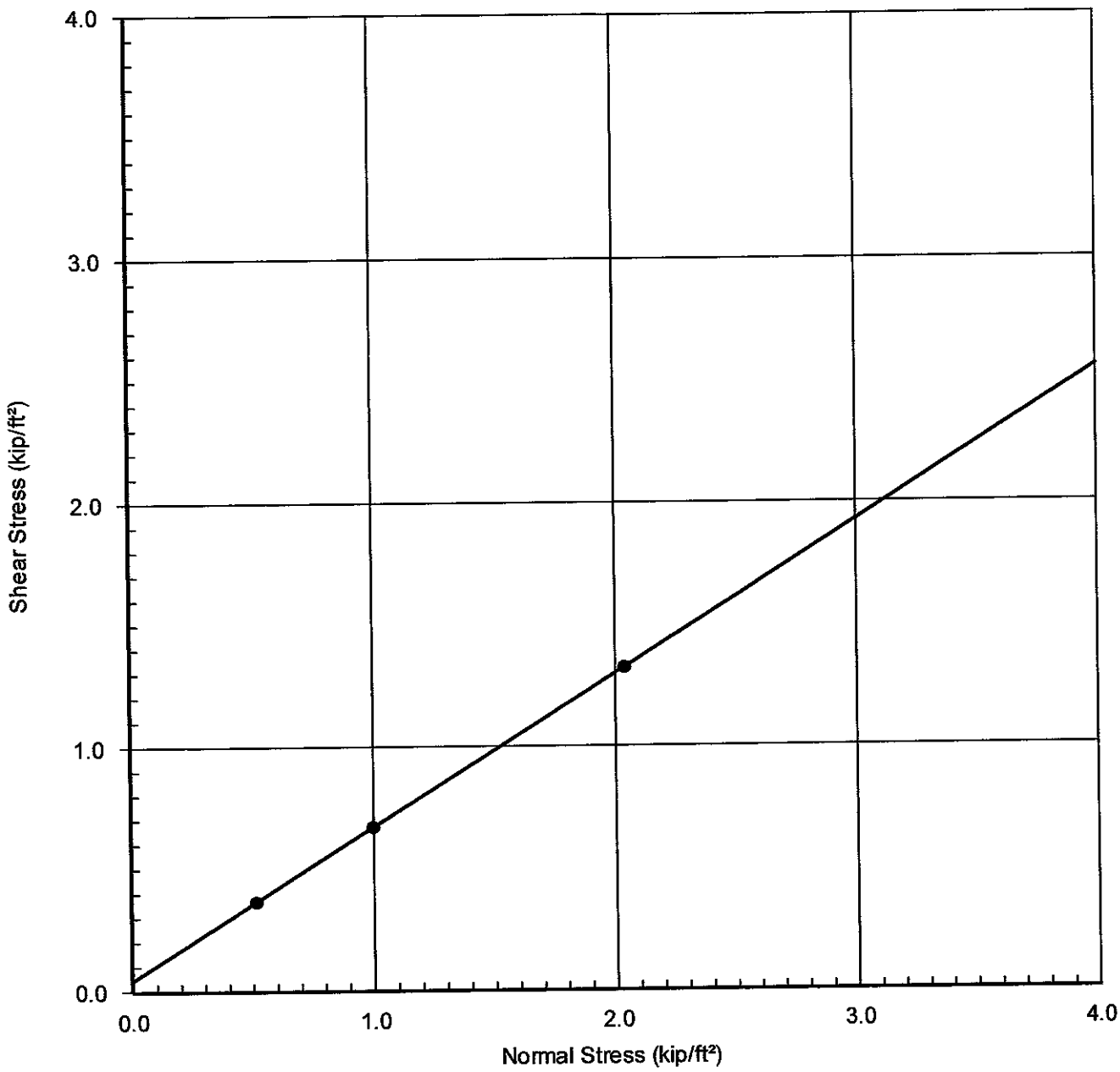


Boring No. : B-1
Depth (ft.) : 4.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand

Cohesion(C) = 0 psf
Friction (ϕ) = 34.5°
Dry Density (pcf) = 108.9
Moisture (%) = 8.7

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-1

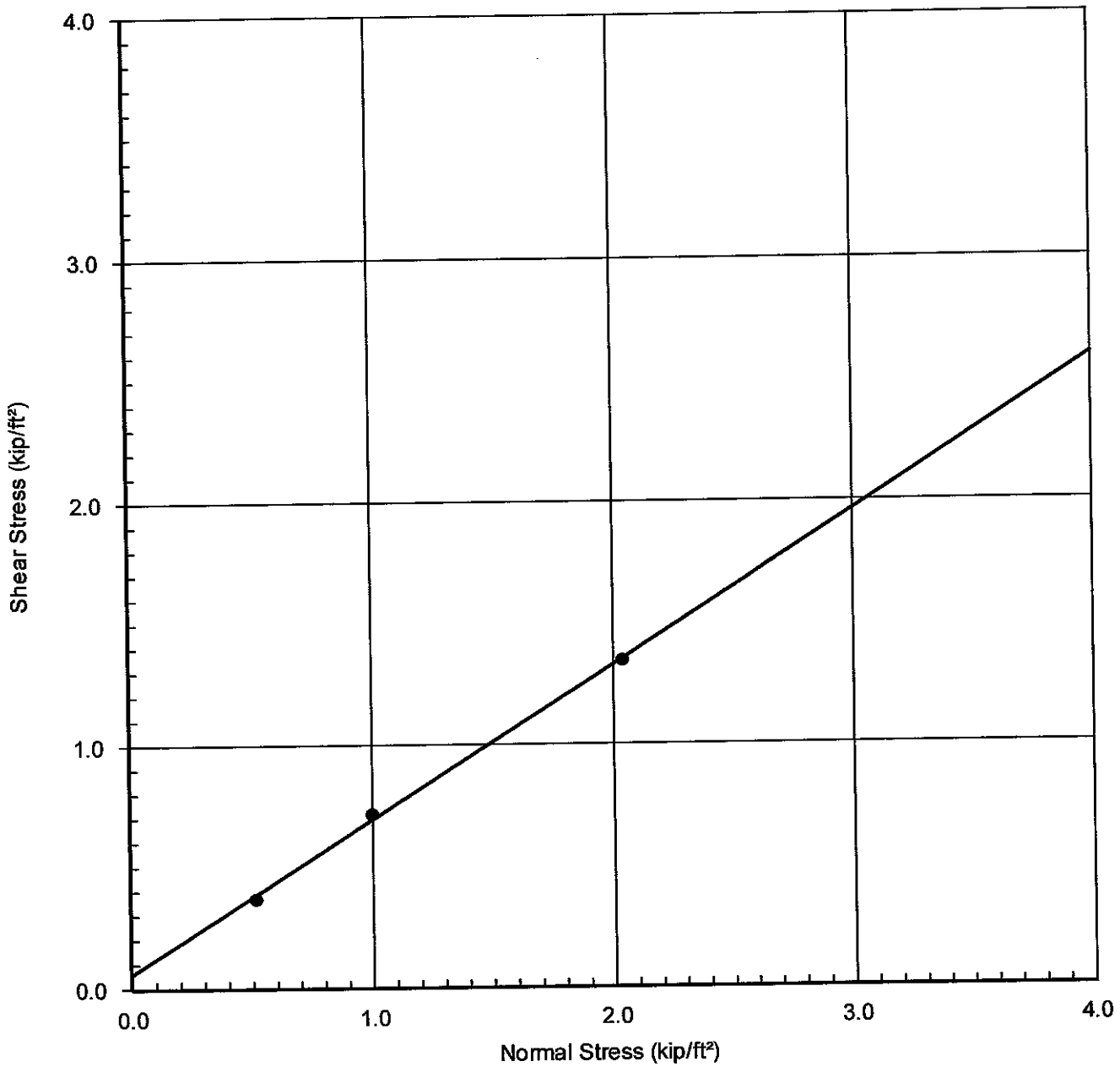


Boring No. : B-2
Depth (ft.) : 7.5
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine to Medium Sand

Cohesion(C) = 45 psf
Friction (ϕ) = 32°
Dry Density (pcf) = 102.1
Moisture (%) = 11.4

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-2

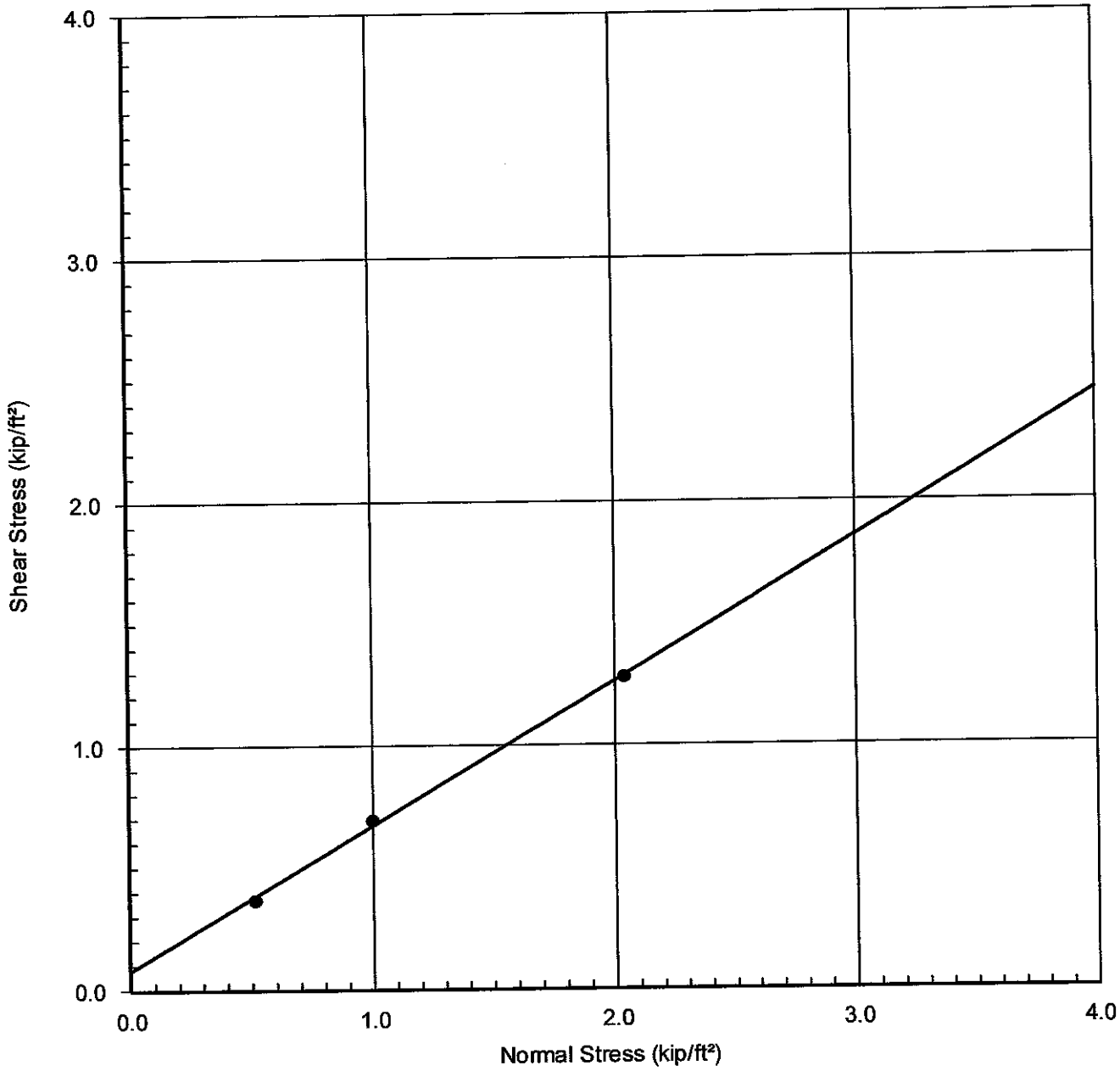


Boring No. : B-3
Depth (ft.) : 4.0
Sample Type : Relatively Undisturbed
Soil Type : Fine to Medium Sand

Cohesion(C) = 60 psf
Friction (ϕ) = 32°
Dry Density (pcf) = 106.6
Moisture (%) = 1.0

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-3

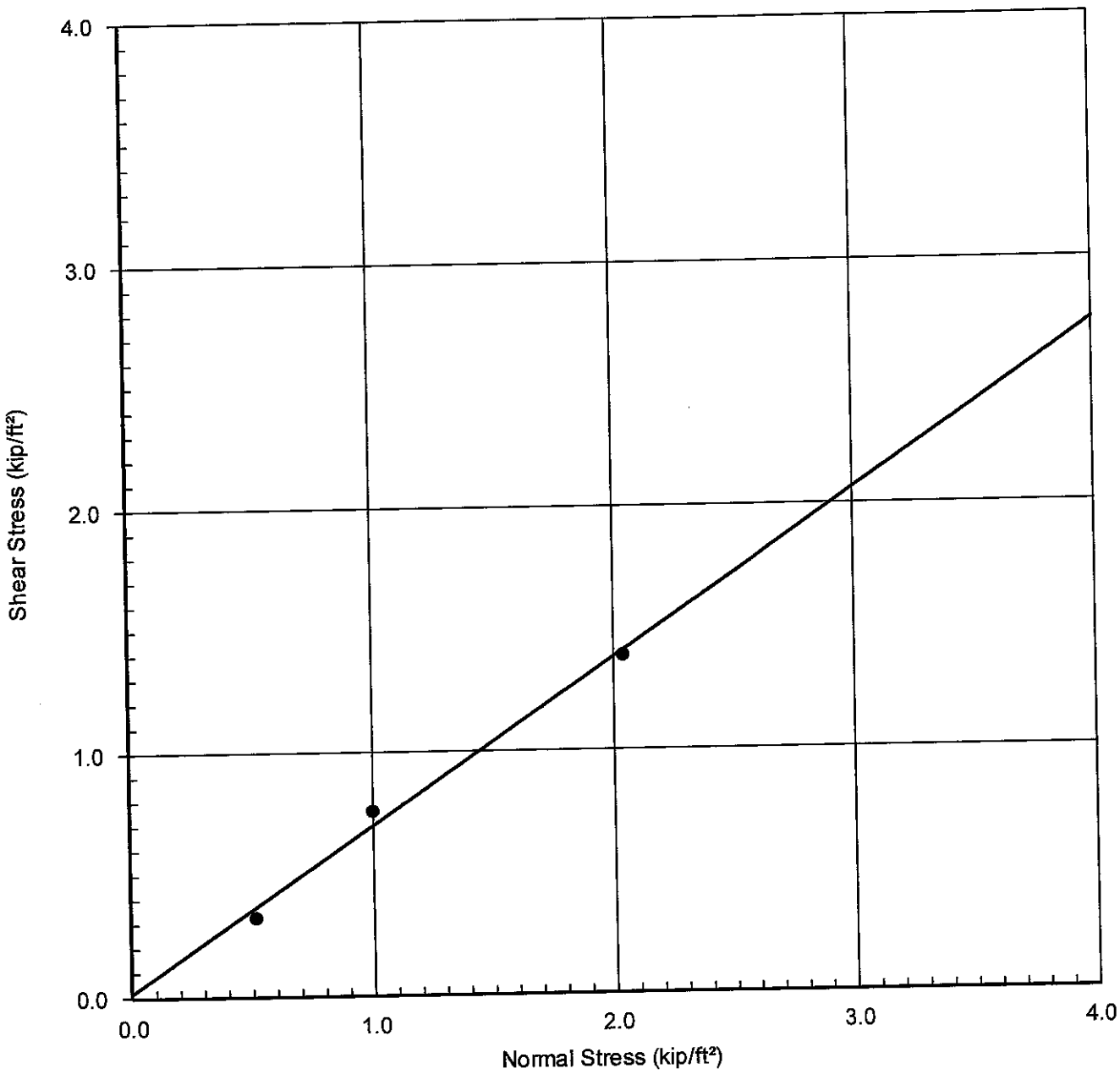


Boring No. : B-4
Depth (ft.) : 7.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand

Cohesion(C) = 80 psf
Friction (ϕ) = 30.5°
Dry Density (pcf) = 110.2
Moisture (%) = 8.7

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-4

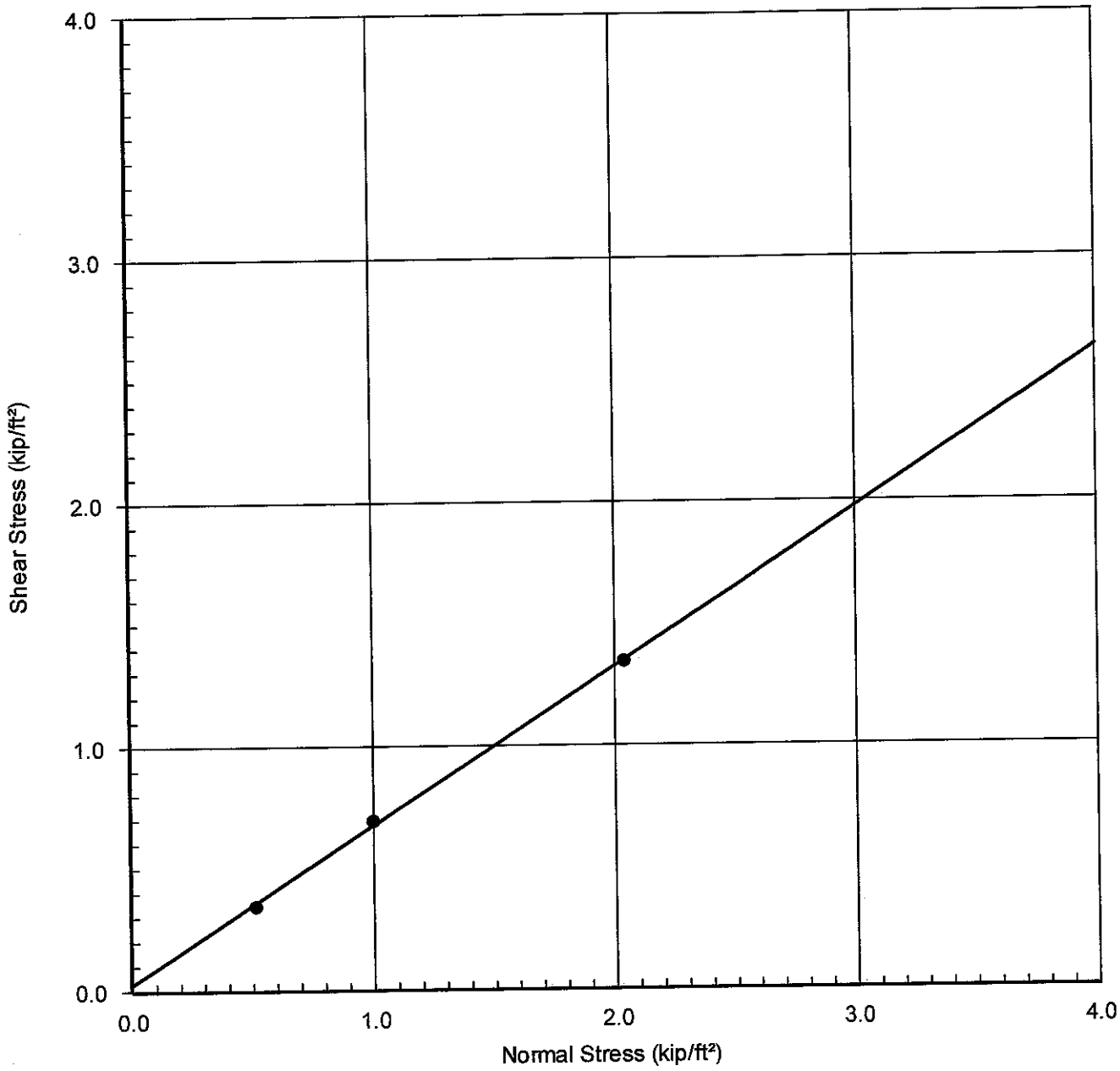


Boring No. : B-5
Depth (ft.) : 10.0
Sample Type : Relatively Undisturbed
Soil Type : Fine Sand

Cohesion(C) = 15 psf
Friction (ϕ) = 34°
Dry Density (pcf) = 105.6
Moisture (%) = 1.5

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-5

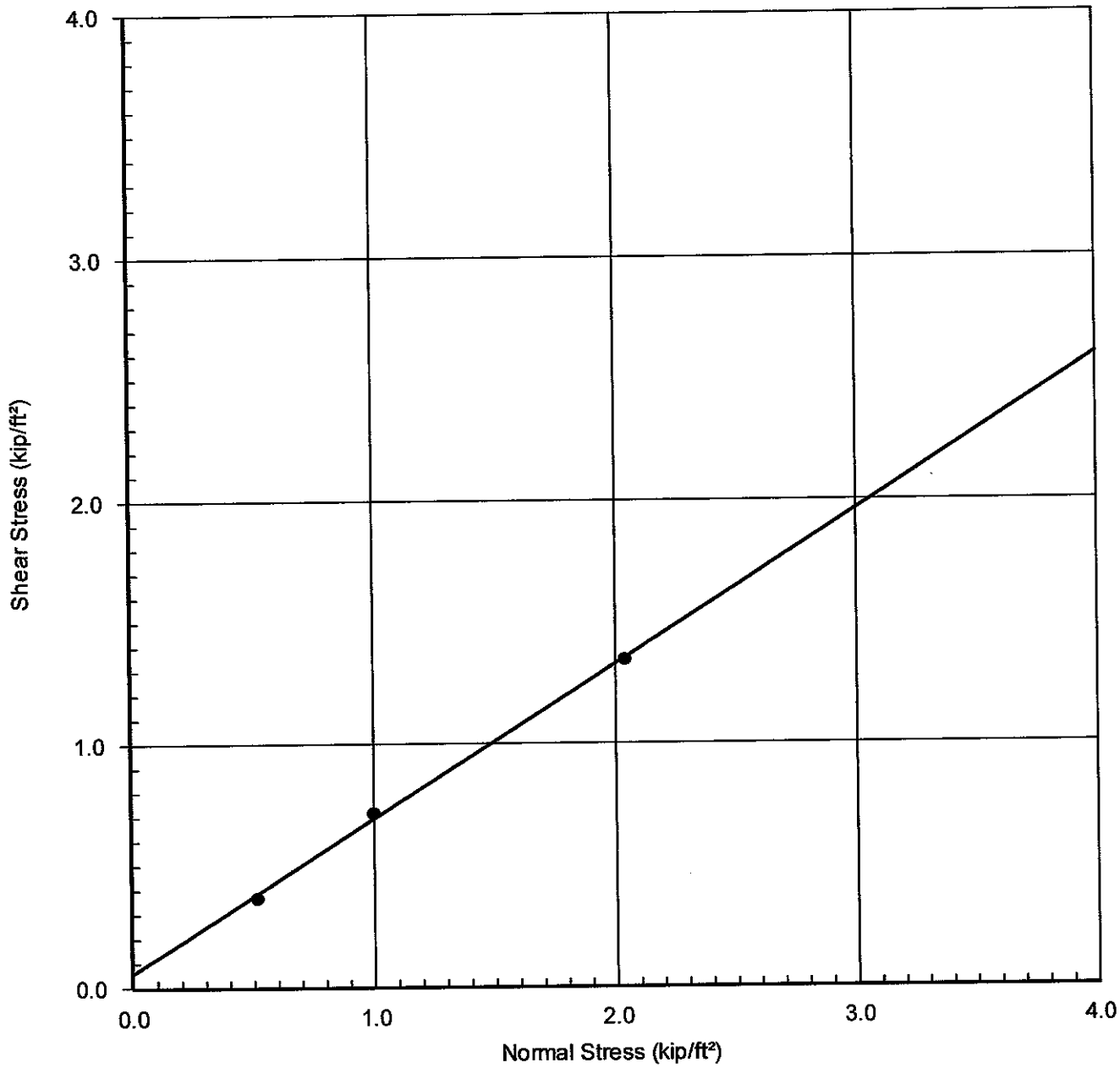


Boring No. : B-6
Depth (ft.) : 7.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand

Cohesion(C) = 25 psf
Friction (ϕ) = 33°
Dry Density (pcf) = 112.6
Moisture (%) = 7.5

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-6

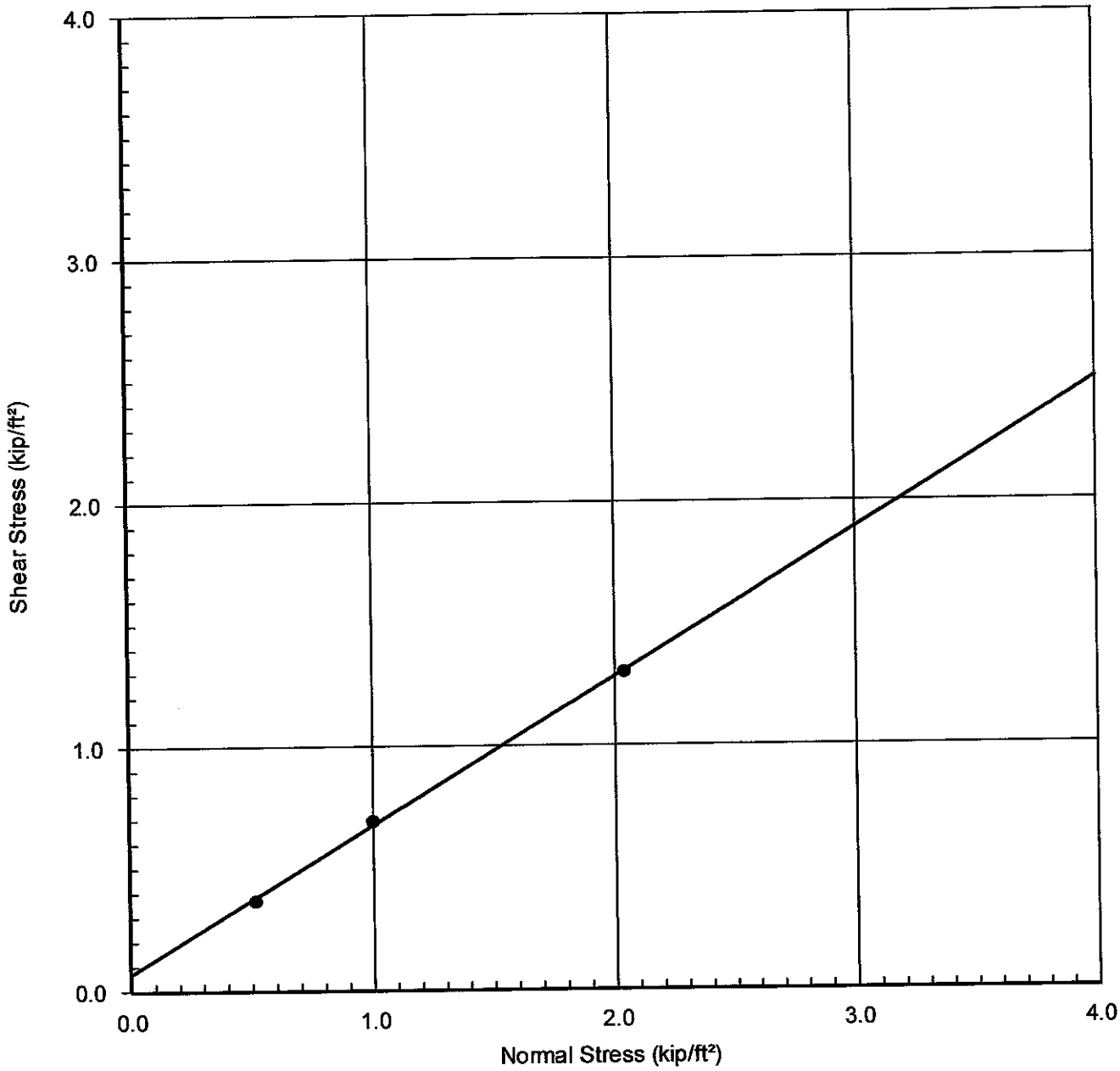


Boring No. : B-7
Depth (ft.) : 10.0
Sample Type : Relatively Undisturbed
Soil Type : Fine Sand

Cohesion(C) = 60 psf
Friction (ϕ) = 32°
Dry Density (pcf) = 99.1
Moisture (%) = 2.6

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-7

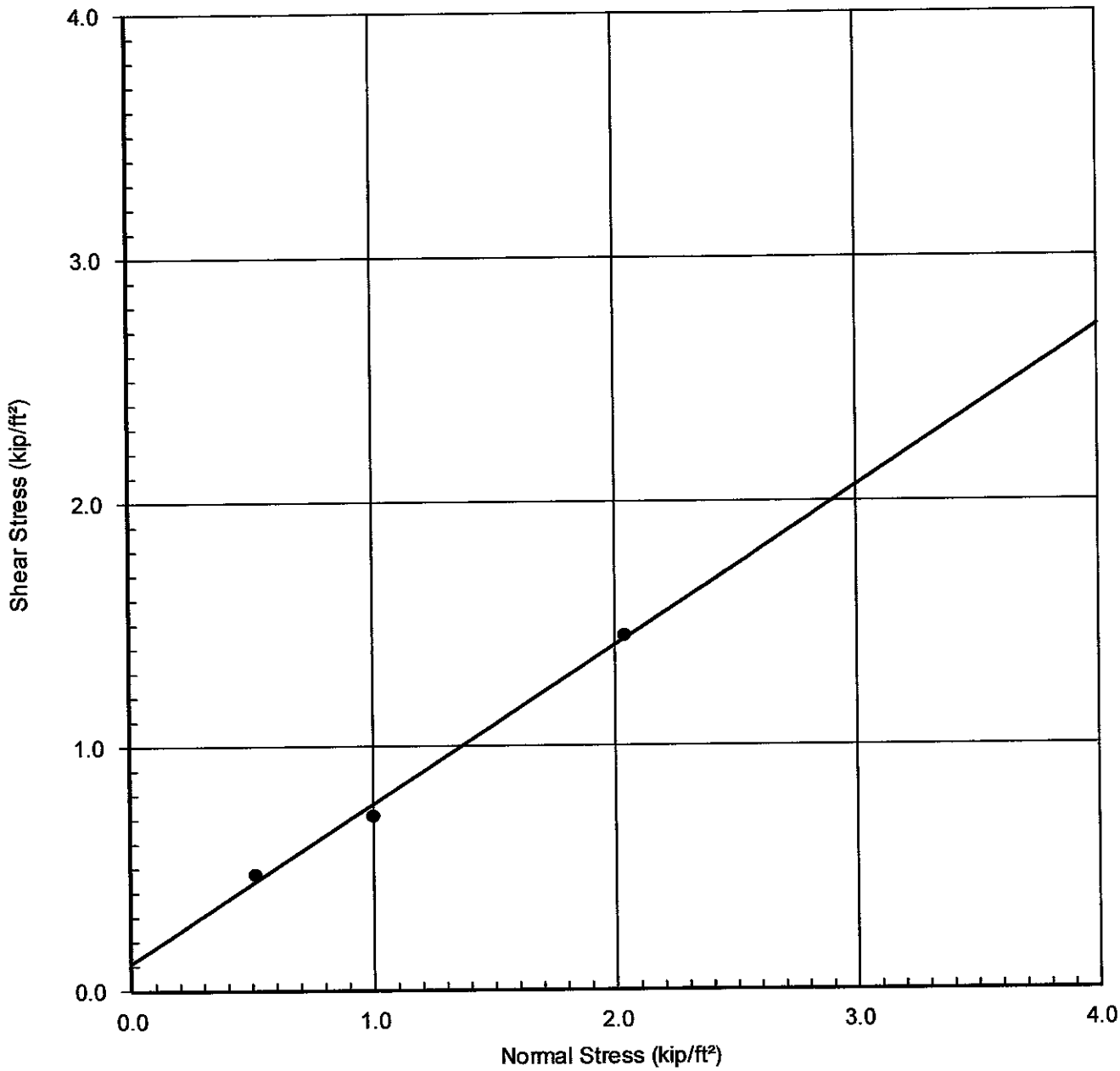


Boring No. : B-8
Depth (ft.) : 7.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand

Cohesion(C) = 70 psf
Friction (ϕ) = 31°
Dry Density (pcf) = 107.2
Moisture (%) = 4.7

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-8

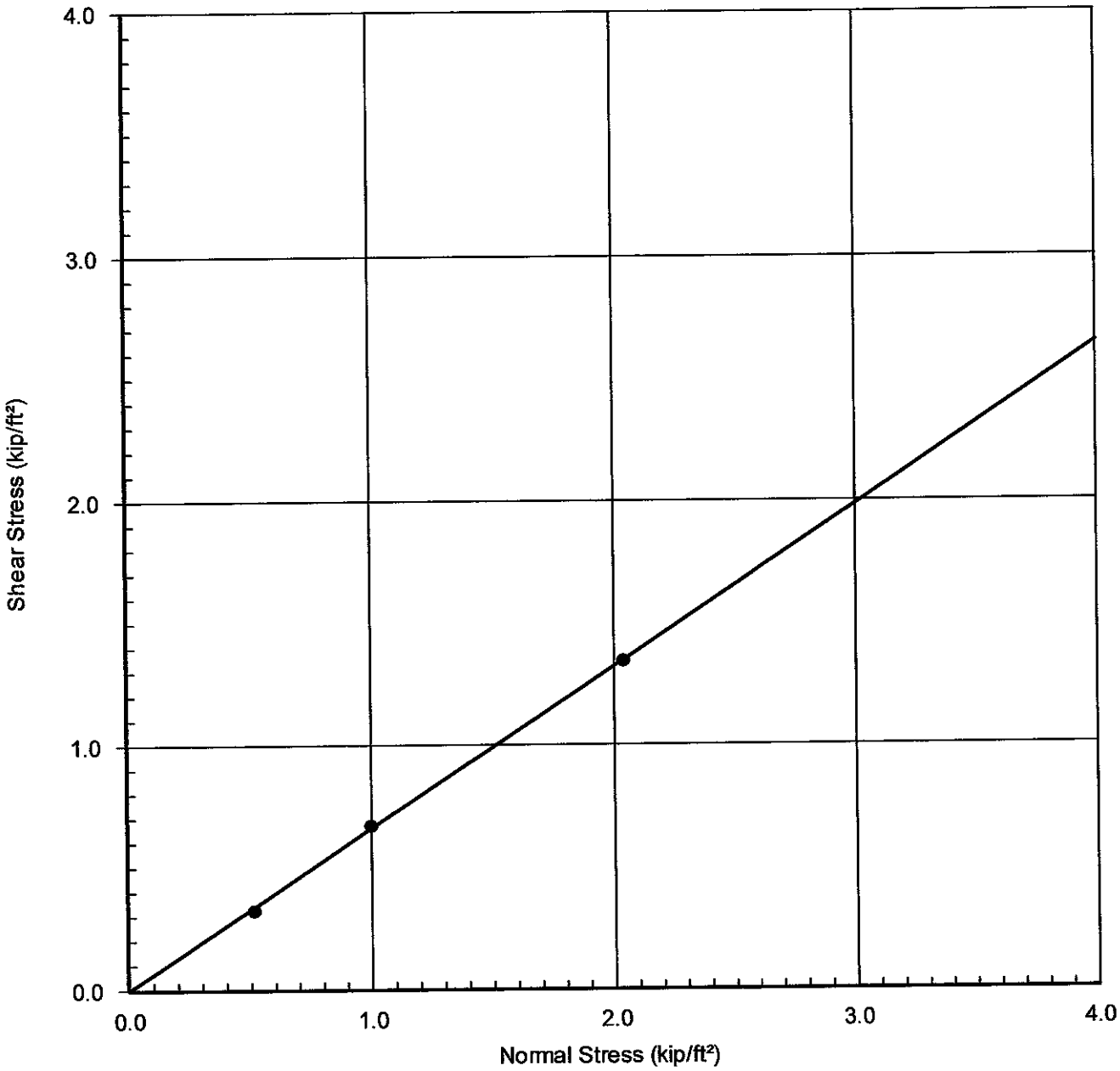


Boring No. : B-9
Depth (ft.) : 4.5
Sample Type : Relatively Undisturbed
Soil Type : Clayey Silt

Cohesion(C) = 110 psf
Friction (ϕ) = 33°
Dry Density (pcf) = 111.0
Moisture (%) = 16.7

Project Name: Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-9

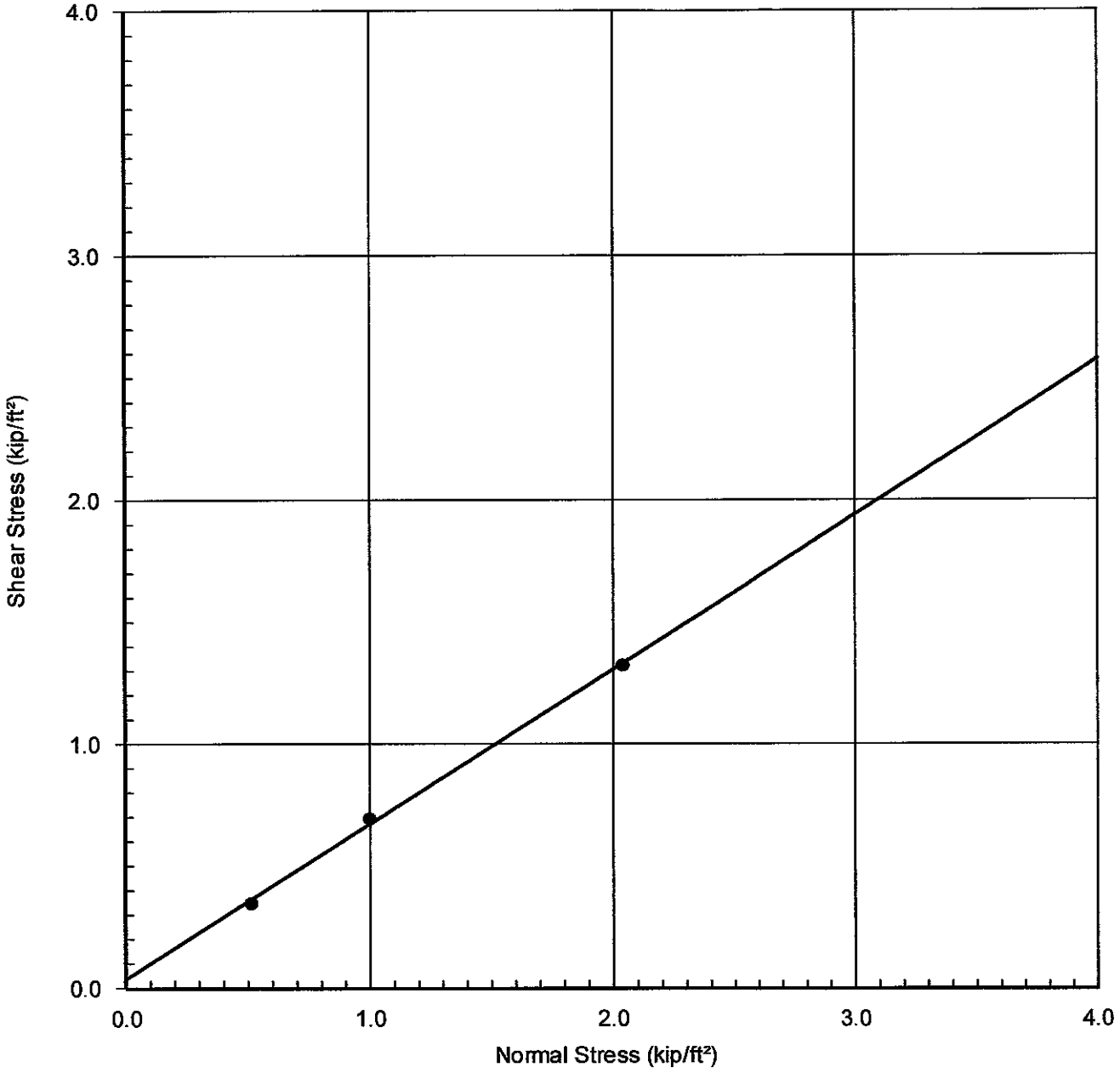


Boring No. : B-10
Depth (ft.) : 2.5
Sample Type : Relatively Undisturbed
Soil Type : Fine Sandy Silt

Cohesion(C) = 0 psf
Friction (ϕ) = 33.5°
Dry Density (pcf) = 108.6
Moisture (%) = 3.2

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-10

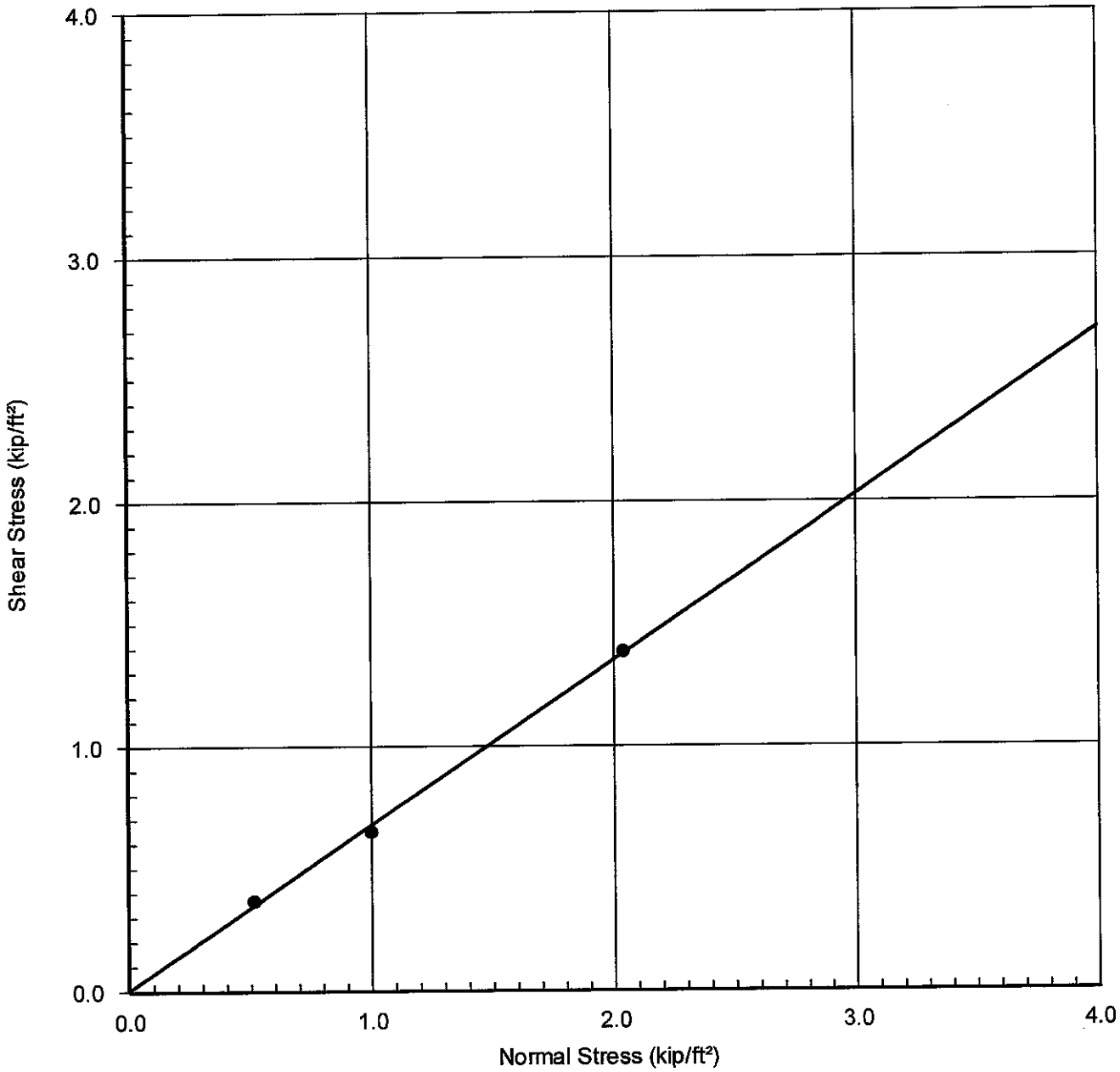


Boring No. : B-11
Depth (ft.) : 4.0
Sample Type : Relatively Undisturbed
Soil Type : Fine Sandy Silt

Cohesion(C) = 35 psf
Friction (ϕ) = 32°
Dry Density (pcf) = 99.4
Moisture (%) = 9.4

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-11

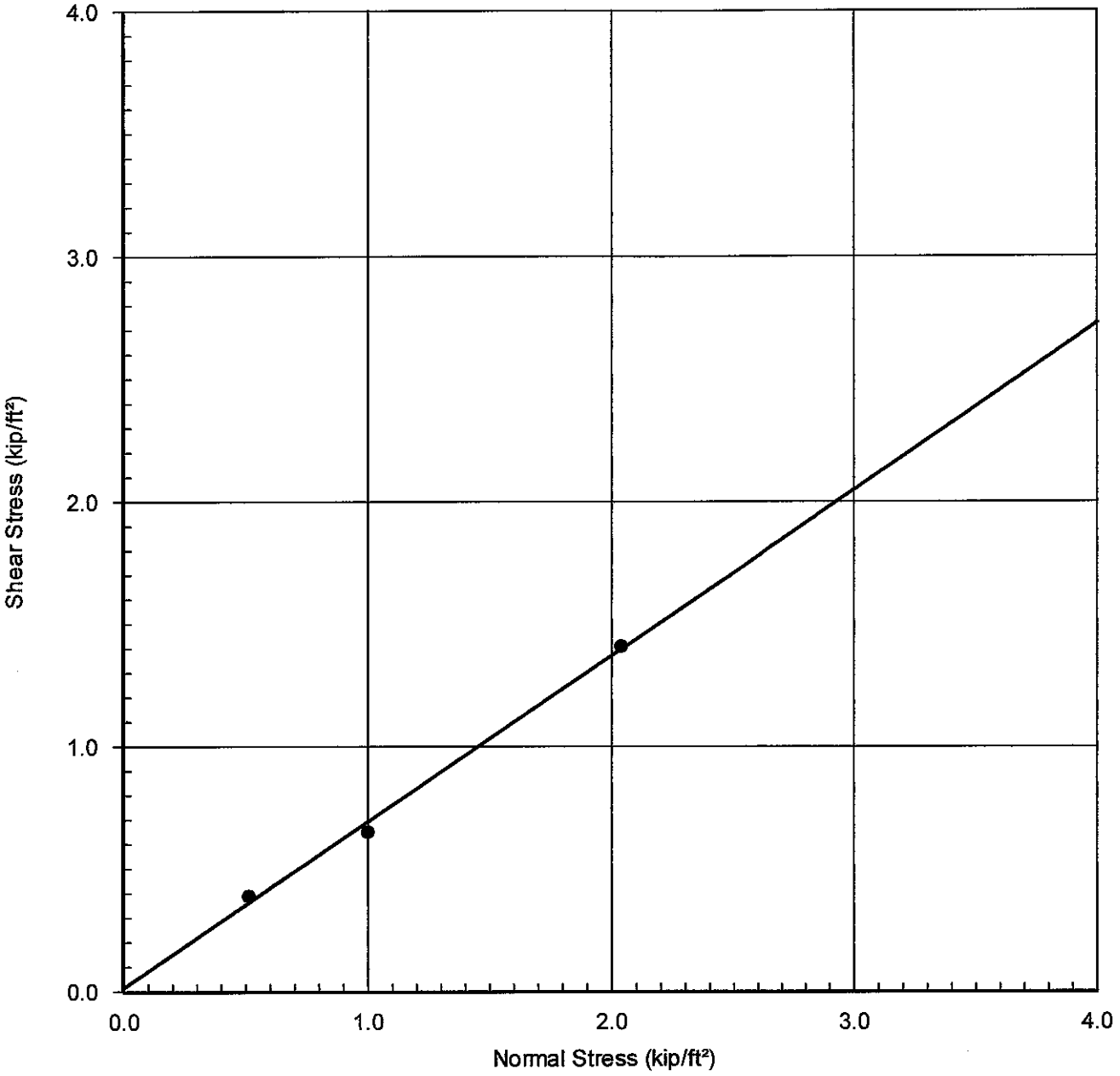


Boring No. : B-12
Depth (ft.) : 15.0
Sample Type : Relatively Undisturbed
Soil Type : Fine Sandy Silt

Cohesion(C) = 5 psf
Friction (ϕ) = 34°
Dry Density (pcf) = 110.6
Moisture (%) = 14.9

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-12

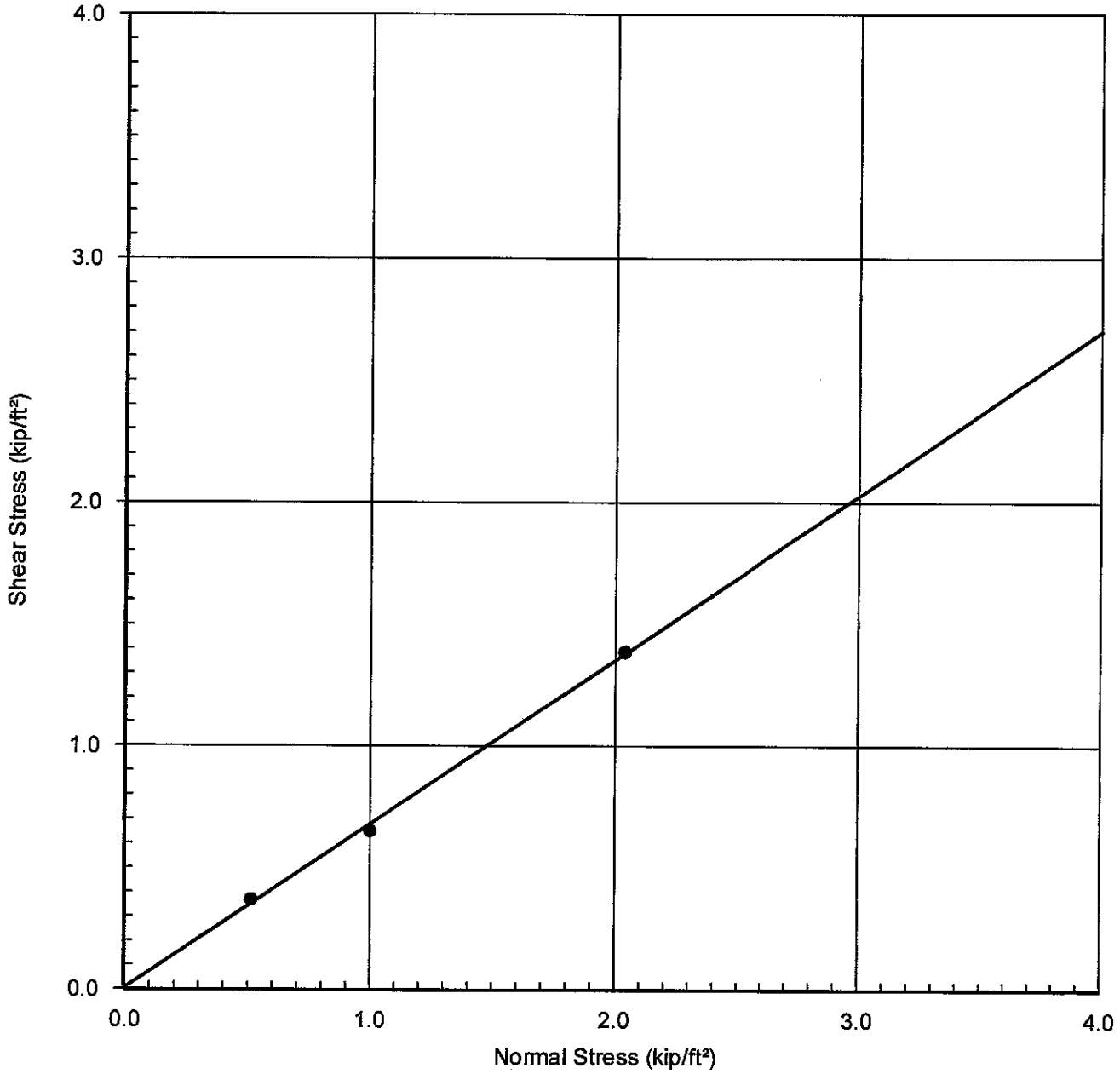


Boring No. : B-13
Depth (ft.) : 10.0
Sample Type : Relatively Undisturbed
Soil Type : Fine to Medium Sand

Cohesion(C) = 15 psf
Friction (ϕ) = 34°
Dry Density (pcf) = 106.9
Moisture (%) = 4.2

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-13

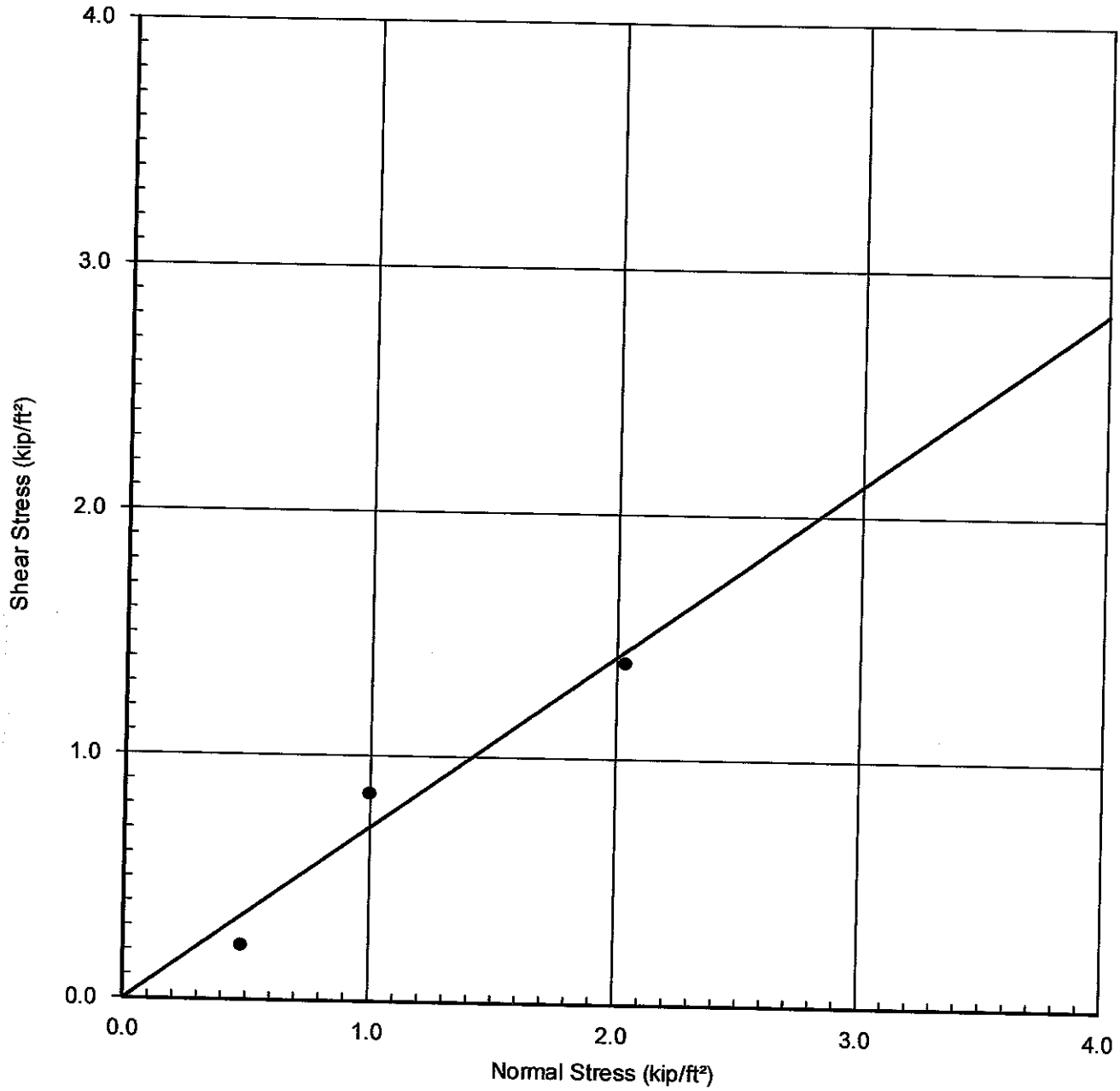


Boring No. : B-14
Depth (ft.) : 7.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand

Cohesion(C) = 5 psf
Friction (ϕ) = 34°
Dry Density (pcf) = 94.9
Moisture (%) = 11.9

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-14



Boring No. : B-15
Depth (ft.) : 6.0
Sample Type : Relatively Undisturbed
Soil Type : Silty Fine Sand with some Gravel

Cohesion(C) = 0 psf
Friction (ϕ) = 37°
Dry Density (pcf) = 115.9
Moisture (%) = 4.2

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.: 6441.13
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-15

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 7, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Gary L Martin/Associated Soils Engineering, Inc.

Person Recording/Company: Gary L Martin/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
11:51	B-1	0.0	2
11:52	B-1	0.8	4
11:52	B-1	0.7	7
11:53	B-1	7.7	10
11:53	B-1	1.5	15
11:54	B-1	21.0	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 7, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Gary L Martin/Associated Soils Engineering, Inc.

Person Recording/Company: Gary L Martin/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
11:13	B-2	0.0	2
11:13	B-2	0.0	4
11:14	B-2	1.7	7
11:14	B-2	1.5	10
11:15	B-2	5.0	15
11:15	B-2	1.0	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 4, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Ted Riddell/Associated Soils Engineering, Inc.

Person Recording/Company: Ted Riddell/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
9:25	B-3	0.7	2
9:27	B-3	1.3	4
9:29	B-3	0.7	7
9:34	B-3	0.5	10
9:36	B-3	1.3	15
9:39	B-3	1.6	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 4, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Ted Riddell/Associated Soils Engineering, Inc.

Person Recording/Company: Ted Riddell/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
10:05	B-4	0.0	2
10:10	B-4	0.2	4
10:12	B-4	0.0	7
10:14	B-4	0.0	10
10:18	B-4	0.0	15
10:21	B-4	1.6	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 4, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Ted Riddell/Associated Soils Engineering, Inc.

Person Recording/Company: Ted Riddell/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
10:51	B-5	0.1	2
10:53	B-5	0.2	4
10:55	B-5	1.7	7
10:59	B-5	1.4	10
11:03	B-5	5.0	15
11:08	B-5	5.0	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 4, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Ted Riddell/Associated Soils Engineering, Inc.

Person Recording/Company: Ted Riddell/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
11:44	B-6	5.8	2
11:46	B-6	3.1	4
11:49	B-6	2.7	7
11:52	B-6	3.2	10
11:55	B-6	5.1	15
11:59	B-6	8.2	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 4, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Ted Riddell/Associated Soils Engineering, Inc.

Person Recording/Company: Ted Riddell/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
12:26	B-7	1.2	2
12:28	B-7	0.1	4
12:30	B-7	1.4	7
12:34	B-7	0.7	10
12:36	B-7	1.2	15
12:36	B-7	1.0	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 4, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Ted Riddell/Associated Soils Engineering, Inc.

Person Recording/Company: Ted Riddell/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
1:03	B-8	1.0	2
1:05	B-8	0.2	4
1:08	B-8	1.0	7
1:11	B-8	7.0	10
1:15	B-8	1.7	15
1:19	B-8	5.6	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 4, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Ted Riddell/Associated Soils Engineering, Inc.

Person Recording/Company: Ted Riddell/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
1:47	B-9	1.2	2
1:50	B-9	0.4	4
1:53	B-9	0.0	7
1:56	B-9	0.0	10
1:58	B-9	0.8	15
2:00	B-9	1.0	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 5, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Gary L Martin/Associated Soils Engineering, Inc.

Person Recording/Company: Gary L Martin/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
9:18	B-10	0.0	2
9:19	B-10	0.0	4
9:20	B-10	0.6	7
9:22	B-10	0.4	10
9:27	B-10	2.2	15
9:31	B-10	7.1	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 5, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Gary L Martin/Associated Soils Engineering, Inc.

Person Recording/Company: Gary L Martin/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
10:04	B-11	0.4	2
10:07	B-11	6.7	4
10:10	B-11	0.8	7
10:13	B-11	0.5	10
10:17	B-11	37.7	15
10:20	B-11	32.1	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 5, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Gary L Martin/Associated Soils Engineering, Inc.

Person Recording/Company: Gary L Martin/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
11:10	B-12	0.4	2
11:10	B-12	1.3	4
11:11	B-12	1.9	7
11:11	B-12	1.6	10
11:12	B-12	4.3	15
11:12	B-12	0.3	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 5, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Gary L Martin/Associated Soils Engineering, Inc.

Person Recording/Company: Gary L Martin/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
12:09	B-13	2.5	2
12:10	B-13	1.4	4
12:10	B-13	0.5	7
12:11	B-13	1.8	10
12:11	B-13	0.4	15
12:12	B-13	1.9	19

VOC MONITORING RECORD FOR SOIL SAMPLING

Date: February 7, 2014

Project Title/Location of Excavation: Beachwood Pump Station Upgrade and Force Main Replacement Project – Burbank

Planned Excavation Depth (feet): 20.0

Monitor Used to measure VOC: Mini RAE

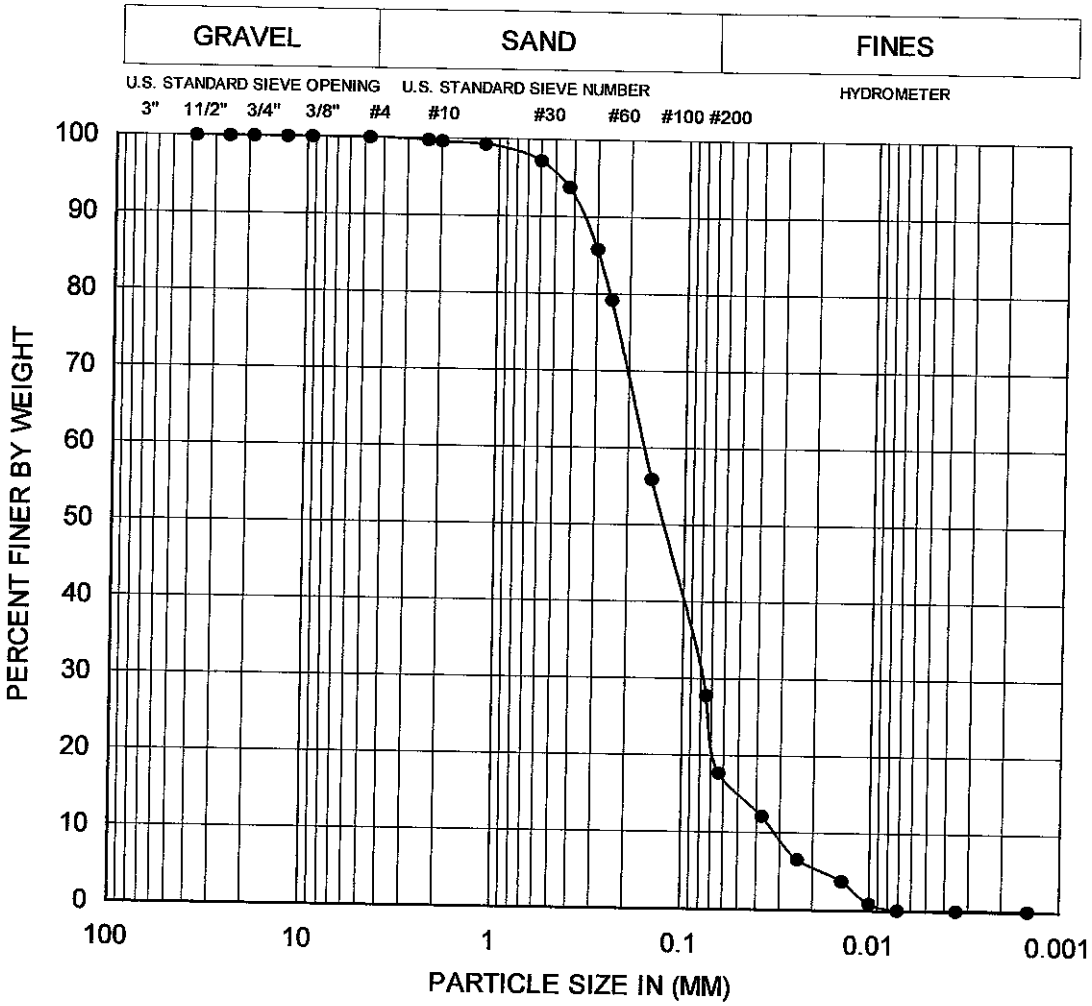
Manufacturer: RAE Systems Model No.: MR 2000

Calibration Gas: Hexane

Person Monitoring/Company: Gary L Martin/Associated Soils Engineering, Inc.

Person Recording/Company: Gary L Martin/Associated Soils Engineering, Inc.

TIME	BORING NO.	VOC LEVEL (PPM)	DEPTH (FEET)
9:44	B-14	8.6	2
9:44	B-14	2.6	4
9:45	B-14	13.4	7
9:46	B-14	8.9	10
9:47	B-14	28.4	15
9:47	B-14	10.3	19

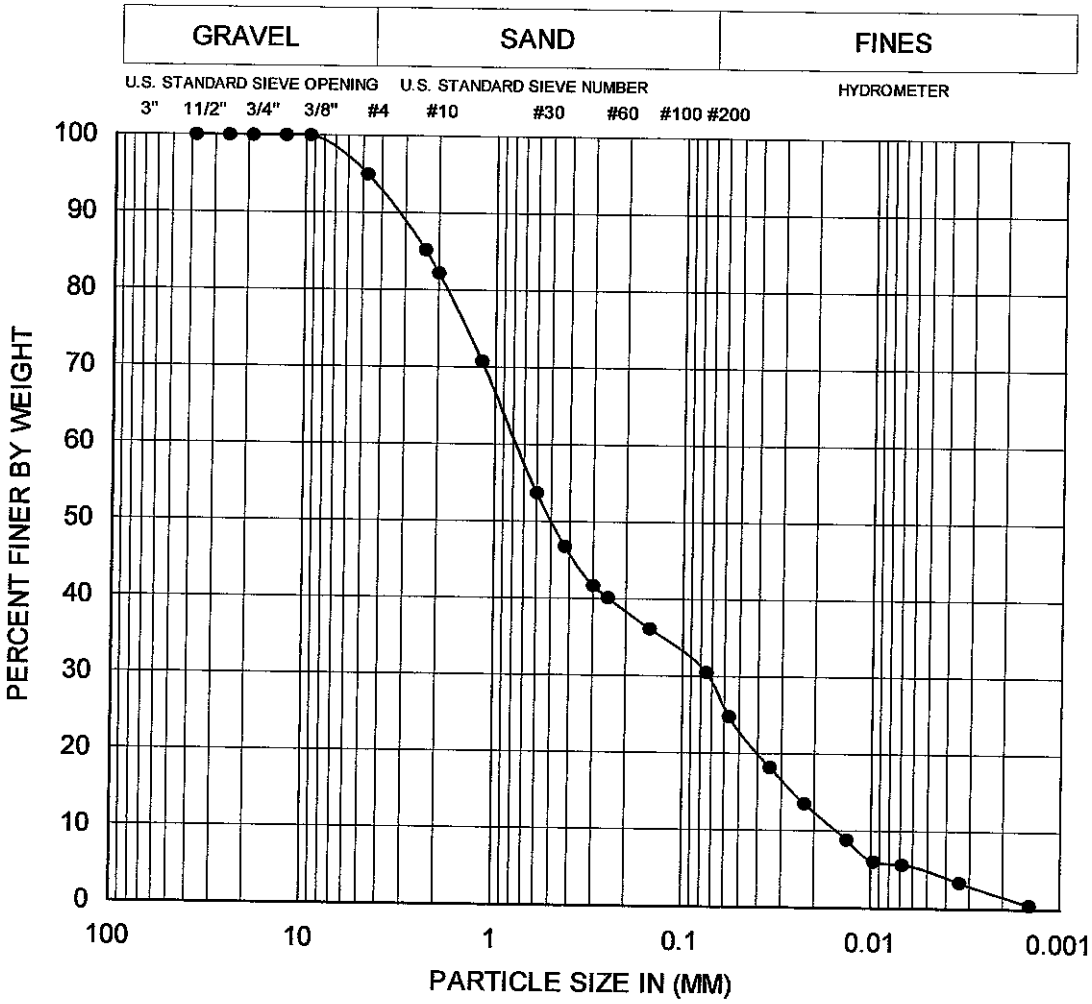


Boring No. : B-1
Depth (Ft.) : 2.5
Sample Type : Silty Fine Sand (SM)

% Gravel: 0.0
% Sand: 72.2
% Silt: 27.8
% Clay: 0.0

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

PLATE G-1

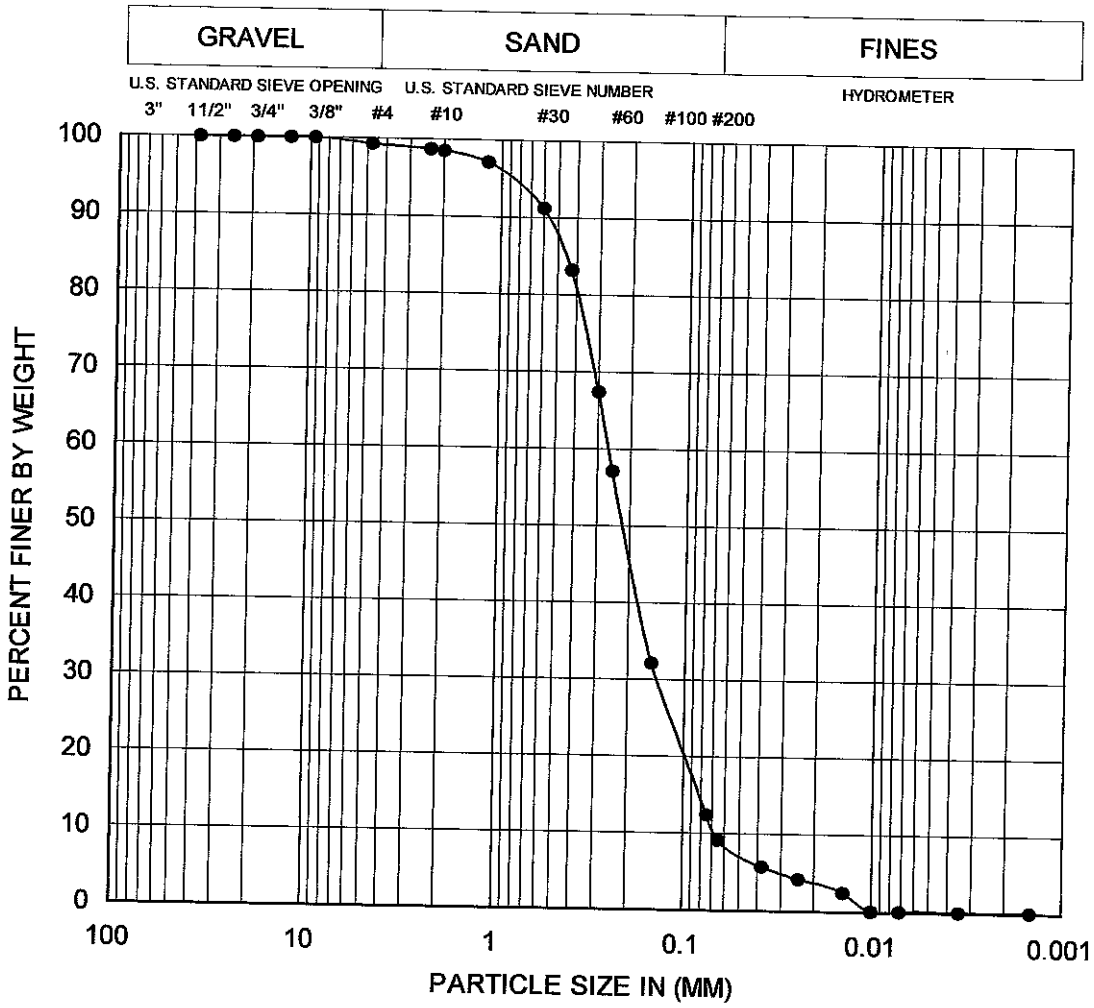


Boring No. : B-2
Depth (Ft.) : 10.0
Sample Type : Silty Fine to Coarse Sand (SM)

% Gravel: 5.0
% Sand: 64.5
% Silt: 26.1
% Clay: 4.4

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

PLATE G-2

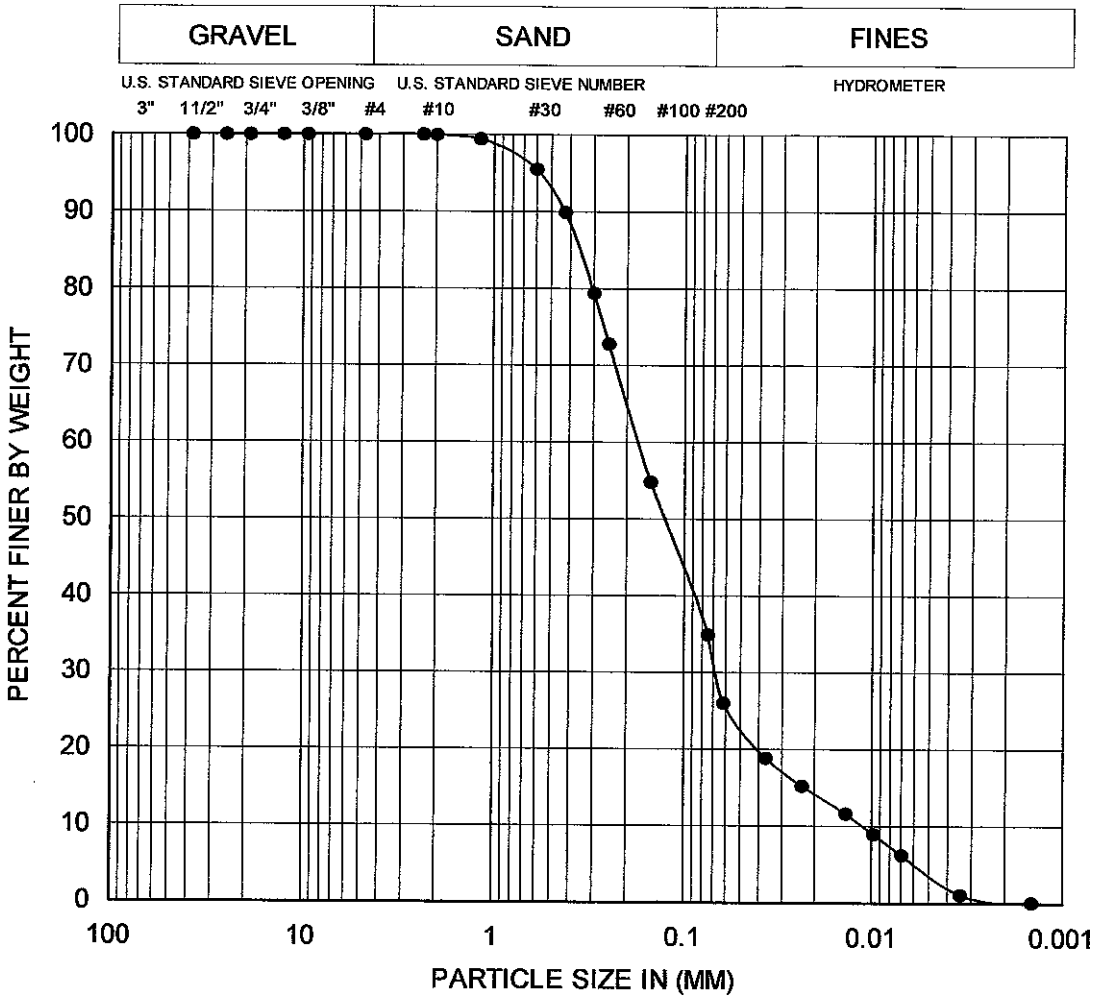


Boring No. : B-3
Depth (Ft.) : 15.0
Sample Type : Fine Sand with Silt and some Medium Sand (SP-SM)

% Gravel: 0.7
% Sand: 86.9
% Silt: 12.4
% Clay: 0.0

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

PLATE G-3

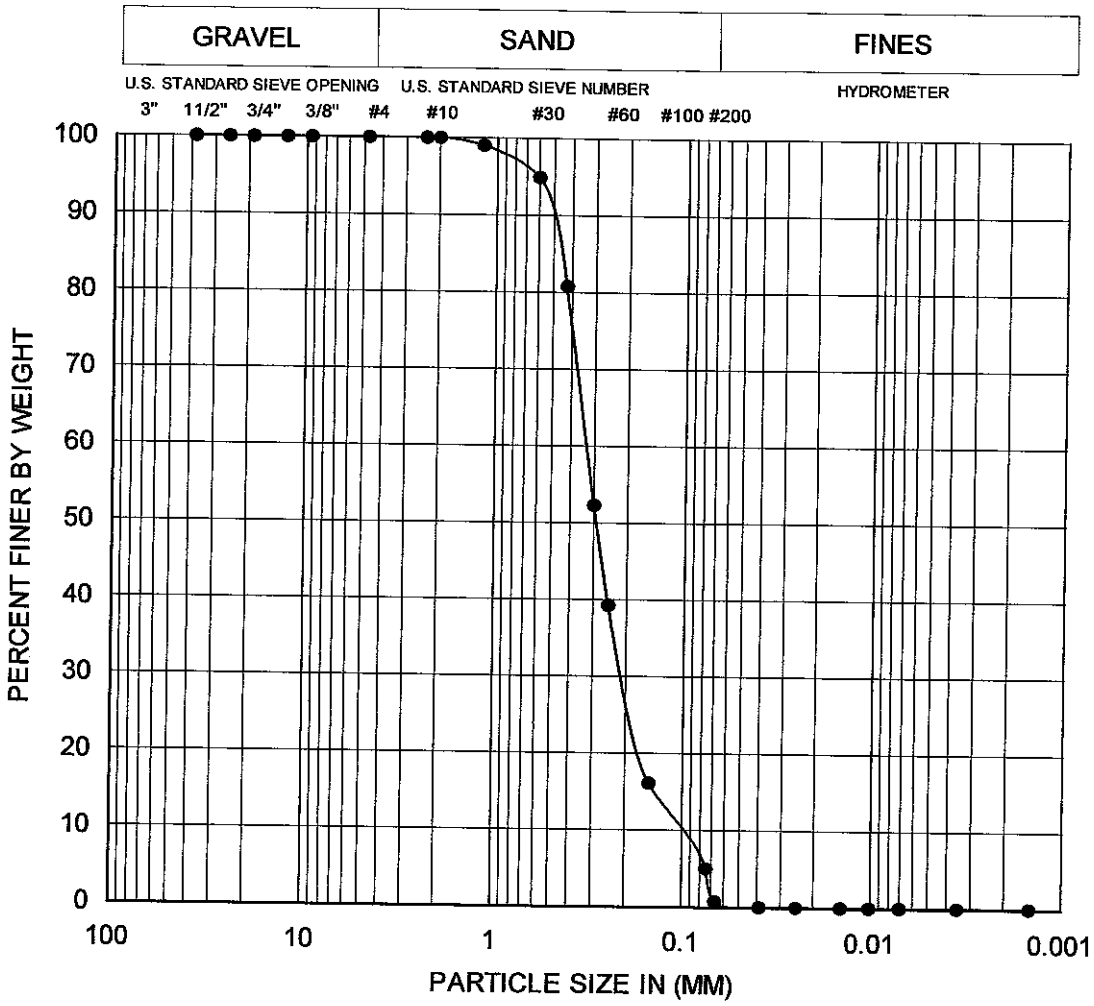


Boring No. : B-4
Depth (Ft.) : 7.0
Sample Type : Silty Fine Sand (SM)

% Gravel: 0.0
% Sand: 65.1
% Silt: 31.6
% Clay: 3.3

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

PLATE G-4

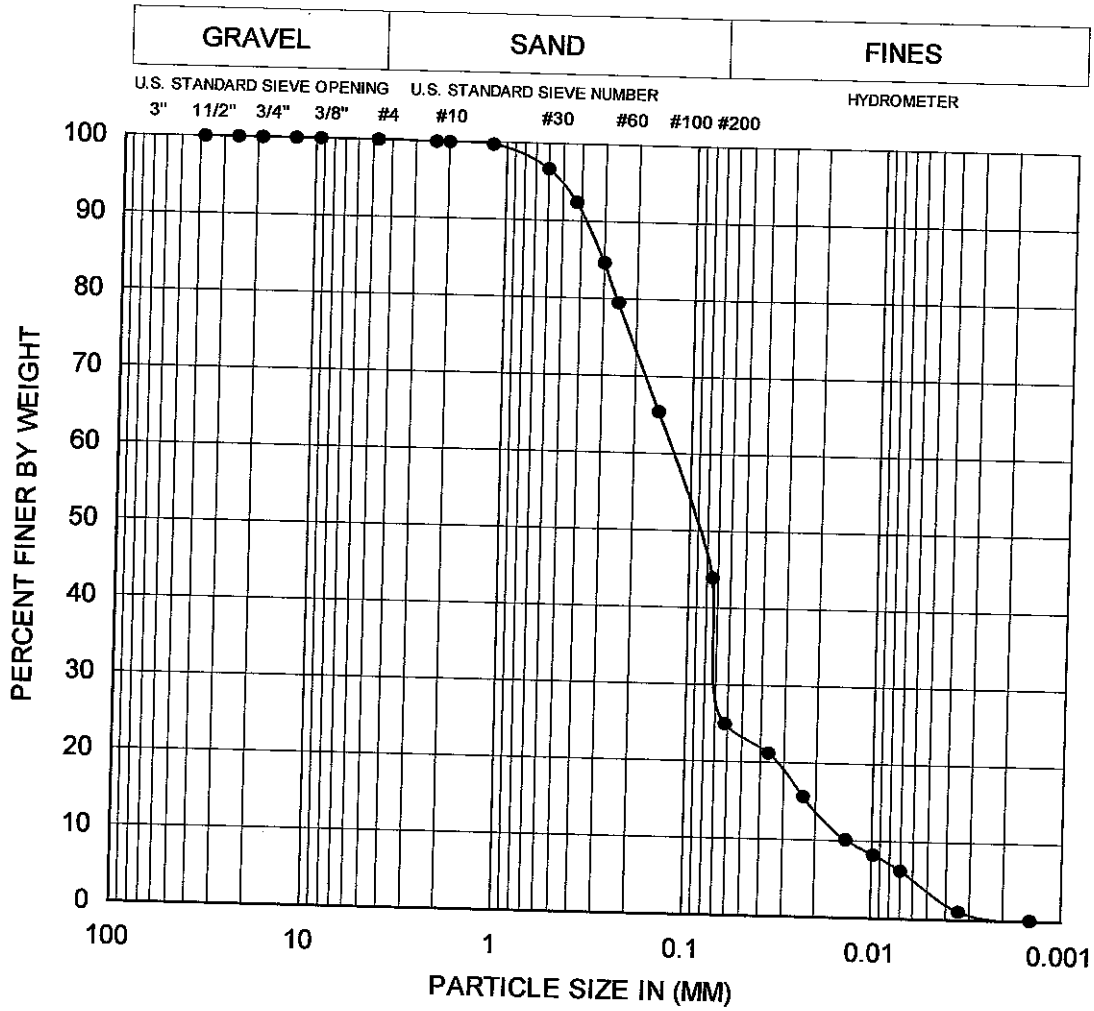


Boring No. : B-5
Depth (Ft.) : 4.0
Sample Type : Fine to Medium Sand (SP)

% Gravel: 0.0
% Sand: 95.0
% Silt: 5.0
% Clay: 0.0

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

PLATE G-5

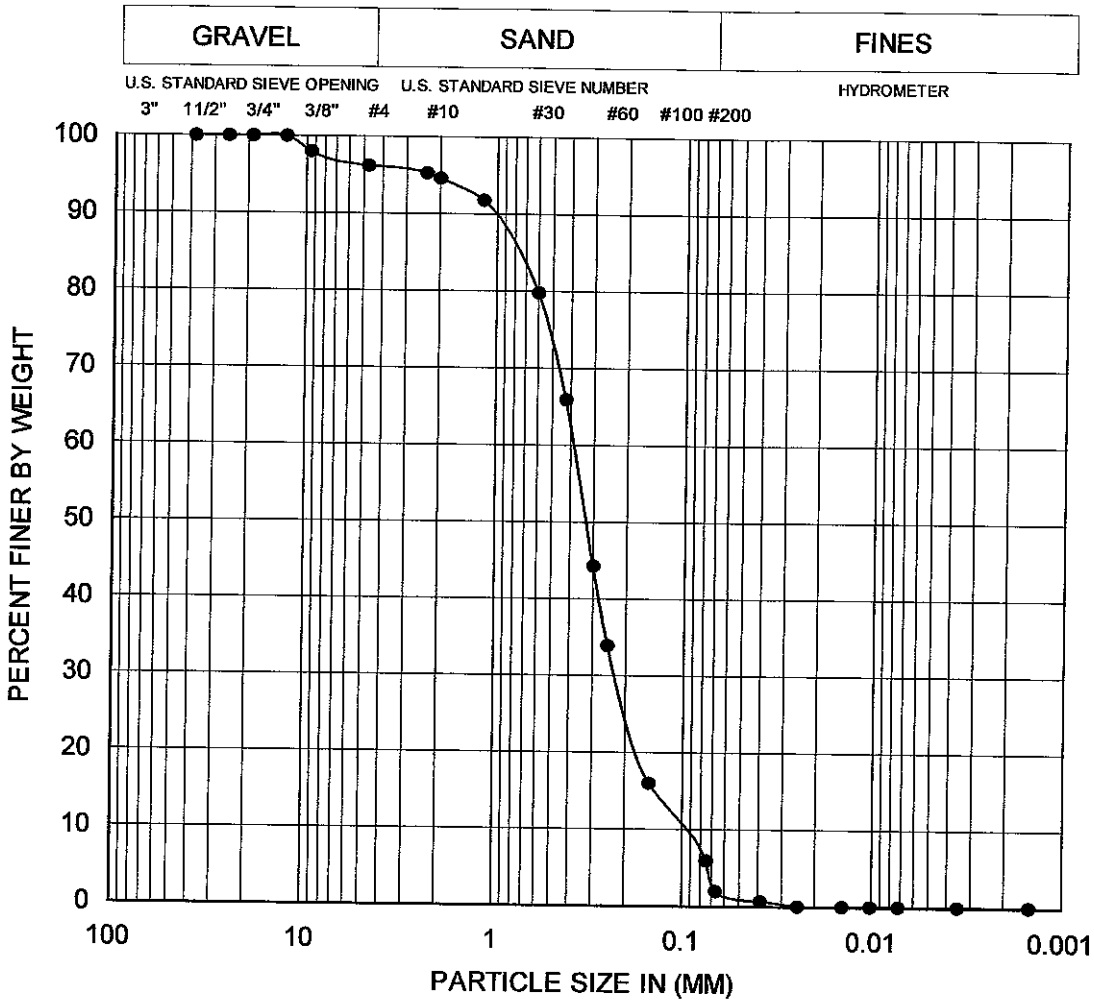


Boring No. : B-6
Depth (Ft.) : 10.0
Sample Type : Silty Fine Sand (SM)

% Gravel: 0.0
% Sand: 56.1
% Silt: 40.6
% Clay: 3.3

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

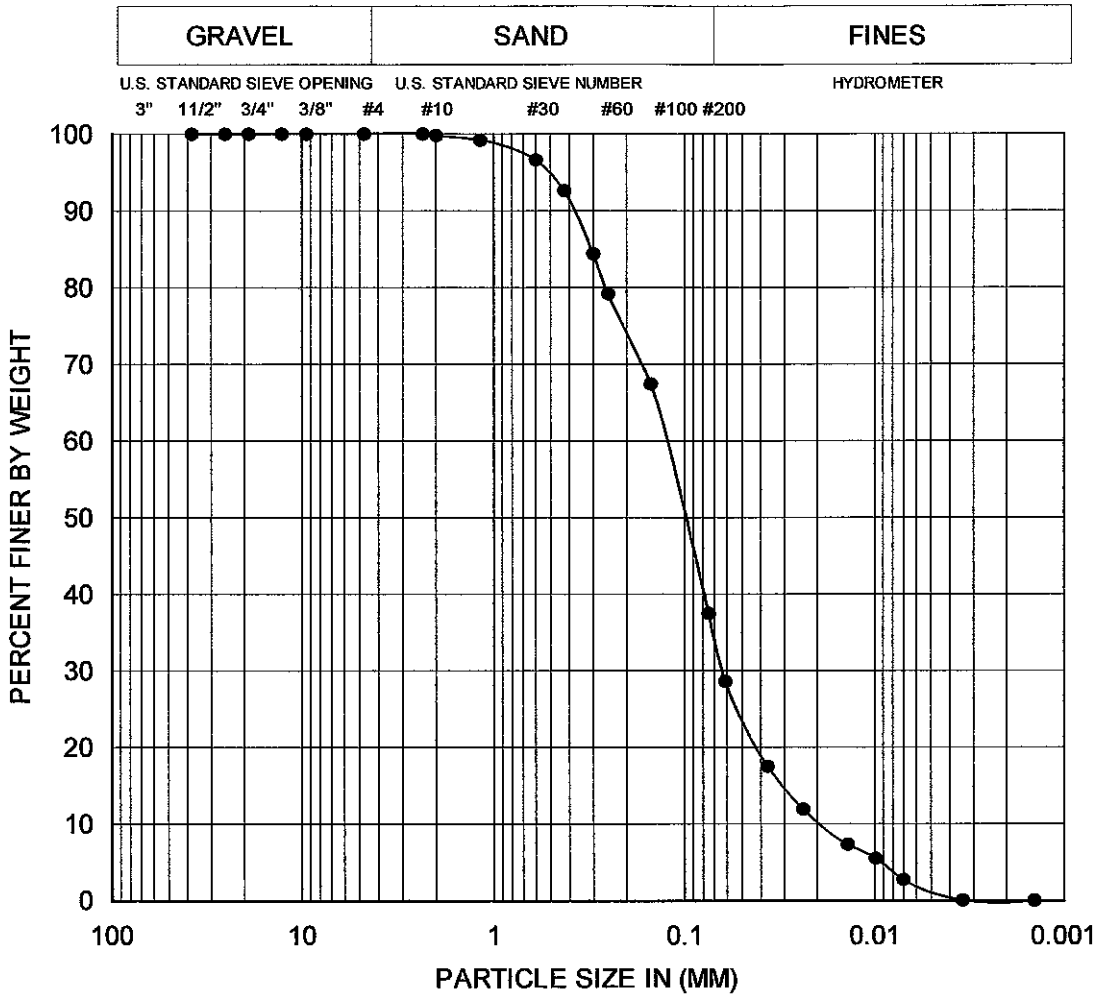
PLATE G-6



Boring No. : B-7
Depth (Ft.) : 7.0
Sample Type : Fine to Medium Sand with Silt (SP-SM)

% Gravel: 3.8
% Sand: 90.3
% Silt: 5.9
% Clay: 0.0

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

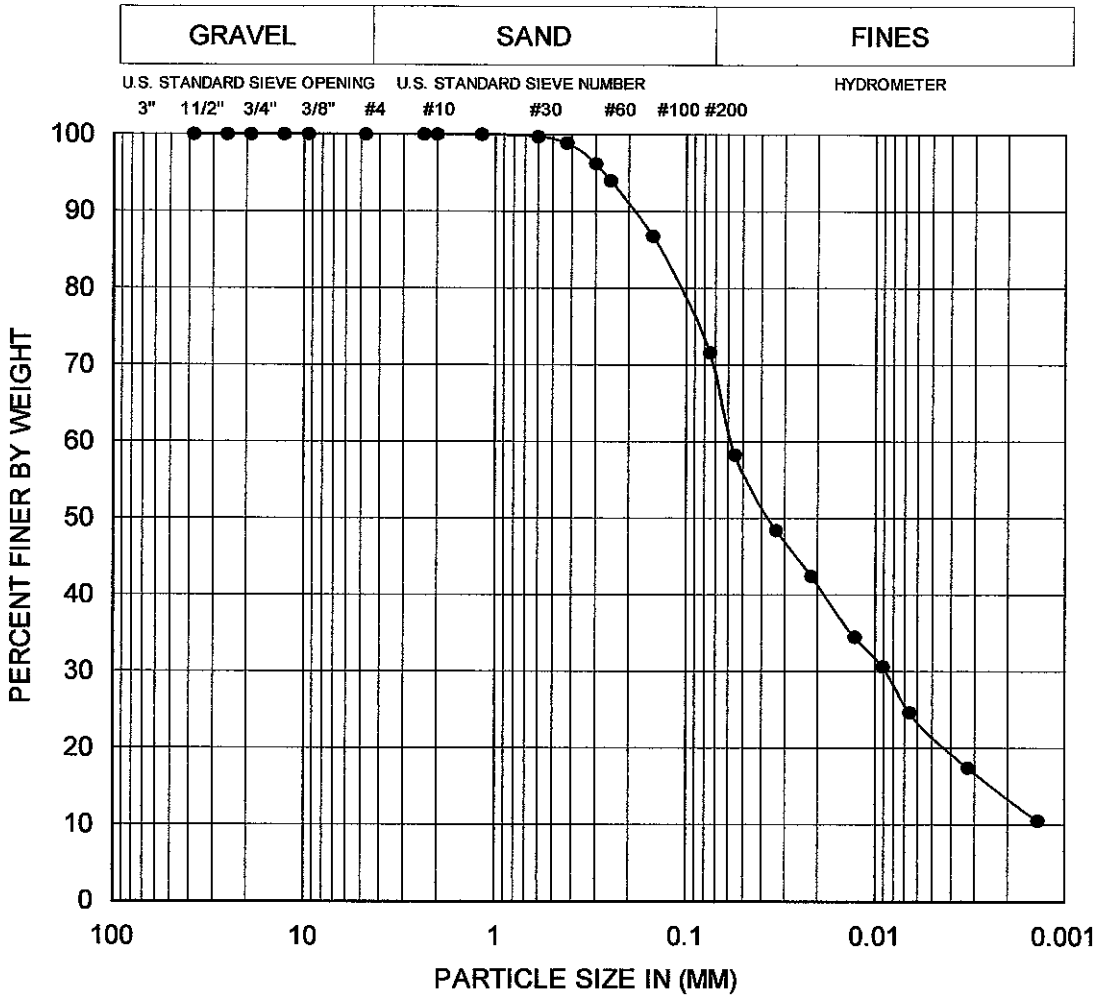


Boring No. : B-8
Depth (Ft.) : 4.0
Sample Type : Silty Fine Sand (SM)

% Gravel: 0.0
% Sand: 62.5
% Silt: 36.3
% Clay: 1.2

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

PLATE G-8

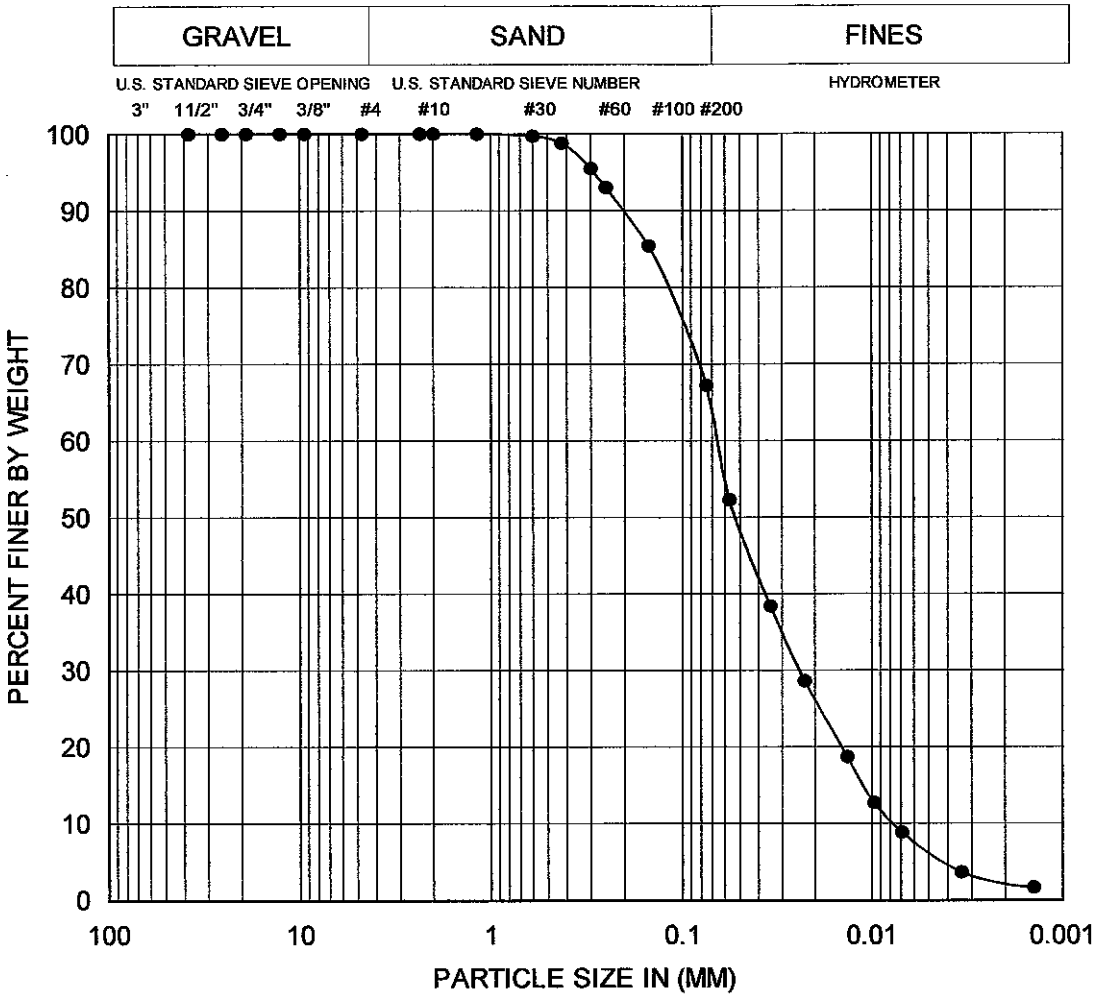


Boring No. : B-9
Depth (Ft.) : 2.0
Sample Type : Clayey Silt with Fine Sand (ML)

% Gravel: 0.0
% Sand: 28.4
% Silt: 50.5
% Clay: 21.1

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

PLATE G-9

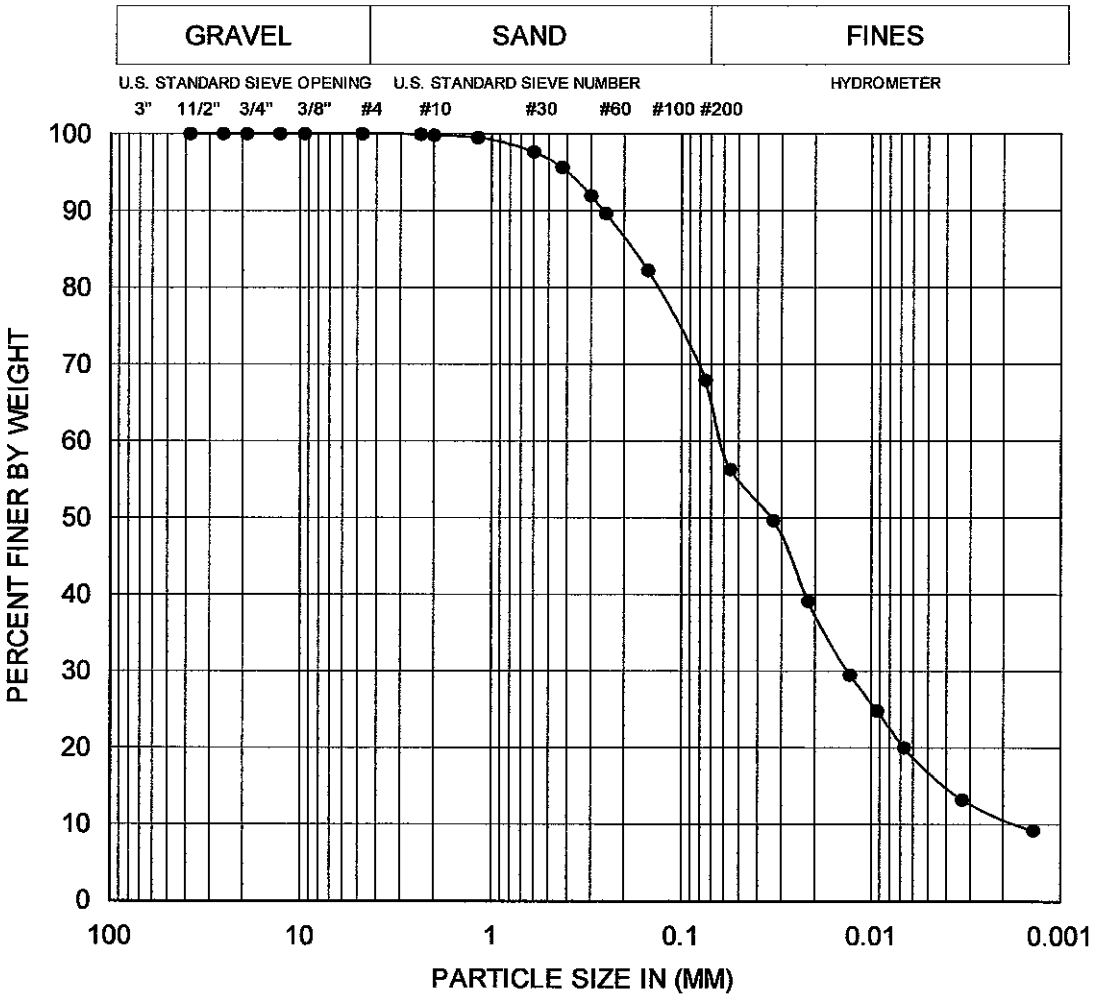


Boring No. : B-10
Depth (Ft.) : 4.0
Sample Type : Fine Sandy Silt (ML)

% Gravel: 0.0
% Sand: 32.8
% Silt: 61.2
% Clay: 6.0

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

PLATE G-10

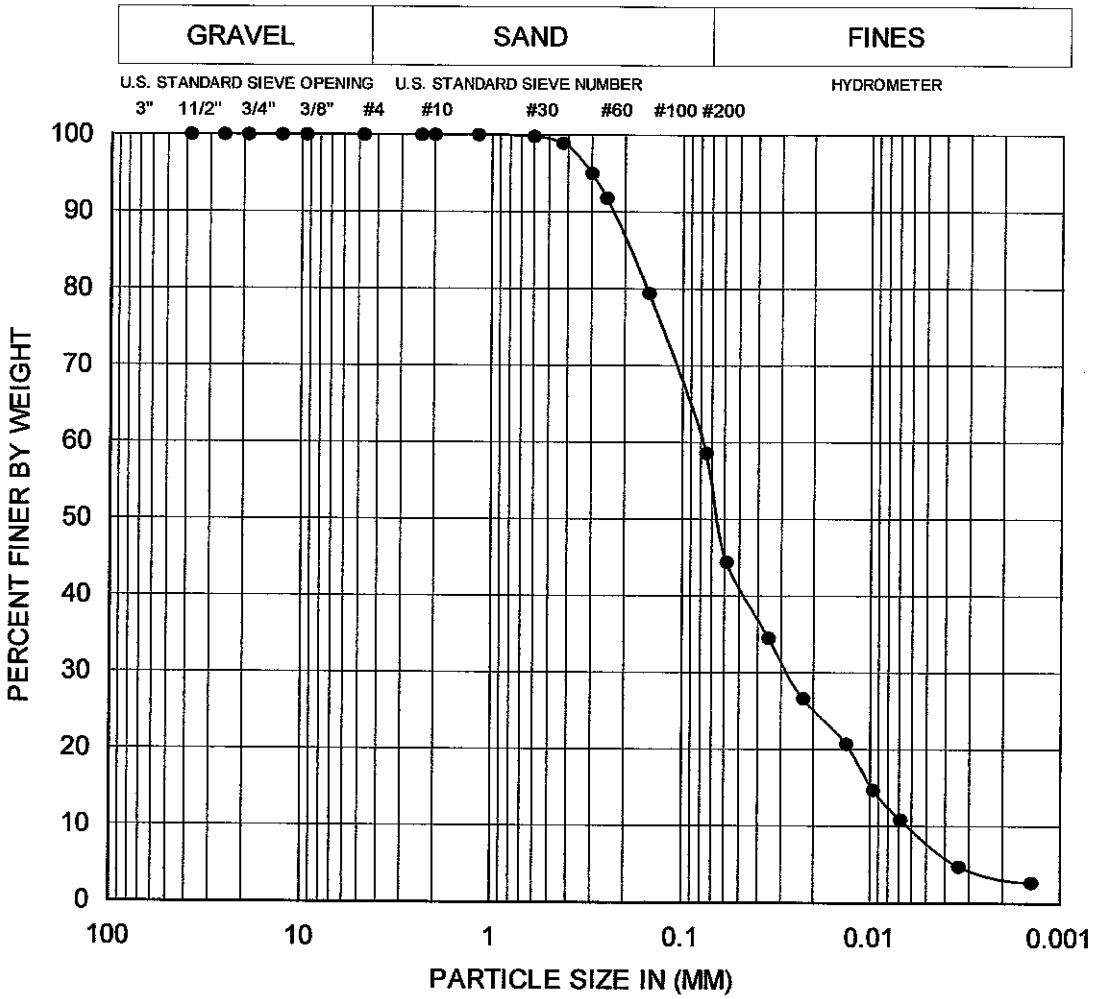


Boring No. : B-11
Depth (Ft.) : 15.0
Sample Type : Fine Sandy Silt with Clay (ML)

% Gravel: 0.0
% Sand: 32.1
% Silt: 51.3
% Clay: 16.6

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

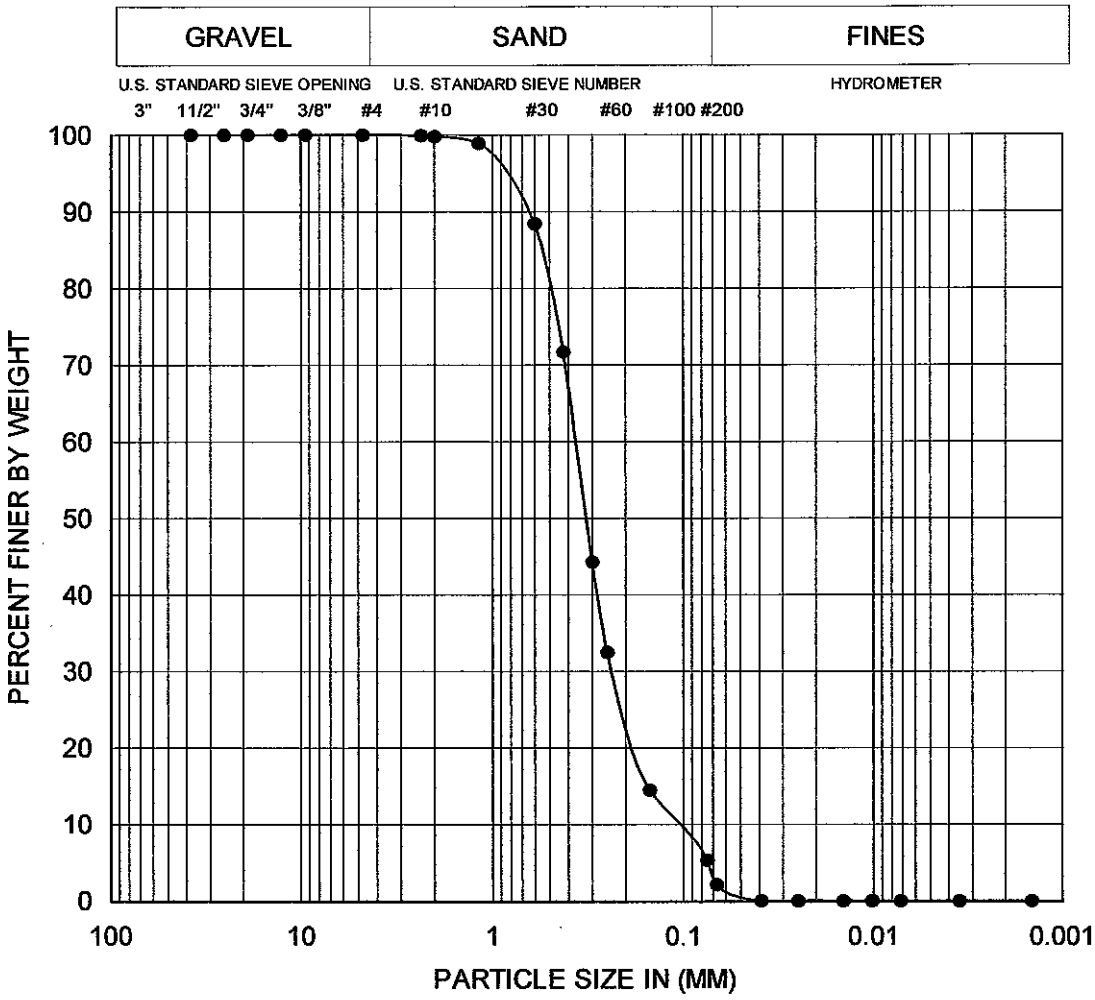
PLATE G-11



Boring No. : B-12
Depth (Ft.) : 4.0
Sample Type : Fine Sandy Silt (ML)

% Gravel: 0.0
% Sand: 41.4
% Silt: 51.1
% Clay: 7.5

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

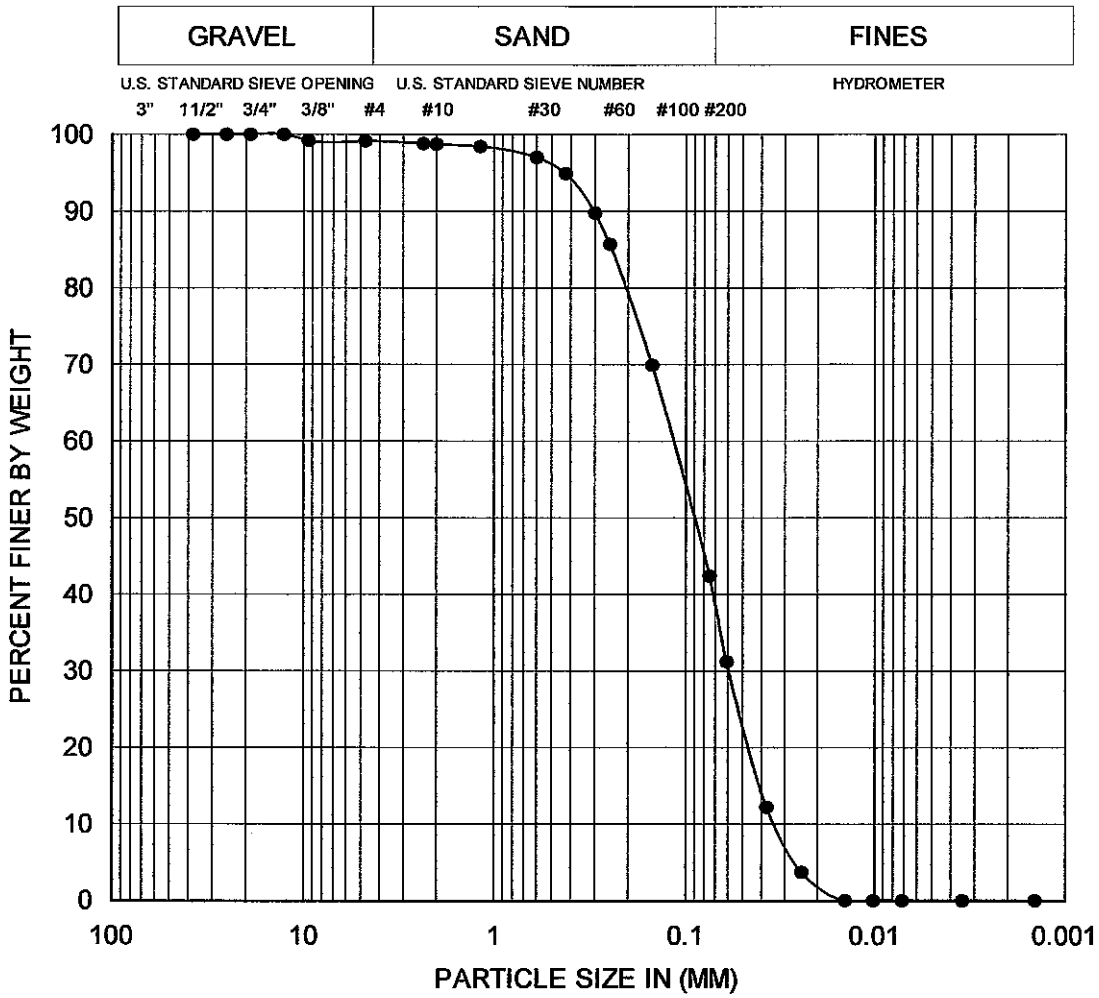


Boring No. : B-13
Depth (Ft.) : 10.0
Sample Type : Fine to Medium Sand (SP)

% Gravel: 0.0
% Sand: 94.7
% Silt: 5.3
% Clay: 0.0

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

PLATE G-13



Boring No. : B-14
Depth (Ft.) : 2.0
Sample Type : Silty Fine Sand (SM)

% Gravel: 0.9
% Sand: 56.7
% Silt: 42.4
% Clay: 0.0

Project Name:Beachwood Pump Station Upgrade-Burbank	Project No.:6441.13
ASSOCIATED SOILS ENGINEERING, INC.	PARTICLE-SIZE CURVE (ASTM D422)

APPENDIX B – SITE FAULTING AND SEISMIC HAZARD DATA

Plates H-1 through H-15	EQFAULT – Deterministic Estimation of Peak Acceleration from Digitized Faults
Plates I-1 through I-15	Printouts of Seismic Design Parameter Derivations from USGS Web Application

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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: 6441.13

DATE: 02-25-2014

JOB NAME: Beachwood Pump Station Upgade and Force Main
Replacement Project-Burbank (Boring B-1)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1576
SITE LONGITUDE: 118.3156

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-1

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
HOLLYWOOD	3.0(4.9)	6.4	0.466	X
VERDUGO	3.0(4.9)	6.9	0.535	X
UPPER ELYSIAN PARK BLIND THRUST	3.8(6.1)	6.4	0.426	X
RAYMOND	5.8(9.4)	6.5	0.362	IX
PUENTE HILLS BLIND THRUST	7.0(11.3)	7.1	0.398	X
SIERRA MADRE	7.3(11.8)	7.2	0.401	X
SIERRA MADRE (San Fernando)	8.1(13.0)	6.7	0.317	IX
SANTA MONICA	8.5(13.6)	6.6	0.295	IX
NEWPORT-INGLEWOOD (L.A.Basin)	8.9(14.4)	7.1	0.269	IX
NORTHRIDGE (E. Oak Ridge)	10.2(16.4)	7.0	0.305	IX
SAN GABRIEL	11.2(18.1)	7.2	0.241	IX
MALIBU COAST	15.0(24.2)	6.7	0.192	VIII
SANTA SUSANA	15.4(24.8)	6.7	0.188	VIII
CLAMSHELL-SAWPIT	17.0(27.3)	6.5	0.152	VIII
PALOS VERDES	20.6(33.2)	7.3	0.155	VIII
WHITTIER	20.7(33.3)	6.8	0.116	VII
HOLSER	21.8(35.1)	6.5	0.116	VII
SIMI-SANTA ROSA	23.4(37.7)	7.0	0.148	VIII
ANACAPA-DUME	24.6(39.6)	7.5	0.188	VIII
SAN JOSE	25.7(41.4)	6.4	0.088	VII
OAK RIDGE (Onshore)	28.0(45.1)	7.0	0.122	VII
SAN ANDREAS - Whole M-1a	29.5(47.5)	8.0	0.163	VIII
SAN ANDREAS - Mojave M-1c-3	29.5(47.5)	7.4	0.115	VII
SAN ANDREAS - 1857 Rupture M-2a	29.5(47.5)	7.8	0.146	VIII
SAN ANDREAS - Cho-Moj M-1b-1	29.5(47.5)	7.8	0.146	VIII
CUCAMONGA	31.9(51.3)	6.9	0.098	VII
SAN CAYETANO	31.9(51.4)	7.0	0.105	VII
CHINO-CENTRAL AVE. (Elsinore)	32.4(52.2)	6.7	0.083	VII
SAN JOAQUIN HILLS	38.8(62.4)	6.6	0.061	VI
SAN ANDREAS - Carrizo M-1c-2	39.0(62.7)	7.4	0.085	VII
ELSINORE (GLEN IVY)	44.1(71.0)	6.8	0.047	VI
SANTA YNEZ (East)	44.4(71.5)	7.1	0.059	VI
NEWPORT-INGLEWOOD (Offshore)	45.4(73.0)	7.1	0.057	VI
SAN JACINTO-SAN BERNARDINO	46.5(74.9)	6.7	0.041	V
SAN ANDREAS - SB-Coach. M-2b	47.6(76.6)	7.7	0.083	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.6(76.6)	7.7	0.083	VII
SAN ANDREAS - San Bernardino M-1	47.6(76.6)	7.5	0.072	VI
VENTURA - PITAS POINT	49.0(78.8)	6.9	0.057	VI
CLEGHORN	49.8(80.2)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	53.2(85.6)	7.2	0.064	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.4(85.9)	7.1	0.059	VI
CHANNEL IS. THRUST (Eastern)	54.7(88.0)	7.5	0.078	VII
OAK RIDGE MID-CHANNEL STRUCTURE	55.4(89.1)	6.6	0.038	V
GARLOCK (West)	55.9(90.0)	7.3	0.051	VI
PLEITO THRUST	57.0(91.8)	7.0	0.050	VI
RED MOUNTAIN	57.7(92.8)	7.0	0.050	VI
BIG PINE	60.5(97.4)	6.9	0.033	V
NORTH FRONTAL FAULT ZONE (West)	60.8(97.9)	7.2	0.054	VI

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-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE HOLLYWOOD FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 3.0 MILES (4.9 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5349 g

PLATE H-1

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

JOB NUMBER: 6441.13

DATE: 02-26-2014

JOB NAME: Beachwood Pump Station Upgrade and Force Main
Repalcement Project-Burbank (Boring B-2)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1576
SITE LONGITUDE: 118.3167

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
HOLLYWOOD	3.0(4.9)	6.4	0.466	X
VERDUGO	3.0(4.9)	6.9	0.535	X
UPPER ELYSIAN PARK BLIND THRUST	3.8(6.1)	6.4	0.426	X
RAYMOND	5.9(9.5)	6.5	0.360	IX
PUENTE HILLS BLIND THRUST	7.0(11.3)	7.1	0.398	X
SIERRA MADRE	7.4(11.9)	7.2	0.399	X
SIERRA MADRE (San Fernando)	8.1(13.0)	6.7	0.317	IX
SANTA MONICA	8.4(13.5)	6.6	0.297	IX
NEWPORT-INGLEWOOD (L.A.Basin)	8.9(14.4)	7.1	0.269	IX
NORTHRIDGE (E. Oak Ridge)	10.2(16.4)	7.0	0.305	IX
SAN GABRIEL	11.2(18.1)	7.2	0.241	IX
MALIBU COAST	15.0(24.1)	6.7	0.193	VIII
SANTA SUSANA	15.4(24.8)	6.7	0.188	VIII
CLAMSHELL-SAWPIT	17.0(27.4)	6.5	0.151	VIII
PALOS VERDES	20.6(33.1)	7.3	0.155	VIII
WHITTIER	20.8(33.4)	6.8	0.115	VII
HOLSER	21.7(35.0)	6.5	0.116	VII
SIMI-SANTA ROSA	23.4(37.6)	7.0	0.148	VIII
ANACAPA-DUME	24.6(39.6)	7.5	0.188	VIII
SAN JOSE	25.8(41.5)	6.4	0.088	VII
OAK RIDGE (Onshore)	28.0(45.0)	7.0	0.122	VII
SAN ANDREAS - Whole M-1a	29.6(47.6)	8.0	0.162	VIII
SAN ANDREAS - Mojave M-1c-3	29.6(47.6)	7.4	0.115	VII
SAN ANDREAS - 1857 Rupture M-2a	29.6(47.6)	7.8	0.146	VIII
SAN ANDREAS - Cho-Moj M-1b-1	29.6(47.6)	7.8	0.146	VIII
CUCAMONGA	31.9(51.4)	6.9	0.098	VII
SAN CAYETANO	31.9(51.4)	7.0	0.105	VII
CHINO-CENTRAL AVE. (Elsinore)	32.5(52.3)	6.7	0.083	VII
SAN JOAQUIN HILLS	38.8(62.4)	6.6	0.061	VI
SAN ANDREAS - Carrizo M-1c-2	39.0(62.7)	7.4	0.085	VII
ELSINORE (GLEN IVY)	44.2(71.1)	6.8	0.047	VI
SANTA YNEZ (East)	44.4(71.4)	7.1	0.059	VI
NEWPORT-INGLEWOOD (Offshore)	45.4(73.1)	7.1	0.057	VI
SAN JACINTO-SAN BERNARDINO	46.6(75.0)	6.7	0.041	V
SAN ANDREAS - SB-Coach. M-2b	47.7(76.7)	7.7	0.083	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.7(76.7)	7.7	0.083	VII
SAN ANDREAS - San Bernardino M-1	47.7(76.7)	7.5	0.072	VI
VENTURA - PITAS POINT	48.9(78.7)	6.9	0.057	VI
CLEGHORN	49.9(80.3)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	53.1(85.5)	7.2	0.065	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.3(85.8)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.6(87.9)	7.5	0.078	VII
OAK RIDGE MID-CHANNEL STRUCTURE	55.3(89.0)	6.6	0.038	V
GARLOCK (West)	55.9(89.9)	7.3	0.051	VI
PLEITO THRUST	57.0(91.8)	7.0	0.050	VI
RED MOUNTAIN	57.6(92.7)	7.0	0.050	VI
BIG PINE	60.5(97.4)	6.9	0.033	V
NORTH FRONTAL FAULT ZONE (West)	60.9(98.0)	7.2	0.054	VI

****

-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE HOLLYWOOD FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 3.0 MILES (4.9 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5349 g

PLATE H-2

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

JOB NUMBER: 6441.13

DATE: 02-26-2014

JOB NAME: Beachwood Pump Station Upgrade and Force Main
Replacement Project-Burbank (Boring B-3)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1598
SITE LONGITUDE: 118.3182

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-3

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	3.0(4.8)	6.9	0.538	X
HOLLYWOOD	3.2(5.1)	6.4	0.459	X
UPPER ELYSIAN PARK BLIND THRUST	4.0(6.4)	6.4	0.416	X
RAYMOND	6.0(9.7)	6.5	0.355	IX
PUENTE HILLS BLIND THRUST	7.1(11.5)	7.1	0.394	X
SIERRA MADRE	7.3(11.8)	7.2	0.401	X
SIERRA MADRE (San Fernando)	8.0(12.8)	6.7	0.321	IX
SANTA MONICA	8.5(13.6)	6.6	0.295	IX
NEWPORT-INGLEWOOD (L.A.Basin)	9.0(14.5)	7.1	0.268	IX
NORTHRIDGE (E. Oak Ridge)	10.0(16.1)	7.0	0.309	IX
SAN GABRIEL	11.1(17.9)	7.2	0.243	IX
MALIBU COAST	15.0(24.1)	6.7	0.193	VIII
SANTA SUSANA	15.2(24.5)	6.7	0.190	VIII
CLAMSHELL-SAWPIT	17.1(27.5)	6.5	0.151	VIII
PALOS VERDES	20.6(33.2)	7.3	0.155	VIII
WHITTIER	20.9(33.7)	6.8	0.114	VII
HOLSER	21.6(34.7)	6.5	0.117	VII
SIMI-SANTA ROSA	23.2(37.4)	7.0	0.149	VIII
ANACAPA-DUME	24.5(39.5)	7.5	0.189	VIII
SAN JOSE	25.9(41.7)	6.4	0.087	VII
OAK RIDGE (Onshore)	27.8(44.8)	7.0	0.122	VII
SAN ANDREAS - Whole M-1a	29.5(47.4)	8.0	0.163	VIII
SAN ANDREAS - Mojave M-1c-3	29.5(47.4)	7.4	0.116	VII
SAN ANDREAS - 1857 Rupture M-2a	29.5(47.4)	7.8	0.146	VIII
SAN ANDREAS - Cho-Moj M-1b-1	29.5(47.4)	7.8	0.146	VIII
SAN CAYETANO	31.8(51.1)	7.0	0.105	VII
CUCAMONGA	32.0(51.5)	6.9	0.097	VII
CHINO-CENTRAL AVE. (Elsinore)	32.6(52.5)	6.7	0.083	VII
SAN ANDREAS - Carrizo M-1c-2	38.8(62.4)	7.4	0.086	VII
SAN JOAQUIN HILLS	39.0(62.7)	6.6	0.061	VI
SANTA YNEZ (East)	44.2(71.2)	7.1	0.059	VI
ELSINORE (GLEN IVY)	44.3(71.3)	6.8	0.047	VI
NEWPORT-INGLEWOOD (Offshore)	45.5(73.3)	7.1	0.057	VI
SAN JACINTO-SAN BERNARDINO	46.7(75.1)	6.7	0.040	V
SAN ANDREAS - SB-Coach. M-2b	47.7(76.8)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.7(76.8)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	47.7(76.8)	7.5	0.072	VI
VENTURA - PITAS POINT	48.8(78.5)	6.9	0.057	VI
CLEGHORN	49.9(80.3)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	53.0(85.3)	7.2	0.065	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.3(85.7)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.5(87.7)	7.5	0.078	VII
OAK RIDGE MID-CHANNEL STRUCTURE	55.2(88.9)	6.6	0.038	V
GARLOCK (West)	55.7(89.6)	7.3	0.051	VI
PLEITO THRUST	56.9(91.5)	7.0	0.050	VI
RED MOUNTAIN	57.5(92.5)	7.0	0.050	VI
BIG PINE	60.3(97.1)	6.9	0.033	V
NORTH FRONTAL FAULT ZONE (West)	61.0(98.1)	7.2	0.054	VI

****

-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 3.0 MILES (4.8 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5383 g

PLATE H-3

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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: 6441.13

DATE: 02-26-2014

JOB NAME: Beachwood Pump Station Upgrade and Force Main
n Replacement Project-Burbank (Boring B-4)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1623
SITE LONGITUDE: 118.3194

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-4

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(MW)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	2.9(4.6)	6.9	0.545	X
HOLLYWOOD	3.4(5.4)	6.4	0.449	X
UPPER ELYSIAN PARK BLIND THRUST	4.1(6.6)	6.4	0.410	X
RAYMOND	6.2(9.9)	6.5	0.351	IX
SIERRA MADRE	7.2(11.6)	7.2	0.405	X
PUENTE HILLS BLIND THRUST	7.3(11.8)	7.1	0.389	X
SIERRA MADRE (San Fernando)	7.8(12.5)	6.7	0.326	IX
SANTA MONICA	8.5(13.7)	6.6	0.294	IX
NEWPORT-INGLEWOOD (L.A.Basin)	9.1(14.7)	7.1	0.266	IX
NORTHRIDGE (E. Oak Ridge)	9.9(15.9)	7.0	0.312	IX
SAN GABRIEL	11.0(17.7)	7.2	0.245	IX
SANTA SUSANA	15.0(24.2)	6.7	0.192	VIII
MALIBU COAST	15.0(24.2)	6.7	0.192	VIII
CLAMSHELL-SAWPIT	17.1(27.5)	6.5	0.151	VIII
PALOS VERDES	20.8(33.4)	7.3	0.154	VIII
WHITTIER	21.1(33.9)	6.8	0.114	VII
HOLSER	21.4(34.4)	6.5	0.118	VII
SIMI-SANTA ROSA	23.1(37.2)	7.0	0.150	VIII
ANACAPA-DUME	24.6(39.6)	7.5	0.188	VIII
SAN JOSE	26.0(41.9)	6.4	0.087	VII
OAK RIDGE (Onshore)	27.7(44.6)	7.0	0.123	VII
SAN ANDREAS - Whole M-1a	29.3(47.2)	8.0	0.164	VIII
SAN ANDREAS - Mojave M-1c-3	29.3(47.2)	7.4	0.116	VII
SAN ANDREAS - 1857 Rupture M-2a	29.3(47.2)	7.8	0.147	VIII
SAN ANDREAS - Cho-Moj M-1b-1	29.3(47.2)	7.8	0.147	VIII
SAN CAYETANO	31.6(50.8)	7.0	0.106	VII
CUCAMONGA	32.1(51.6)	6.9	0.097	VII
CHINO-CENTRAL AVE. (Elsinore)	32.7(52.7)	6.7	0.082	VII
SAN ANDREAS - Carrizo M-1c-2	38.6(62.1)	7.4	0.086	VII
SAN JOAQUIN HILLS	39.1(63.0)	6.6	0.061	VI
SANTA YNEZ (East)	44.1(70.9)	7.1	0.059	VI
ELSINORE (GLEN IVY)	44.4(71.5)	6.8	0.047	VI
NEWPORT-INGLEWOOD (Offshore)	45.7(73.6)	7.1	0.057	VI
SAN JACINTO-SAN BERNARDINO	46.7(75.2)	6.7	0.040	V
SAN ANDREAS - SB-Coach. M-2b	47.8(76.9)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.8(76.9)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	47.8(76.9)	7.5	0.072	VI
VENTURA - PITAS POINT	48.7(78.3)	6.9	0.057	VI
CLEGHORN	50.0(80.4)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.9(85.1)	7.2	0.065	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(MW)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.2(85.6)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.4(87.6)	7.5	0.078	VII
OAK RIDGE MID-CHANNEL STRUCTURE	55.1(88.7)	6.6	0.038	V
GARLOCK (West)	55.5(89.3)	7.3	0.051	VI
PLEITO THRUST	56.7(91.2)	7.0	0.051	VI
RED MOUNTAIN	57.4(92.3)	7.0	0.050	VI
BIG PINE	60.1(96.8)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	61.0(98.2)	7.2	0.054	VI

****

-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.9 MILES (4.6 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5451 g

PLATE H-4

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

JOB NUMBER: 6441.13

DATE: 02-26-2014

JOB NAME: Beachwood Pump Station Upgrade and Force Main
Replacement Project-Burbank (Boring B-5)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1649
SITE LONGITUDE: 118.3206

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-5

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	2.7(4.4)	6.9	0.552	X
HOLLYWOOD	3.5(5.7)	6.4	0.439	X
UPPER ELYSIAN PARK BLIND THRUST	4.3(6.9)	6.4	0.402	X
RAYMOND	6.3(10.1)	6.5	0.346	IX
SIERRA MADRE	7.1(11.5)	7.2	0.406	X
PUENTE HILLS BLIND THRUST	7.5(12.0)	7.1	0.385	X
SIERRA MADRE (San Fernando)	7.6(12.2)	6.7	0.331	IX
SANTA MONICA	8.6(13.9)	6.6	0.291	IX
NEWPORT-INGLEWOOD (L.A.Basin)	9.3(14.9)	7.1	0.264	IX
NORTHRIDGE (E. Oak Ridge)	9.7(15.6)	7.0	0.316	IX
SAN GABRIEL	10.8(17.4)	7.2	0.248	IX
SANTA SUSANA	14.9(23.9)	6.7	0.195	VIII
MALIBU COAST	15.0(24.2)	6.7	0.192	VIII
CLAMSHELL-SAWPIT	17.1(27.5)	6.5	0.151	VIII
PALOS VERDES	20.9(33.6)	7.3	0.153	VIII
HOLSER	21.3(34.2)	6.5	0.119	VII
WHITTIER	21.3(34.2)	6.8	0.112	VII
SIMI-SANTA ROSA	22.9(36.9)	7.0	0.151	VIII
ANACAPA-DUME	24.6(39.6)	7.5	0.188	VIII
SAN JOSE	26.2(42.1)	6.4	0.086	VII
OAK RIDGE (Onshore)	27.5(44.3)	7.0	0.124	VII
SAN ANDREAS - Whole M-1a	29.2(47.0)	8.0	0.164	VIII
SAN ANDREAS - Mojave M-1c-3	29.2(47.0)	7.4	0.117	VII
SAN ANDREAS - 1857 Rupture M-2a	29.2(47.0)	7.8	0.147	VIII
SAN ANDREAS - Cho-Moj M-1b-1	29.2(47.0)	7.8	0.147	VIII
SAN CAYETANO	31.4(50.6)	7.0	0.107	VII
CUCAMONGA	32.1(51.6)	6.9	0.097	VII
CHINO-CENTRAL AVE. (Elsinore)	32.9(52.9)	6.7	0.082	VII
SAN ANDREAS - Carrizo M-1c-2	38.4(61.8)	7.4	0.086	VII
SAN JOAQUIN HILLS	39.3(63.3)	6.6	0.060	VI
SANTA YNEZ (East)	43.9(70.6)	7.1	0.060	VI
ELSINORE (GLEN IVY)	44.6(71.8)	6.8	0.046	VI
NEWPORT-INGLEWOOD (Offshore)	45.9(73.9)	7.1	0.056	VI
SAN JACINTO-SAN BERNARDINO	46.8(75.3)	6.7	0.040	V
SAN ANDREAS - SB-Coach. M-2b	47.8(76.9)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.8(76.9)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	47.8(76.9)	7.5	0.072	VI
VENTURA - PITAS POINT	48.5(78.1)	6.9	0.058	VI
CLEGHORN	50.0(80.4)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.7(84.8)	7.2	0.065	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.1(85.5)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.4(87.5)	7.5	0.078	VII
OAK RIDGE MID-CHANNEL STRUCTURE	55.1(88.6)	6.6	0.038	V
GARLOCK (West)	55.3(89.0)	7.3	0.052	VI
PLEITO THRUST	56.5(90.9)	7.0	0.051	VI
RED MOUNTAIN	57.2(92.1)	7.0	0.050	VI
BIG PINE	60.0(96.5)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	61.0(98.2)	7.2	0.054	VI

****

-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.7 MILES (4.4 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5522 g

PLATE H-5

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

JOB NUMBER: 6441.13

DATE: 02-25-2014

JOB NAME: Beachwood Pump Station Upgade and Force Main
Replacement Project-Burbank (Boring B-6)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1678
SITE LONGITUDE: 118.3220

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-6

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	2.5(4.1)	6.9	0.563	X
HOLLYWOOD	3.7(6.0)	6.4	0.429	X
UPPER ELYSIAN PARK BLIND THRUST	4.5(7.2)	6.4	0.393	X
RAYMOND	6.5(10.4)	6.5	0.340	IX
SIERRA MADRE	7.0(11.3)	7.2	0.410	X
SIERRA MADRE (San Fernando)	7.4(11.9)	6.7	0.336	IX
PUENTE HILLS BLIND THRUST	7.6(12.3)	7.1	0.380	X
SANTA MONICA	8.7(14.0)	6.6	0.289	IX
NEWPORT-INGLEWOOD (L.A.Basin)	9.4(15.2)	7.1	0.260	IX
NORTHRIDGE (E. Oak Ridge)	9.5(15.3)	7.0	0.320	IX
SAN GABRIEL	10.6(17.1)	7.2	0.250	IX
SANTA SUSANA	14.7(23.6)	6.7	0.197	VIII
MALIBU COAST	15.1(24.3)	6.7	0.192	VIII
CLAMSHELL-SAWPIT	17.1(27.5)	6.5	0.151	VIII
PALOS VERDES	20.9(33.7)	7.3	0.153	VIII
HOLSER	21.0(33.8)	6.5	0.121	VII
WHITTIER	21.4(34.4)	6.8	0.112	VII
SIMI-SANTA ROSA	22.8(36.7)	7.0	0.152	VIII
ANACAPA-DUME	24.6(39.6)	7.5	0.188	VIII
SAN JOSE	26.3(42.3)	6.4	0.086	VII
OAK RIDGE (Onshore)	27.3(44.0)	7.0	0.125	VII
SAN ANDREAS - Whole M-1a	29.1(46.8)	8.0	0.165	VIII
SAN ANDREAS - Mojave M-1c-3	29.1(46.8)	7.4	0.117	VII
SAN ANDREAS - 1857 Rupture M-2a	29.1(46.8)	7.8	0.148	VIII
SAN ANDREAS - Cho-Moj M-1b-1	29.1(46.8)	7.8	0.148	VIII
SAN CAYETANO	31.3(50.3)	7.0	0.107	VII
CUCAMONGA	32.1(51.7)	6.9	0.097	VII
CHINO-CENTRAL AVE. (Elsinore)	33.0(53.1)	6.7	0.081	VII
SAN ANDREAS - Carrizo M-1c-2	38.2(61.5)	7.4	0.087	VII
SAN JOAQUIN HILLS	39.5(63.6)	6.6	0.060	VI
SANTA YNEZ (East)	43.7(70.3)	7.1	0.060	VI
ELSINORE (GLEN IVY)	44.7(72.0)	6.8	0.046	VI
NEWPORT-INGLEWOOD (Offshore)	46.2(74.3)	7.1	0.056	VI
SAN JACINTO-SAN BERNARDINO	46.9(75.4)	6.7	0.040	V
SAN ANDREAS - SB-Coach. M-2b	47.8(77.0)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.8(77.0)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	47.8(77.0)	7.5	0.072	VI
VENTURA - PITAS POINT	48.4(77.9)	6.9	0.058	VI
CLEGHORN	50.0(80.5)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.6(84.6)	7.2	0.065	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.1(85.4)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.3(87.4)	7.5	0.079	VII
OAK RIDGE MID-CHANNEL STRUCTURE	54.9(88.4)	6.6	0.038	V
GARLOCK (West)	55.1(88.7)	7.3	0.052	VI
PLEITO THRUST	56.3(90.6)	7.0	0.051	VI
RED MOUNTAIN	57.1(91.9)	7.0	0.050	VI
BIG PINE	59.8(96.2)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	61.1(98.3)	7.2	0.054	VI

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-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.5 MILES (4.1 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5629 g

PLATE H-6

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

JOB NUMBER: 6441.13

DATE: 02-26-2014

JOB NAME: Beachwood Pump Station Upgrade and Force Main
Replacement Project-Burbank (Boring B-7)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1704
SITE LONGITUDE: 118.3233

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-7

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	2.4(3.9)	6.9	0.570	X
HOLLYWOOD	3.9(6.3)	6.4	0.420	X
UPPER ELYSIAN PARK BLIND THRUST	4.7(7.5)	6.4	0.385	X
RAYMOND	6.6(10.6)	6.5	0.336	IX
SIERRA MADRE	6.9(11.1)	7.2	0.414	X
SIERRA MADRE (San Fernando)	7.2(11.6)	6.7	0.342	IX
PUENTE HILLS BLIND THRUST	7.8(12.6)	7.1	0.375	IX
SANTA MONICA	8.8(14.2)	6.6	0.286	IX
NORTHRIDGE (E. Oak Ridge)	9.3(15.0)	7.0	0.324	IX
NEWPORT-INGLEWOOD (L.A.Basin)	9.6(15.4)	7.1	0.258	IX
SAN GABRIEL	10.5(16.9)	7.2	0.252	IX
SANTA SUSANA	14.5(23.3)	6.7	0.199	VIII
MALIBU COAST	15.2(24.4)	6.7	0.191	VIII
CLAMSHELL-SAWPIT	17.1(27.6)	6.5	0.150	VIII
HOLSER	20.9(33.6)	6.5	0.122	VII
PALOS VERDES	21.1(33.9)	7.3	0.152	VIII
WHITTIER	21.6(34.7)	6.8	0.111	VII
SIMI-SANTA ROSA	22.6(36.4)	7.0	0.153	VIII
ANACAPA-DUME	24.6(39.6)	7.5	0.188	VIII
SAN JOSE	26.4(42.5)	6.4	0.085	VII
OAK RIDGE (Onshore)	27.2(43.8)	7.0	0.126	VIII
SAN ANDREAS - Whole M-1a	29.0(46.6)	8.0	0.166	VIII
SAN ANDREAS - Mojave M-1c-3	29.0(46.6)	7.4	0.118	VII
SAN ANDREAS - 1857 Rupture M-2a	29.0(46.6)	7.8	0.149	VIII
SAN ANDREAS - Cho-Moj M-1b-1	29.0(46.6)	7.8	0.149	VIII
SAN CAYETANO	31.1(50.0)	7.0	0.108	VII
CUCAMONGA	32.2(51.8)	6.9	0.097	VII
CHINO-CENTRAL AVE. (Elsinore)	33.2(53.4)	6.7	0.081	VII
SAN ANDREAS - Carrizo M-1c-2	38.0(61.2)	7.4	0.087	VII
SAN JOAQUIN HILLS	39.7(63.9)	6.6	0.060	VI
SANTA YNEZ (East)	43.5(70.0)	7.1	0.060	VI
ELSINORE (GLEN IVY)	44.9(72.3)	6.8	0.046	VI
NEWPORT-INGLEWOOD (Offshore)	46.4(74.6)	7.1	0.056	VI
SAN JACINTO-SAN BERNARDINO	46.9(75.5)	6.7	0.040	V
SAN ANDREAS - SB-Coach. M-2b	47.9(77.1)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.9(77.1)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	47.9(77.1)	7.5	0.071	VI
VENTURA - PITAS POINT	48.3(77.7)	6.9	0.058	VI
CLEGHORN	50.1(80.6)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.4(84.4)	7.2	0.066	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.0(85.3)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.2(87.3)	7.5	0.079	VII
OAK RIDGE MID-CHANNEL STRUCTURE	54.9(88.3)	6.6	0.038	V
GARLOCK (West)	54.9(88.4)	7.3	0.052	VI
PLEITO THRUST	56.1(90.3)	7.0	0.051	VI
RED MOUNTAIN	57.0(91.7)	7.0	0.050	VI
BIG PINE	59.6(95.9)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	61.1(98.3)	7.2	0.054	VI

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-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.4 MILES (3.9 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5703 g

PLATE H-7

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

JOB NUMBER: 6441.13

DATE: 02-26-2014

JOB NAME: Beachwood Pump Station Upgrade and Force Main
Replacement Project-Burbank (Boring B-8)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1715
SITE LONGITUDE: 118.3238

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-8

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	2.4(3.8)	6.9	0.574	X
HOLLYWOOD	4.0(6.4)	6.4	0.416	X
UPPER ELYSIAN PARK BLIND THRUST	4.7(7.6)	6.4	0.382	X
RAYMOND	6.6(10.7)	6.5	0.334	IX
SIERRA MADRE	6.9(11.1)	7.2	0.414	X
SIERRA MADRE (San Fernando)	7.1(11.5)	6.7	0.344	IX
PUENTE HILLS BLIND THRUST	7.9(12.7)	7.1	0.373	IX
SANTA MONICA	8.9(14.3)	6.6	0.285	IX
NORTHRIDGE (E. Oak Ridge)	9.3(14.9)	7.0	0.326	IX
NEWPORT-INGLEWOOD (L.A.Basin)	9.6(15.5)	7.1	0.257	IX
SAN GABRIEL	10.4(16.8)	7.2	0.253	IX
SANTA SUSANA	14.4(23.2)	6.7	0.200	VIII
MALIBU COAST	15.2(24.4)	6.7	0.191	VIII
CLAMSHELL-SAWPIT	17.1(27.6)	6.5	0.150	VIII
HOLSER	20.8(33.4)	6.5	0.122	VII
PALOS VERDES	21.1(34.0)	7.3	0.152	VIII
WHITTIER	21.6(34.8)	6.8	0.110	VII
SIMI-SANTA ROSA	22.6(36.4)	7.0	0.153	VIII
ANACAPA-DUME	24.6(39.6)	7.5	0.188	VIII
SAN JOSE	26.5(42.6)	6.4	0.085	VII
OAK RIDGE (Onshore)	27.2(43.7)	7.0	0.126	VIII
SAN ANDREAS - Whole M-1a	28.9(46.5)	8.0	0.166	VIII
SAN ANDREAS - Mojave M-1c-3	28.9(46.5)	7.4	0.118	VII
SAN ANDREAS - 1857 Rupture M-2a	28.9(46.5)	7.8	0.149	VIII
SAN ANDREAS - Cho-Moj M-1b-1	28.9(46.5)	7.8	0.149	VIII
SAN CAYETANO	31.0(49.9)	7.0	0.108	VII
CUCAMONGA	32.2(51.8)	6.9	0.097	VII
CHINO-CENTRAL AVE. (Elsinore)	33.2(53.4)	6.7	0.081	VII
SAN ANDREAS - Carrizo M-1c-2	37.9(61.0)	7.4	0.088	VII
SAN JOAQUIN HILLS	39.8(64.1)	6.6	0.059	VI
SANTA YNEZ (East)	43.4(69.9)	7.1	0.060	VI
ELSINORE (GLEN IVY)	45.0(72.4)	6.8	0.046	VI
NEWPORT-INGLEWOOD (Offshore)	46.4(74.7)	7.1	0.055	VI
SAN JACINTO-SAN BERNARDINO	46.9(75.5)	6.7	0.040	V
SAN ANDREAS - SB-Coach. M-2b	47.9(77.1)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.9(77.1)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	47.9(77.1)	7.5	0.071	VI
VENTURA - PITAS POINT	48.2(77.6)	6.9	0.058	VI
CLEGHORN	50.1(80.6)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.4(84.3)	7.2	0.066	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.0(85.3)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.2(87.2)	7.5	0.079	VII
GARLOCK (West)	54.8(88.2)	7.3	0.052	VI
OAK RIDGE MID-CHANNEL STRUCTURE	54.8(88.2)	6.6	0.038	V
PLEITO THRUST	56.0(90.1)	7.0	0.052	VI
RED MOUNTAIN	56.9(91.6)	7.0	0.050	VI
BIG PINE	59.5(95.8)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	61.1(98.4)	7.2	0.054	VI

****

-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.4 MILES (3.8 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5740 g

PLATE H-8

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

JOB NUMBER: 6441.13

DATE: 02-26-2014

JOB NAME: Beachwood Pump Station Upgrade and Force Main
Replacement Project-Burbank (Boring B-9)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1734
SITE LONGITUDE: 118.3247

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

PLATE H-9

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	2.2(3.6)	6.9	0.582	X
HOLLYWOOD	4.1(6.6)	6.4	0.410	X
UPPER ELYSIAN PARK BLIND THRUST	4.8(7.8)	6.4	0.377	IX
RAYMOND	6.8(10.9)	6.5	0.330	IX
SIERRA MADRE	6.8(10.9)	7.2	0.418	X
SIERRA MADRE (San Fernando)	7.0(11.3)	6.7	0.347	IX
PUENTE HILLS BLIND THRUST	8.0(12.8)	7.1	0.371	IX
SANTA MONICA	8.9(14.4)	6.6	0.283	IX
NORTHRIDGE (E. Oak Ridge)	9.1(14.7)	7.0	0.329	IX
NEWPORT-INGLEWOOD (L.A.Basin)	9.8(15.7)	7.1	0.255	IX
SAN GABRIEL	10.3(16.6)	7.2	0.255	IX
SANTA SUSANA	14.3(23.0)	6.7	0.202	VIII
MALIBU COAST	15.2(24.5)	6.7	0.190	VIII
CLAMSHELL-SAWPIT	17.1(27.6)	6.5	0.150	VIII
HOLSER	20.6(33.2)	6.5	0.123	VII
PALOS VERDES	21.2(34.1)	7.3	0.151	VIII
WHITTIER	21.7(35.0)	6.8	0.110	VII
SIMI-SANTA ROSA	22.5(36.2)	7.0	0.154	VIII
ANACAPA-DUME	24.7(39.7)	7.5	0.188	VIII
SAN JOSE	26.5(42.7)	6.4	0.085	VII
OAK RIDGE (Onshore)	27.0(43.5)	7.0	0.126	VIII
SAN ANDREAS - Whole M-1a	28.8(46.3)	8.0	0.166	VIII
SAN ANDREAS - Mojave M-1c-3	28.8(46.3)	7.4	0.119	VII
SAN ANDREAS - 1857 Rupture M-2a	28.8(46.3)	7.8	0.150	VIII
SAN ANDREAS - Cho-Moj M-1b-1	28.8(46.3)	7.8	0.150	VIII
SAN CAYETANO	30.9(49.7)	7.0	0.109	VII
CUCAMONGA	32.2(51.9)	6.9	0.097	VII
CHINO-CENTRAL AVE. (Elsinore)	33.3(53.6)	6.7	0.080	VII
SAN ANDREAS - Carrizo M-1c-2	37.8(60.8)	7.4	0.088	VII
SAN JOAQUIN HILLS	40.0(64.3)	6.6	0.059	VI
SANTA YNEZ (East)	43.3(69.7)	7.1	0.061	VI
ELSINORE (GLEN IVY)	45.1(72.6)	6.8	0.046	VI
NEWPORT-INGLEWOOD (Offshore)	46.5(74.9)	7.1	0.055	VI
SAN JACINTO-SAN BERNARDINO	47.0(75.6)	6.7	0.040	V
SAN ANDREAS - SB-Coach. M-2b	47.9(77.1)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.9(77.1)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	47.9(77.1)	7.5	0.071	VI
VENTURA - PITAS POINT	48.2(77.5)	6.9	0.058	VI
CLEGHORN	50.1(80.6)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.3(84.1)	7.2	0.066	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	52.9(85.2)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.2(87.2)	7.5	0.079	VII
GARLOCK (West)	54.7(88.0)	7.3	0.052	VI
OAK RIDGE MID-CHANNEL STRUCTURE	54.7(88.1)	6.6	0.038	V
PLEITO THRUST	55.9(89.9)	7.0	0.052	VI
RED MOUNTAIN	56.9(91.5)	7.0	0.050	VI
BIG PINE	59.3(95.5)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	61.1(98.4)	7.2	0.054	VI

****

-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.2 MILES (3.6 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5816 g

PLATE H-9

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

JOB NUMBER: 6441.13

DATE: 02-26-2014

JOB NAME: Beachwood Pump Station Upgrade and Force Main
Replacement Project-Burbank (Boring B-10)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1752
SITE LONGITUDE: 118.3256

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-10

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(MW)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	2.2(3.5)	6.9	0.585	X
HOLLYWOOD	4.2(6.8)	6.4	0.405	X
UPPER ELYSIAN PARK BLIND THRUST	5.0(8.0)	6.4	0.372	IX
SIERRA MADRE	6.7(10.8)	7.2	0.420	X
RAYMOND	6.9(11.1)	6.5	0.326	IX
SIERRA MADRE (San Fernando)	6.9(11.1)	6.7	0.351	IX
PUENTE HILLS BLIND THRUST	8.1(13.0)	7.1	0.368	IX
SANTA MONICA	9.0(14.5)	6.6	0.282	IX
NORTHRIDGE (E. Oak Ridge)	9.0(14.5)	7.0	0.332	IX
NEWPORT-INGLEWOOD (L.A.Basin)	9.8(15.8)	7.1	0.254	IX
SAN GABRIEL	10.2(16.4)	7.2	0.257	IX
SANTA SUSANA	14.2(22.8)	6.7	0.203	VIII
MALIBU COAST	15.3(24.6)	6.7	0.189	VIII
CLAMSHELL-SAWPIT	17.1(27.6)	6.5	0.150	VIII
HOLSER	20.5(33.0)	6.5	0.124	VII
PALOS VERDES	21.3(34.2)	7.3	0.151	VIII
WHITTIER	21.9(35.2)	6.8	0.109	VII
SIMI-SANTA ROSA	22.4(36.0)	7.0	0.155	VIII
ANACAPA-DUME	24.7(39.7)	7.5	0.188	VIII
SAN JOSE	26.7(42.9)	6.4	0.084	VII
OAK RIDGE (Onshore)	27.0(43.4)	7.0	0.127	VIII
SAN ANDREAS - Whole M-1a	28.7(46.2)	8.0	0.167	VIII
SAN ANDREAS - Mojave M-1c-3	28.7(46.2)	7.4	0.119	VII
SAN ANDREAS - 1857 Rupture M-2a	28.7(46.2)	7.8	0.150	VIII
SAN ANDREAS - Cho-Moj M-1b-1	28.7(46.2)	7.8	0.150	VIII
SAN CAYETANO	30.8(49.5)	7.0	0.109	VII
CUCAMONGA	32.2(51.9)	6.9	0.097	VII
CHINO-CENTRAL AVE. (Elsinore)	33.4(53.7)	6.7	0.080	VII
SAN ANDREAS - Carrizo M-1c-2	37.7(60.6)	7.4	0.088	VII
SAN JOAQUIN HILLS	40.1(64.5)	6.6	0.059	VI
SANTA YNEZ (East)	43.2(69.5)	7.1	0.061	VI
ELSINORE (GLEN IVY)	45.2(72.7)	6.8	0.046	VI
NEWPORT-INGLEWOOD (Offshore)	46.7(75.2)	7.1	0.055	VI
SAN JACINTO-SAN BERNARDINO	47.0(75.6)	6.7	0.040	V
SAN ANDREAS - SB-Coach. M-2b	48.0(77.2)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	48.0(77.2)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	48.0(77.2)	7.5	0.071	VI
VENTURA - PITAS POINT	48.1(77.4)	6.9	0.058	VI
CLEGHORN	50.1(80.7)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.2(84.0)	7.2	0.066	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(MW)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	52.9(85.2)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.1(87.1)	7.5	0.079	VII
GARLOCK (West)	54.6(87.8)	7.3	0.052	VI
OAK RIDGE MID-CHANNEL STRUCTURE	54.7(88.0)	6.6	0.039	V
PLEITO THRUST	55.7(89.7)	7.0	0.052	VI
RED MOUNTAIN	56.7(91.3)	7.0	0.051	VI
BIG PINE	59.2(95.3)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	61.2(98.5)	7.2	0.054	VI

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-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.2 MILES (3.5 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5855 g

PLATE H-10

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

JOB NUMBER: 6441.13

DATE: 02-25-2014

JOB NAME: Beachwood Pump Station Upgade and Force Main
Repalcement Project-Burbank (Boring B-11)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1778
SITE LONGITUDE: 118.3268

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-11

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	2.1(3.3)	6.9	0.593	X
HOLLYWOOD	4.4(7.1)	6.4	0.396	X
UPPER ELYSIAN PARK BLIND THRUST	5.2(8.3)	6.4	0.365	IX
SIERRA MADRE	6.6(10.7)	7.2	0.422	X
SIERRA MADRE (San Fernando)	6.7(10.8)	6.7	0.357	IX
RAYMOND	7.0(11.3)	6.5	0.322	IX
PUENTE HILLS BLIND THRUST	8.3(13.3)	7.1	0.363	IX
NORTHRIDGE (E. Oak Ridge)	8.8(14.2)	7.0	0.336	IX
SANTA MONICA	9.1(14.7)	6.6	0.279	IX
NEWPORT-INGLEWOOD (L.A.Basin)	9.9(16.0)	7.1	0.252	IX
SAN GABRIEL	10.1(16.2)	7.2	0.260	IX
SANTA SUSANA	14.0(22.5)	6.7	0.206	VIII
MALIBU COAST	15.3(24.6)	6.7	0.189	VIII
CLAMSHELL-SAWPIT	17.1(27.6)	6.5	0.150	VIII
HOLSER	20.3(32.7)	6.5	0.125	VII
PALOS VERDES	21.3(34.3)	7.3	0.150	VIII
WHITTIER	22.1(35.5)	6.8	0.108	VII
SIMI-SANTA ROSA	22.2(35.8)	7.0	0.156	VIII
ANACAPA-DUME	24.7(39.7)	7.5	0.188	VIII
SAN JOSE	26.8(43.1)	6.4	0.084	VII
OAK RIDGE (Onshore)	26.8(43.1)	7.0	0.128	VIII
SAN ANDREAS - Whole M-1a	28.5(45.9)	8.0	0.168	VIII
SAN ANDREAS - Mojave M-1c-3	28.5(45.9)	7.4	0.120	VII
SAN ANDREAS - 1857 Rupture M-2a	28.5(45.9)	7.8	0.151	VIII
SAN ANDREAS - Cho-Moj M-1b-1	28.5(45.9)	7.8	0.151	VIII
SAN CAYETANO	30.6(49.3)	7.0	0.110	VII
CUCAMONGA	32.3(52.0)	6.9	0.096	VII
CHINO-CENTRAL AVE. (Elsinore)	33.5(53.9)	6.7	0.080	VII
SAN ANDREAS - Carrizo M-1c-2	37.5(60.3)	7.4	0.089	VII
SAN JOAQUIN HILLS	40.3(64.8)	6.6	0.058	VI
SANTA YNEZ (East)	43.1(69.3)	7.1	0.061	VI
ELSINORE (GLEN IVY)	45.4(73.0)	6.8	0.045	VI
NEWPORT-INGLEWOOD (Offshore)	46.9(75.5)	7.1	0.055	VI
SAN JACINTO-SAN BERNARDINO	47.0(75.7)	6.7	0.040	V
VENTURA - PITAS POINT	48.0(77.2)	6.9	0.059	VI
SAN ANDREAS - SB-Coach. M-2b	48.0(77.2)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	48.0(77.2)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	48.0(77.2)	7.5	0.071	VI
CLEGHORN	50.1(80.7)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.0(83.7)	7.2	0.066	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	52.9(85.1)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.1(87.0)	7.5	0.079	VII
GARLOCK (West)	54.4(87.5)	7.3	0.053	VI
OAK RIDGE MID-CHANNEL STRUCTURE	54.6(87.9)	6.6	0.039	V
PLEITO THRUST	55.6(89.4)	7.0	0.052	VI
RED MOUNTAIN	56.7(91.2)	7.0	0.051	VI
BIG PINE	59.0(95.0)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	61.2(98.5)	7.2	0.054	VI

****

-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 2.1 MILES (3.3 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.5933 g

PLATE H-11

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*    Version 3.00     *
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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 6441.13

DATE: 02-26-2014

JOB NAME: Beachwood Pump Station Upgrade and Force Main
Replacement Project-Burbank (Boring B-12)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1792
SITE LONGITUDE: 118.3248

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-12

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	1.9(3.0)	6.9	0.605	X
HOLLYWOOD	4.5(7.2)	6.4	0.393	X
UPPER ELYSIAN PARK BLIND THRUST	5.2(8.4)	6.4	0.362	IX
SIERRA MADRE	6.5(10.4)	7.2	0.427	X
SIERRA MADRE (San Fernando)	6.6(10.6)	6.7	0.361	IX
RAYMOND	7.0(11.2)	6.5	0.324	IX
PUENTE HILLS BLIND THRUST	8.3(13.3)	7.1	0.363	IX
NORTHRIDGE (E. Oak Ridge)	8.8(14.2)	7.0	0.336	IX
SANTA MONICA	9.3(14.9)	6.6	0.276	IX
SAN GABRIEL	9.9(16.0)	7.2	0.262	IX
NEWPORT-INGLEWOOD (L.A.Basin)	10.1(16.2)	7.1	0.250	IX
SANTA SUSANA	14.0(22.5)	6.7	0.206	VIII
MALIBU COAST	15.5(24.9)	6.7	0.187	VIII
CLAMSHELL-SAWPIT	17.0(27.4)	6.5	0.151	VIII
HOLSER	20.3(32.7)	6.5	0.125	VII
PALOS VERDES	21.5(34.6)	7.3	0.149	VIII
WHITTIER	22.0(35.4)	6.8	0.108	VII
SIMI-SANTA ROSA	22.3(35.9)	7.0	0.155	VIII
ANACAPA-DUME	24.8(39.9)	7.5	0.187	VIII
SAN JOSE	26.7(42.9)	6.4	0.084	VII
OAK RIDGE (Onshore)	26.8(43.2)	7.0	0.127	VIII
SAN ANDREAS - Whole M-1a	28.4(45.7)	8.0	0.168	VIII
SAN ANDREAS - Mojave M-1c-3	28.4(45.7)	7.4	0.120	VII
SAN ANDREAS - 1857 Rupture M-2a	28.4(45.7)	7.8	0.151	VIII
SAN ANDREAS - Cho-Moj M-1b-1	28.4(45.7)	7.8	0.151	VIII
SAN CAYETANO	30.6(49.3)	7.0	0.110	VII
CUCAMONGA	32.2(51.8)	6.9	0.097	VII
CHINO-CENTRAL AVE. (Elsinore)	33.4(53.8)	6.7	0.080	VII
SAN ANDREAS - Carrizo M-1c-2	37.4(60.2)	7.4	0.089	VII
SAN JOAQUIN HILLS	40.3(64.8)	6.6	0.058	VI
SANTA YNEZ (East)	43.1(69.3)	7.1	0.061	VI
ELSINORE (GLEN IVY)	45.3(72.9)	6.8	0.046	VI
SAN JACINTO-SAN BERNARDINO	46.9(75.5)	6.7	0.040	V
NEWPORT-INGLEWOOD (Offshore)	46.9(75.5)	7.1	0.055	VI
SAN ANDREAS - SB-Coach. M-2b	47.8(77.0)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.8(77.0)	7.7	0.082	VII
SAN ANDREAS - San Bernardino M-1	47.8(77.0)	7.5	0.072	VI
VENTURA - PITAS POINT	48.0(77.3)	6.9	0.058	VI
CLEGHORN	50.0(80.5)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.1(83.9)	7.2	0.066	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.0(85.3)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	54.2(87.2)	7.5	0.079	VII
GARLOCK (West)	54.4(87.5)	7.3	0.053	VI
OAK RIDGE MID-CHANNEL STRUCTURE	54.7(88.0)	6.6	0.039	V
PLEITO THRUST	55.6(89.4)	7.0	0.052	VI
RED MOUNTAIN	56.7(91.3)	7.0	0.051	VI
BIG PINE	59.0(95.0)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	61.1(98.3)	7.2	0.054	VI

****

-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 1.9 MILES (3.0 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.6054 g

PLATE H-12

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

JOB NUMBER: 6441.13

DATE: 02-25-2014

JOB NAME: Beachwood Pump Station Upgade and Force Main
Replacement Project-Burbank (Boring B-13)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1802
SITE LONGITUDE: 118.3302

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

PLATE H-13

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	1.9(3.1)	6.9	0.601	X
HOLLYWOOD	4.6(7.4)	6.4	0.388	X
UPPER ELYSIAN PARK BLIND THRUST	5.4(8.7)	6.4	0.355	IX
SIERRA MADRE (San Fernando)	6.5(10.5)	6.7	0.363	IX
SIERRA MADRE	6.6(10.6)	7.2	0.423	X
RAYMOND	7.3(11.7)	6.5	0.315	IX
PUENTE HILLS BLIND THRUST	8.5(13.6)	7.1	0.358	IX
NORTHRIDGE (E. Oak Ridge)	8.6(13.9)	7.0	0.341	IX
SANTA MONICA	9.1(14.7)	6.6	0.279	IX
SAN GABRIEL	9.9(16.0)	7.2	0.262	IX
NEWPORT-INGLEWOOD (L.A.Basin)	10.1(16.2)	7.1	0.250	IX
SANTA SUSANA	13.7(22.1)	6.7	0.209	VIII
MALIBU COAST	15.3(24.6)	6.7	0.189	VIII
CLAMSHELL-SAWPIT	17.3(27.8)	6.5	0.149	VIII
HOLSER	20.1(32.3)	6.5	0.127	VIII
PALOS VERDES	21.4(34.4)	7.3	0.150	VIII
SIMI-SANTA ROSA	22.0(35.4)	7.0	0.157	VIII
WHITTIER	22.3(35.9)	6.8	0.107	VII
ANACAPA-DUME	24.6(39.6)	7.5	0.188	VIII
OAK RIDGE (Onshore)	26.5(42.7)	7.0	0.129	VIII
SAN JOSE	27.0(43.4)	6.4	0.083	VII
SAN ANDREAS - Whole M-1a	28.5(45.8)	8.0	0.168	VIII
SAN ANDREAS - Mojave M-1c-3	28.5(45.8)	7.4	0.120	VII
SAN ANDREAS - 1857 Rupture M-2a	28.5(45.8)	7.8	0.151	VIII
SAN ANDREAS - Cho-Moj M-1b-1	28.5(45.8)	7.8	0.151	VIII
SAN CAYETANO	30.4(48.9)	7.0	0.111	VII
CUCAMONGA	32.4(52.2)	6.9	0.096	VII
CHINO-CENTRAL AVE. (Elsinore)	33.7(54.3)	6.7	0.079	VII
SAN ANDREAS - Carrizo M-1c-2	37.2(59.9)	7.4	0.090	VII
SAN JOAQUIN HILLS	40.5(65.2)	6.6	0.058	VI
SANTA YNEZ (East)	42.8(68.9)	7.1	0.061	VI
ELSINORE (GLEN IVY)	45.6(73.4)	6.8	0.045	VI
NEWPORT-INGLEWOOD (Offshore)	47.2(75.9)	7.1	0.054	VI
SAN JACINTO-SAN BERNARDINO	47.2(76.0)	6.7	0.040	V
VENTURA - PITAS POINT	47.7(76.8)	6.9	0.059	VI
SAN ANDREAS - San Bernardino M-1	48.2(77.5)	7.5	0.071	VI
SAN ANDREAS - SB-Coach. M-1b-2	48.2(77.5)	7.7	0.082	VII
SAN ANDREAS - SB-Coach. M-2b	48.2(77.5)	7.7	0.082	VII
CLEGHORN	50.3(81.0)	6.5	0.031	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	51.8(83.4)	7.2	0.067	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG. (Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	52.7(84.8)	7.1	0.060	VI
CHANNEL IS. THRUST (Eastern)	53.9(86.7)	7.5	0.079	VII
GARLOCK (West)	54.1(87.1)	7.3	0.053	VI
OAK RIDGE MID-CHANNEL STRUCTURE	54.4(87.5)	6.6	0.039	V
PLEITO THRUST	55.3(89.0)	7.0	0.052	VI
RED MOUNTAIN	56.4(90.8)	7.0	0.051	VI
BIG PINE	58.8(94.6)	6.9	0.035	V
NORTH FRONTAL FAULT ZONE (West)	61.4(98.8)	7.2	0.053	VI

****

-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 1.9 MILES (3.1 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.6013 g

PLATE H-13

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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 6441.13

DATE: 02-25-2014

JOB NAME: Beachwood Pump Station Upgade and Force Main
Repalcement Project-Burbank (Boring B-14)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1809
SITE LONGITUDE: 118.3201

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-14

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	1.7(2.7)	6.9	0.618	X
HOLLYWOOD	4.5(7.3)	6.4	0.391	X
UPPER ELYSIAN PARK BLIND THRUST	5.2(8.4)	6.4	0.362	IX
SIERRA MADRE	6.2(10.0)	7.2	0.435	X
SIERRA MADRE (San Fernando)	6.5(10.4)	6.7	0.365	IX
RAYMOND	6.8(11.0)	6.5	0.328	IX
PUENTE HILLS BLIND THRUST	8.2(13.2)	7.1	0.365	IX
NORTHRIDGE (E. Oak Ridge)	8.9(14.3)	7.0	0.335	IX
SANTA MONICA	9.5(15.3)	6.6	0.270	IX
SAN GABRIEL	9.8(15.7)	7.2	0.265	IX
NEWPORT-INGLEWOOD (L.A.Basin)	10.3(16.6)	7.1	0.246	IX
SANTA SUSANA	14.1(22.7)	6.7	0.204	VIII
MALIBU COAST	15.7(25.3)	6.7	0.184	VIII
CLAMSHELL-SAWPIT	16.8(27.0)	6.5	0.154	VIII
HOLSER	20.4(32.9)	6.5	0.124	VII
PALOS VERDES	21.7(35.0)	7.3	0.148	VIII
WHITTIER	21.9(35.2)	6.8	0.109	VII
SIMI-SANTA ROSA	22.5(36.2)	7.0	0.154	VIII
ANACAPA-DUME	25.1(40.4)	7.5	0.185	VIII
SAN JOSE	26.5(42.6)	6.4	0.085	VII
OAK RIDGE (Onshore)	27.0(43.5)	7.0	0.126	VIII
SAN ANDREAS - Whole M-1a	28.2(45.4)	8.0	0.169	VIII
SAN ANDREAS - Mojave M-1c-3	28.2(45.4)	7.4	0.121	VII
SAN ANDREAS - 1857 Rupture M-2a	28.2(45.4)	7.8	0.152	VIII
SAN ANDREAS - Cho-Moj M-1b-1	28.2(45.4)	7.8	0.152	VIII
SAN CAYETANO	30.8(49.6)	7.0	0.109	VII
CUCAMONGA	31.9(51.3)	6.9	0.098	VII
CHINO-CENTRAL AVE. (Elsinore)	33.2(53.5)	6.7	0.081	VII
SAN ANDREAS - Carrizo M-1c-2	37.3(60.1)	7.4	0.089	VII
SAN JOAQUIN HILLS	40.2(64.7)	6.6	0.059	VI
SANTA YNEZ (East)	43.2(69.5)	7.1	0.061	VI
ELSINORE (GLEN IVY)	45.1(72.6)	6.8	0.046	VI
SAN JACINTO-SAN BERNARDINO	46.6(75.0)	6.7	0.041	V
NEWPORT-INGLEWOOD (Offshore)	46.9(75.5)	7.1	0.055	VI
SAN ANDREAS - SB-Coach. M-2b	47.6(76.6)	7.7	0.083	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.6(76.6)	7.7	0.083	VII
SAN ANDREAS - San Bernardino M-1	47.6(76.6)	7.5	0.072	VI
VENTURA - PITAS POINT	48.3(77.7)	6.9	0.058	VI
CLEGHORN	49.7(80.0)	6.5	0.032	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.3(84.2)	7.2	0.066	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.3(85.8)	7.1	0.060	VI
GARLOCK (West)	54.4(87.5)	7.3	0.053	VI
CHANNEL IS. THRUST (Eastern)	54.4(87.6)	7.5	0.078	VII
OAK RIDGE MID-CHANNEL STRUCTURE	54.9(88.4)	6.6	0.038	V
PLEITO THRUST	55.6(89.5)	7.0	0.052	VI
RED MOUNTAIN	57.0(91.7)	7.0	0.050	VI
BIG PINE	59.2(95.2)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	60.8(97.9)	7.2	0.054	VI

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-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 1.7 MILES (2.7 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.6179 g

PLATE H-14

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

JOB NUMBER: 6441.13

DATE: 02-25-2014

JOB NAME: Beachwood Pump Station Upgade and Force Main
Replacement Project-Burbank (Boring B-15)
CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\Cgsflte.dat

SITE COORDINATES:
SITE LATITUDE: 34.1825
SITE LONGITUDE: 118.3182

SEARCH RADIUS: 62 mi

ATTENUATION RELATION: 20) Sadigh et al. (1997) Horiz. - Soil
UNCERTAINTY (M=Median, S=Sigma): M Number of Sigmas: 0.0
DISTANCE MEASURE: clodis
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: Campbell SHR:
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\Cgsflte.dat

MINIMUM DEPTH VALUE (km): 0.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

Page 1

PLATE H-15

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
VERDUGO	1.6(2.5)	6.9	0.626	X
HOLLYWOOD	4.7(7.5)	6.4	0.385	X
UPPER ELYSIAN PARK BLIND THRUST	5.3(8.5)	6.4	0.360	IX
SIERRA MADRE	6.1(9.8)	7.2	0.439	X
SIERRA MADRE (San Fernando)	6.3(10.2)	6.7	0.370	IX
RAYMOND	6.8(10.9)	6.5	0.330	IX
PUENTE HILLS BLIND THRUST	8.3(13.3)	7.1	0.363	IX
NORTHRIDGE (E. Oak Ridge)	8.9(14.3)	7.0	0.335	IX
SANTA MONICA	9.6(15.5)	6.6	0.268	IX
SAN GABRIEL	9.6(15.5)	7.2	0.267	IX
NEWPORT-INGLEWOOD (L.A.Basin)	10.4(16.8)	7.1	0.244	IX
SANTA SUSANA	14.1(22.7)	6.7	0.204	VIII
MALIBU COAST	15.9(25.6)	6.7	0.182	VIII
CLAMSHELL-SAWPIT	16.7(26.8)	6.5	0.155	VIII
HOLSER	20.4(32.9)	6.5	0.124	VII
WHITTIER	21.8(35.1)	6.8	0.109	VII
PALOS VERDES	21.9(35.2)	7.3	0.147	VIII
SIMI-SANTA ROSA	22.6(36.3)	7.0	0.153	VIII
ANACAPA-DUME	25.2(40.6)	7.5	0.184	VIII
SAN JOSE	26.4(42.5)	6.4	0.085	VII
OAK RIDGE (Onshore)	27.0(43.5)	7.0	0.126	VIII
SAN ANDREAS - Whole M-1a	28.0(45.1)	8.0	0.170	VIII
SAN ANDREAS - Mojave M-1c-3	28.0(45.1)	7.4	0.122	VII
SAN ANDREAS - 1857 Rupture M-2a	28.0(45.1)	7.8	0.153	VIII
SAN ANDREAS - Cho-Moj M-1b-1	28.0(45.1)	7.8	0.153	VIII
SAN CAYETANO	30.8(49.6)	7.0	0.109	VII
CUCAMONGA	31.8(51.2)	6.9	0.098	VII
CHINO-CENTRAL AVE. (Elsinore)	33.2(53.4)	6.7	0.081	VII
SAN ANDREAS - Carrizo M-1c-2	37.3(60.0)	7.4	0.089	VII
SAN JOAQUIN HILLS	40.3(64.8)	6.6	0.058	VI
SANTA YNEZ (East)	43.2(69.5)	7.1	0.061	VI
ELSINORE (GLEN IVY)	45.0(72.5)	6.8	0.046	VI
SAN JACINTO-SAN BERNARDINO	46.5(74.9)	6.7	0.041	V
NEWPORT-INGLEWOOD (Offshore)	46.9(75.5)	7.1	0.055	VI
SAN ANDREAS - SB-Coach. M-2b	47.5(76.4)	7.7	0.083	VII
SAN ANDREAS - SB-Coach. M-1b-2	47.5(76.4)	7.7	0.083	VII
SAN ANDREAS - San Bernardino M-1	47.5(76.4)	7.5	0.072	VII
VENTURA - PITAS POINT	48.3(77.8)	6.9	0.058	VI
CLEGHORN	49.6(79.8)	6.5	0.032	V
M.RIDGE-ARROYO PARIDA-SANTA ANA	52.4(84.3)	7.2	0.066	VI

DETERMINISTIC SITE PARAMETERS

Page 2

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
OAK RIDGE(Blind Thrust Offshore)	53.4(85.9)	7.1	0.059	VI
GARLOCK (West)	54.4(87.5)	7.3	0.053	VI
CHANNEL IS. THRUST (Eastern)	54.6(87.8)	7.5	0.078	VII
OAK RIDGE MID-CHANNEL STRUCTURE	55.1(88.6)	6.6	0.038	V
PLEITO THRUST	55.6(89.4)	7.0	0.052	VI
RED MOUNTAIN	57.0(91.8)	7.0	0.050	VI
BIG PINE	59.2(95.2)	6.9	0.034	V
NORTH FRONTAL FAULT ZONE (West)	60.7(97.7)	7.2	0.054	VI

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-END OF SEARCH- 48 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE VERDUGO FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 1.6 MILES (2.5 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.6264 g

PLATE H-15

USGS Design Maps Summary Report

User–Specified Input

Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-1)
Sun March 9, 2014 19:32:58 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1576°N, 118.3156°W

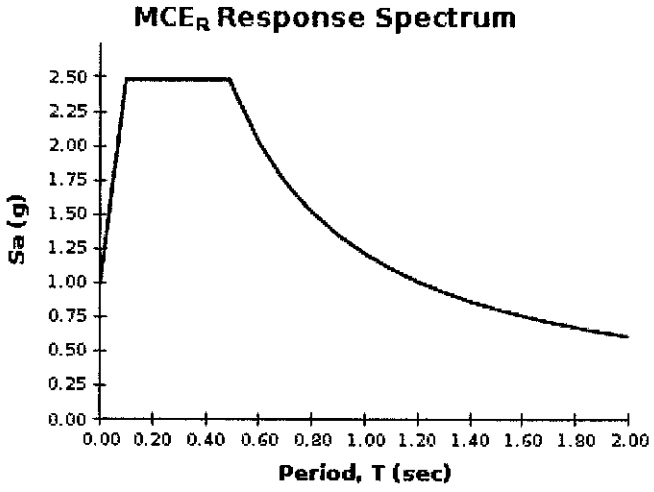
Site Soil Classification Site Class D – "Stiff Soil"

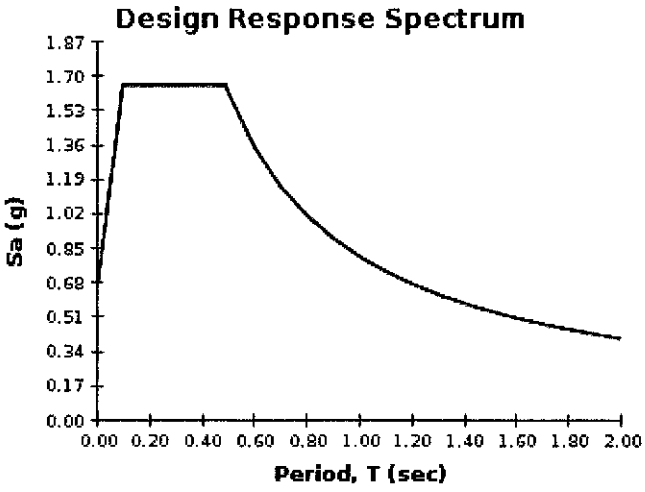
Risk Category I/II/III

USGS–Provided Output

S_S =	2.485 g	S_{MS} =	2.485 g	S_{DS} =	1.657 g
S_1 =	0.809 g	S_{M1} =	1.214 g	S_{D1} =	0.809 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1576°N, 118.3156°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.485$ g
From Figure 22-2 [2]	$S_1 = 0.809$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.485$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.809$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.485 = 2.485$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.809 = 1.214$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

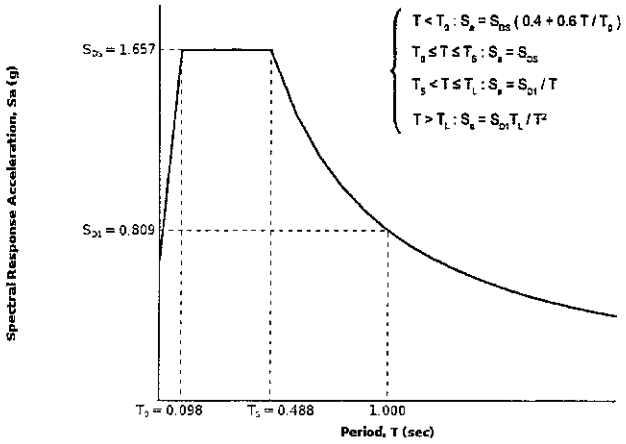
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.485 = 1.657$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 1.214 = 0.809$ g

Section 11.4.5 — Design Response Spectrum

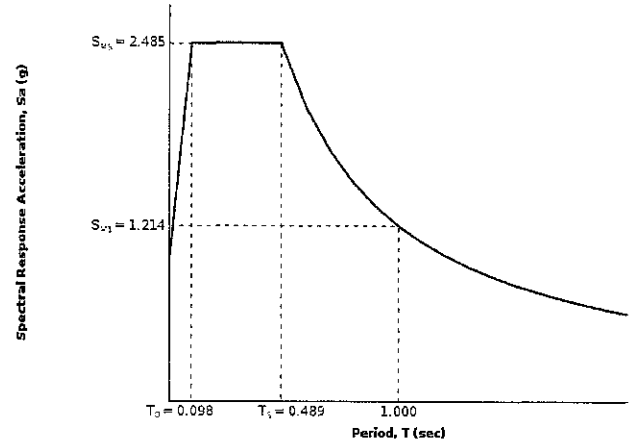
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.959

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.959 = 0.959$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.959 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.954

From Figure 22-18 [6] C_{R1} = 0.965

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.657 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.809 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-2)
Sun March 9, 2014 19:34:49 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1576°N, 118.3167°W

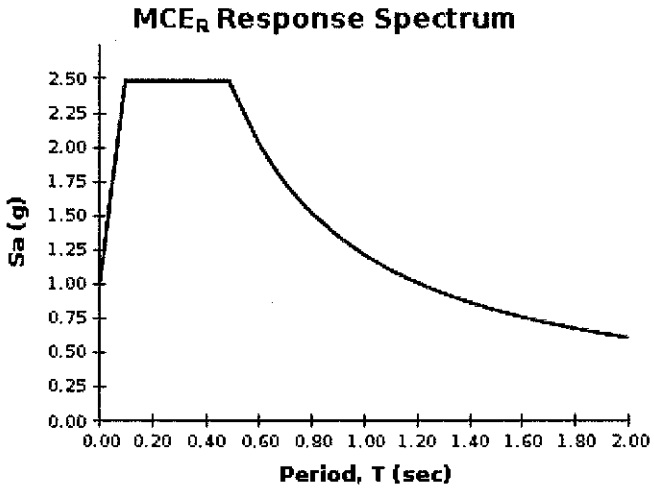
Site Soil Classification Site Class D – "Stiff Soil"

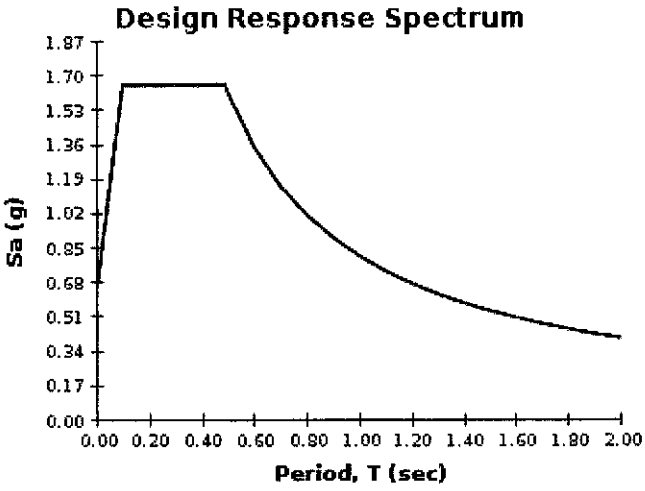
Risk Category I/II/III

USGS–Provided Output

S_S =	2.484 g	S_{MS} =	2.484 g	S_{DS} =	1.656 g
S_1 =	0.809 g	S_{M1} =	1.213 g	S_{D1} =	0.809 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1576°N, 118.3167°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.484$ g
From Figure 22-2 [2]	$S_1 = 0.809$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.484$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.809$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.484 = 2.484$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.809 = 1.213$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

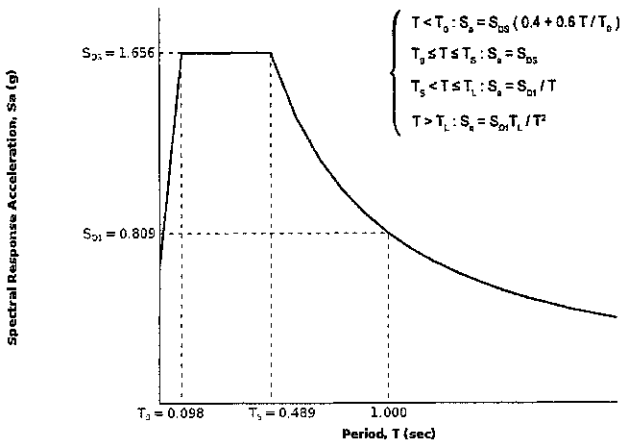
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.484 = 1.656$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.213 = 0.809$ g

Section 11.4.5 — Design Response Spectrum

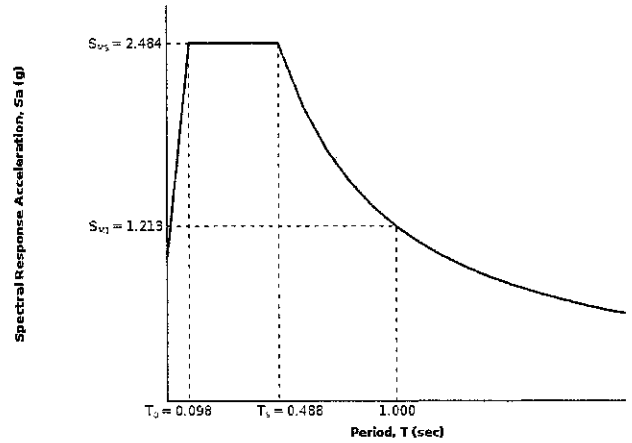
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.959

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.959 = 0.959$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.959 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.955

From Figure 22-18 [6] C_{R1} = 0.965

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.656 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.809 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is E for buildings in Risk Categories I, II, and III, and F for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

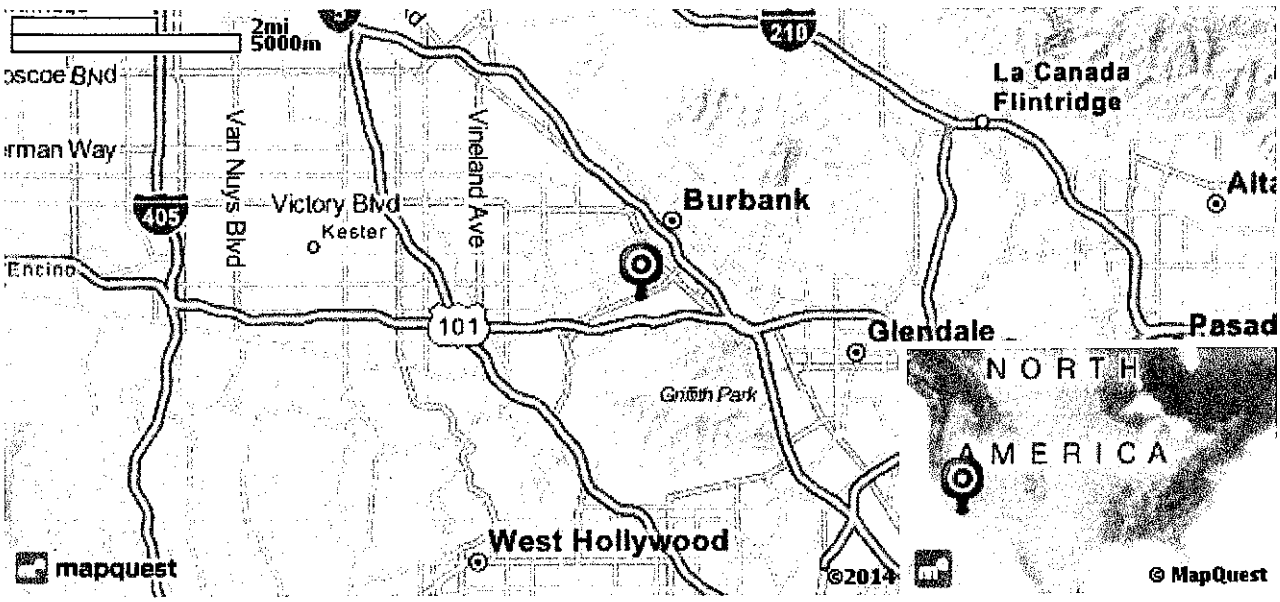
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-3)
Sun March 9, 2014 19:37:45 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1598°N, 118.3182°W

Site Soil Classification Site Class D – "Stiff Soil"

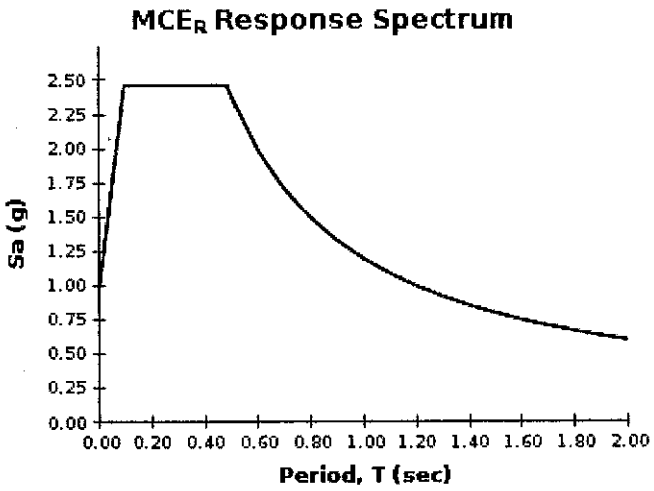
Risk Category I/II/III

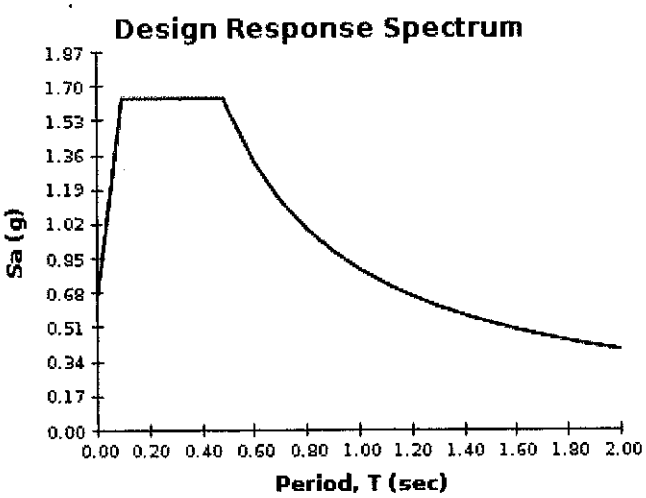


USGS–Provided Output

S_S =	2.461 g	S_{MS} =	2.461 g	S_{DS} =	1.641 g
S_1 =	0.796 g	S_{M1} =	1.194 g	S_{D1} =	0.796 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1598°N, 118.3182°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.461$ g
From Figure 22-2 [2]	$S_1 = 0.796$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.461$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.796$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.461 = 2.461$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.796 = 1.194$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

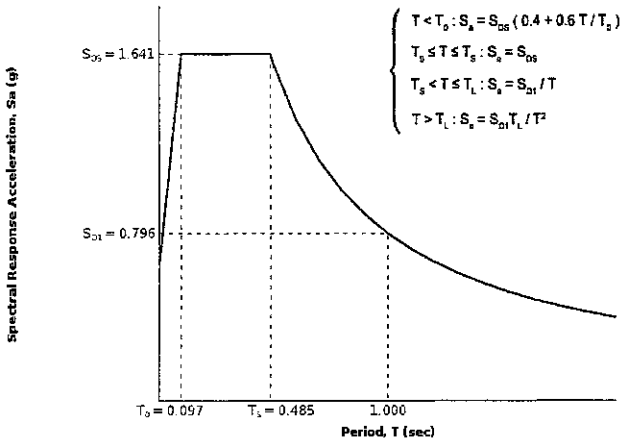
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.461 = 1.641$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.194 = 0.796$ g

Section 11.4.5 — Design Response Spectrum

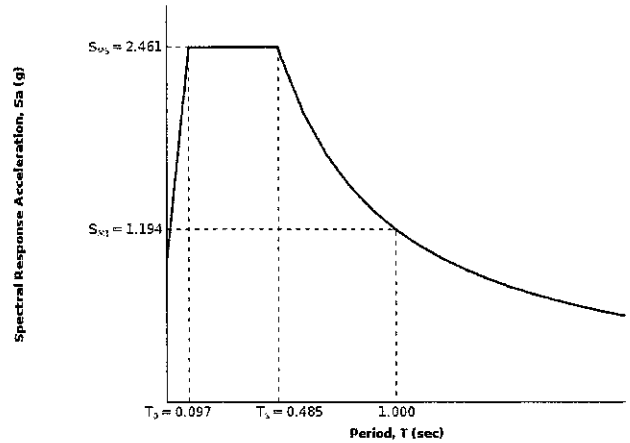
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7[4] PGA = 0.949

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.949 = 0.949$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.949 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17[5] C_{RS} = 0.957

From Figure 22-18[6] C_{R1} = 0.968

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.641 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.796 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

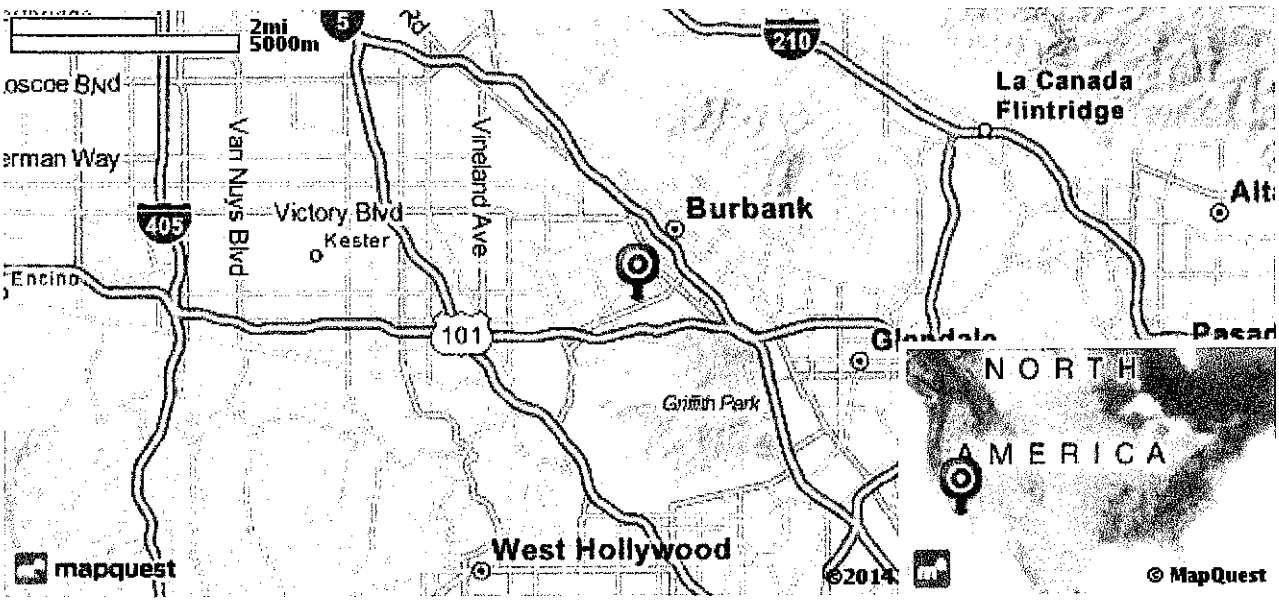
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-4)
Sun March 9, 2014 19:39:19 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1623°N, 118.3194°W

Site Soil Classification Site Class D – "Stiff Soil"

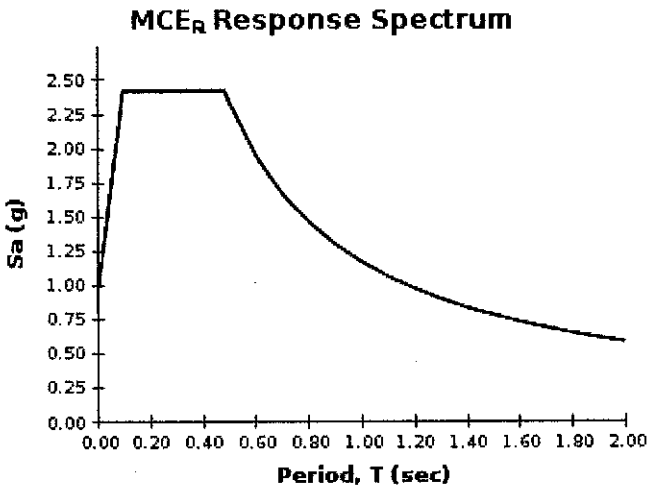
Risk Category I/II/III

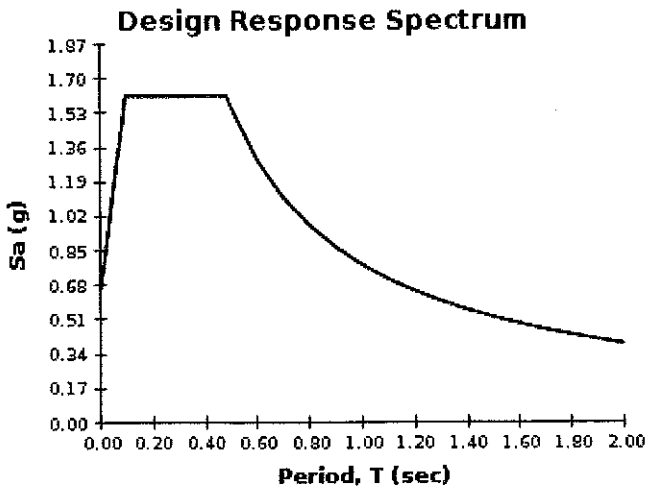


USGS–Provided Output

S_S =	2.422 g	S_{MS} =	2.422 g	S_{DS} =	1.615 g
S_1 =	0.780 g	S_{M1} =	1.170 g	S_{D1} =	0.780 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1623°N, 118.3194°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.422$ g
From Figure 22-2 [2]	$S_1 = 0.780$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.422$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.780$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.422 = 2.422$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.780 = 1.170$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

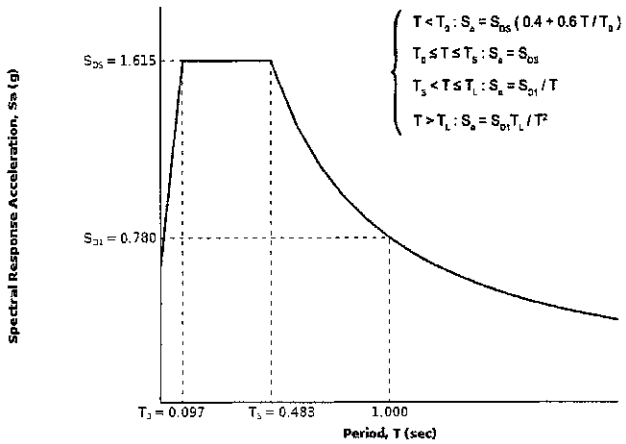
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.422 = 1.615$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.170 = 0.780$ g

Section 11.4.5 — Design Response Spectrum

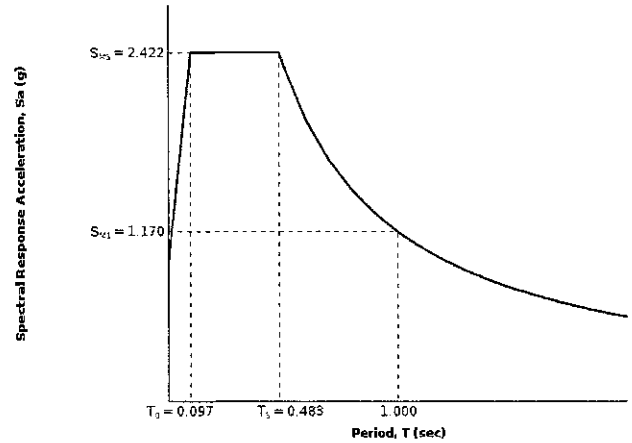
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.932

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.932 = 0.932$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.932 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.959

From Figure 22-18 [6] C_{R1} = 0.970

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.615 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.780 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-5)
Sun March 9, 2014 19:40:35 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1649°N, 118.3206°W

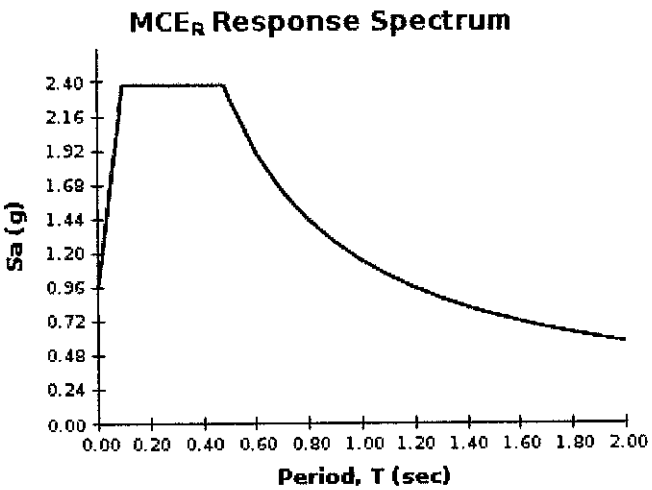
Site Soil Classification Site Class D – "Stiff Soil"

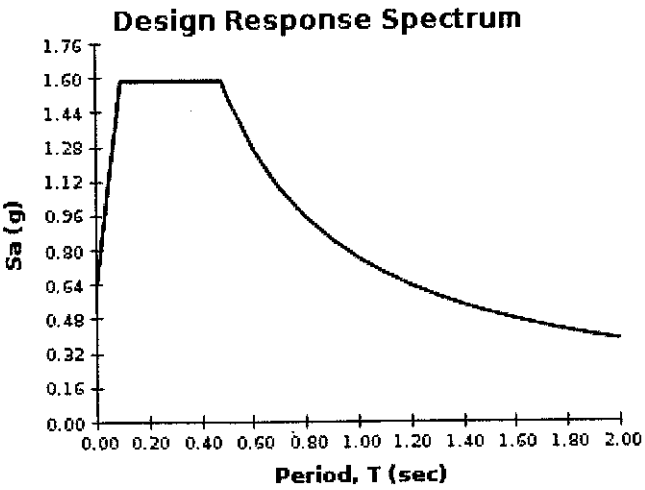
Risk Category I/II/III

USGS–Provided Output

S_S =	2.379 g	S_{MS} =	2.379 g	S_{DS} =	1.586 g
S_1 =	0.763 g	S_{M1} =	1.145 g	S_{D1} =	0.763 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1649°N, 118.3206°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.379$ g
From Figure 22-2 [2]	$S_1 = 0.763$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.379$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.763$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.379 = 2.379$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.763 = 1.145$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

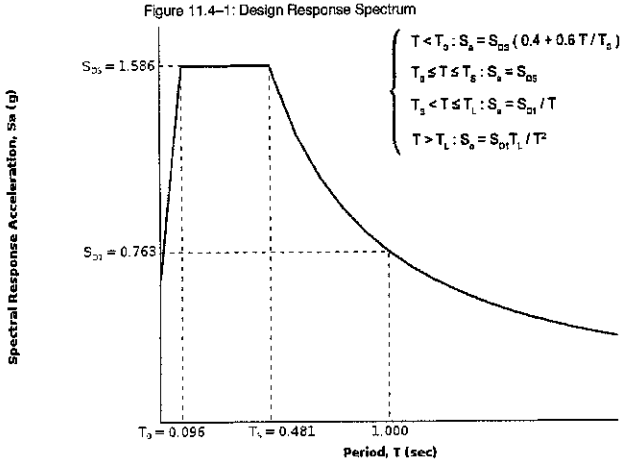
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.379 = 1.586$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.145 = 0.763$ g

Section 11.4.5 — Design Response Spectrum

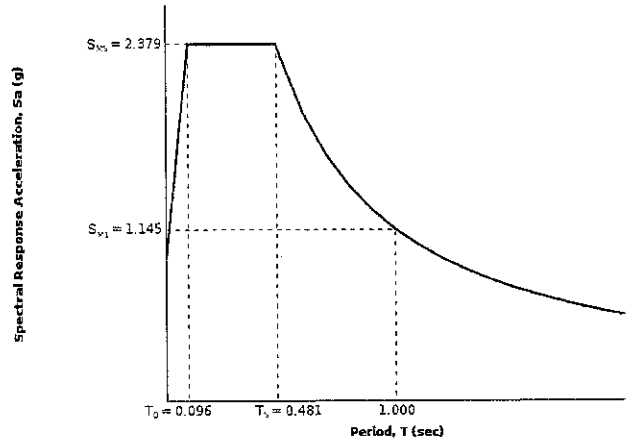
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.913

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.913 = 0.913$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.913 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.961

From Figure 22-18 [6] C_{R1} = 0.972

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.586 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.763 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

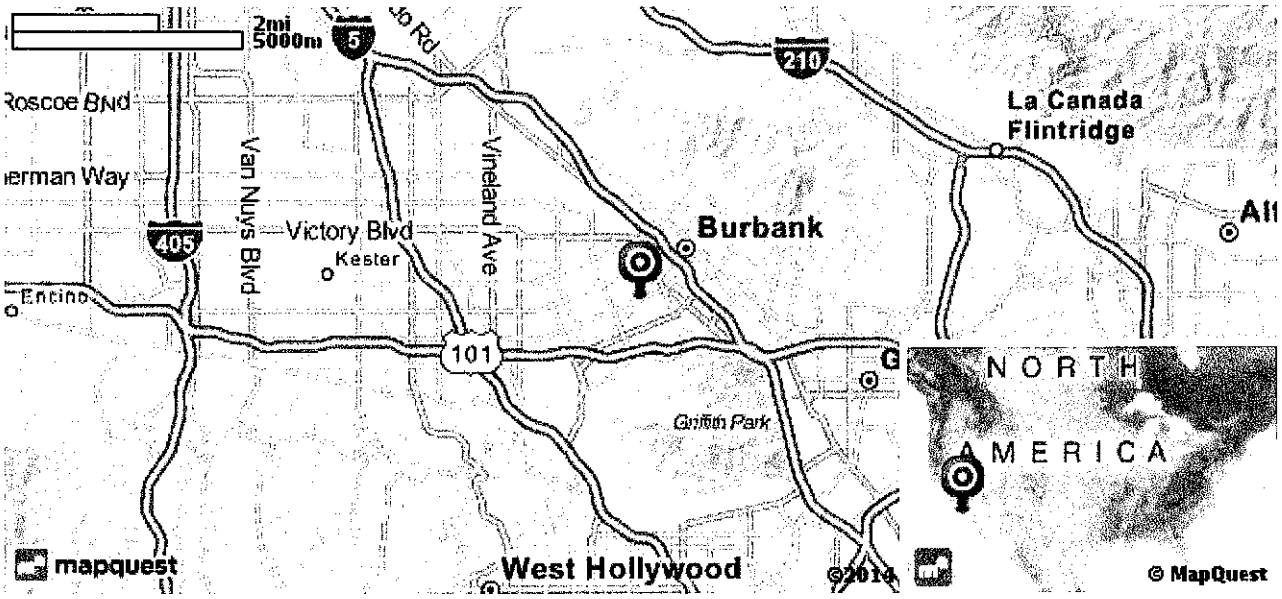
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-6)
Sun March 9, 2014 19:42:00 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1678°N, 118.322°W

Site Soil Classification Site Class D – "Stiff Soil"

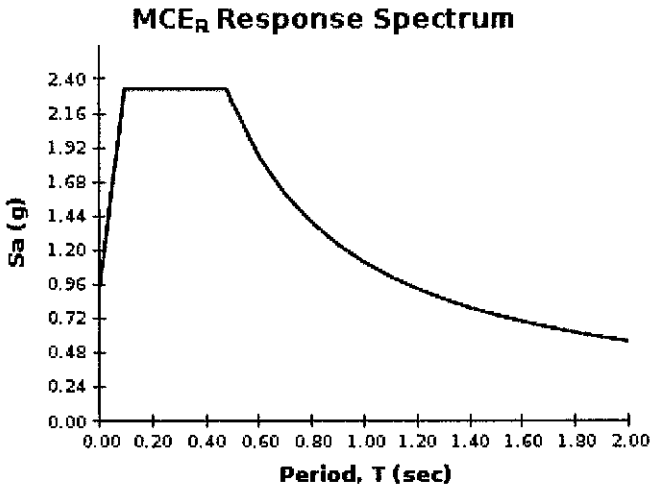
Risk Category I/II/III

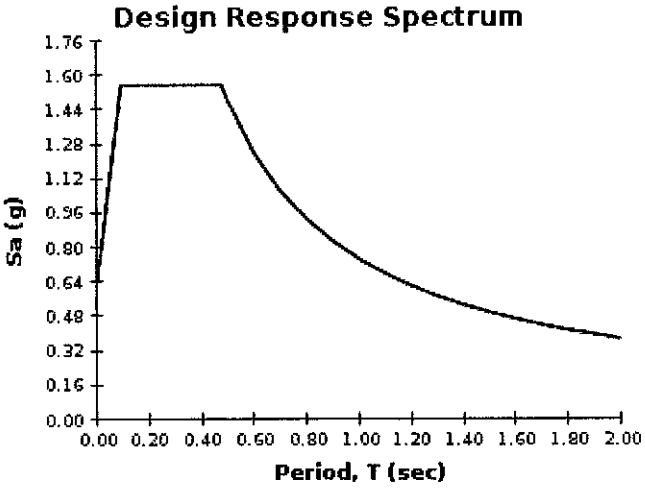


USGS–Provided Output

S_S =	2.330 g	S_{MS} =	2.330 g	S_{DS} =	1.553 g
S_1 =	0.744 g	S_{M1} =	1.116 g	S_{D1} =	0.744 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1678°N, 118.322°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.330$ g
From Figure 22-2 [2]	$S_1 = 0.744$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	$\boxed{1.0}$
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 2.330 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	$\boxed{1.5}$
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.744 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.330 = 2.330$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.744 = 1.116$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

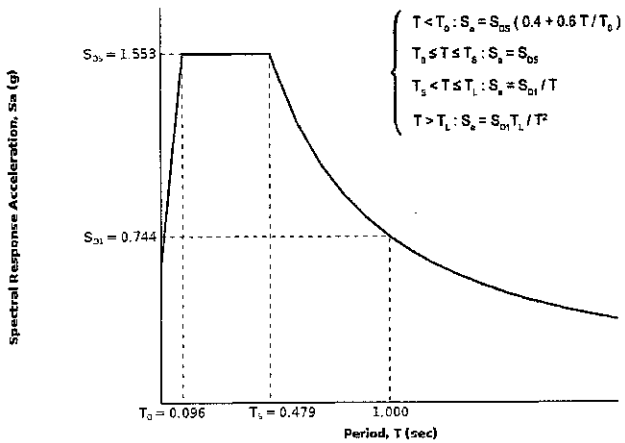
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.330 = 1.553$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 1.116 = 0.744$ g

Section 11.4.5 — Design Response Spectrum

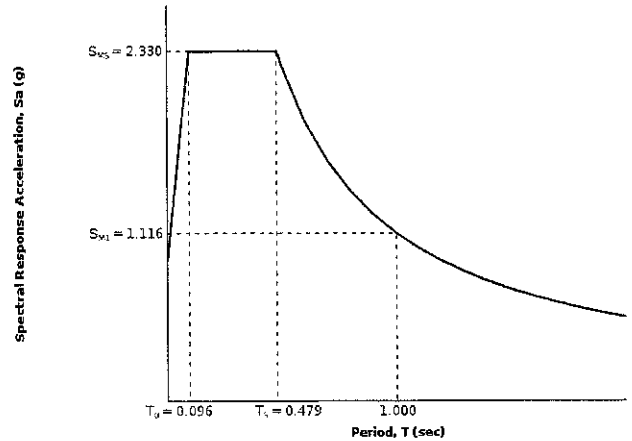
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7[4] PGA = 0.892

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.892 = 0.892$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.892 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17[5] C_{RS} = 0.963

From Figure 22-18[6] C_{R1} = 0.974

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.553 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.744 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

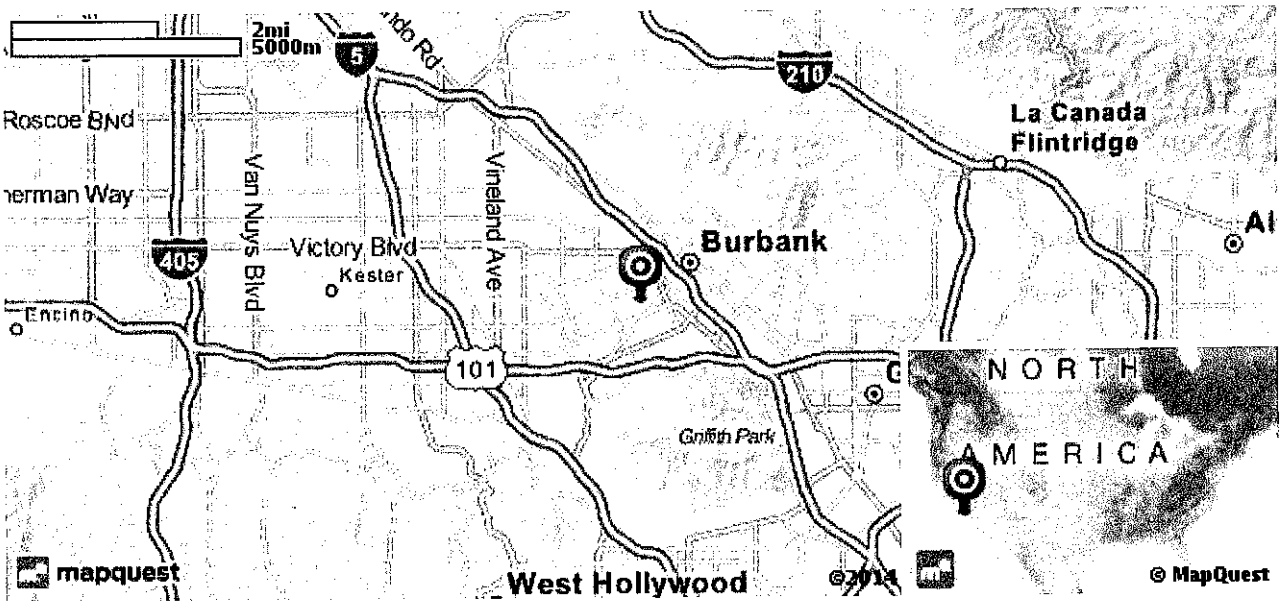
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-7)
Sun March 9, 2014 19:43:11 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1704°N, 118.3233°W

Site Soil Classification Site Class D – "Stiff Soil"

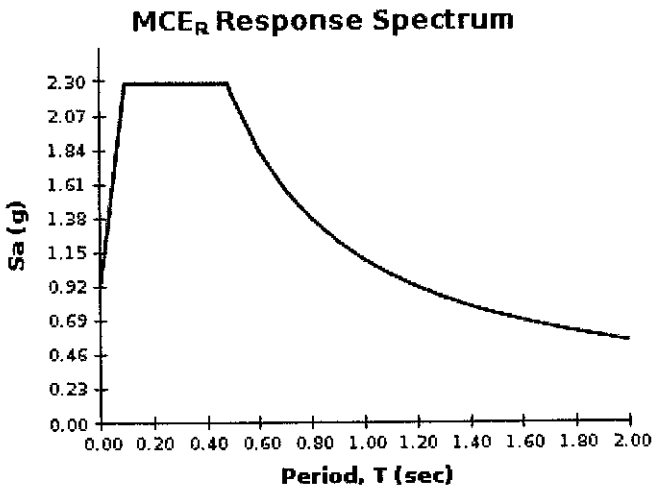
Risk Category I/II/III

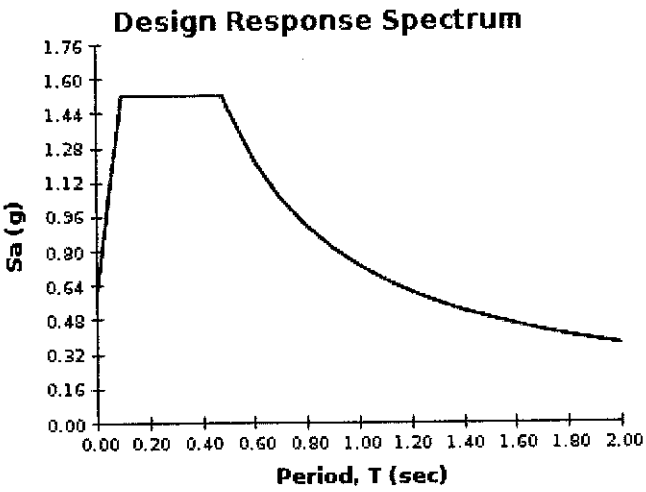


USGS–Provided Output

S_S =	2.283 g	S_{MS} =	2.283 g	S_{DS} =	1.522 g
S_1 =	0.732 g	S_{M1} =	1.097 g	S_{D1} =	0.732 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1704°N, 118.3233°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.283$ g
From Figure 22-2 [2]	$S_1 = 0.732$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.283$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.732$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.283 = 2.283$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.732 = 1.097$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

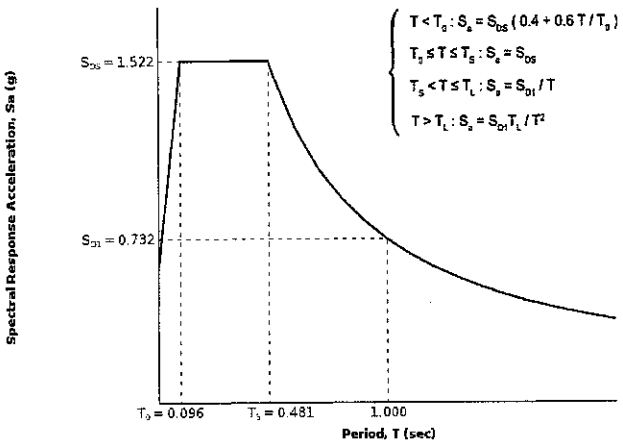
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.283 = 1.522$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.097 = 0.732$ g

Section 11.4.5 — Design Response Spectrum

From Figure 22-12[3] $T_L = 8$ seconds

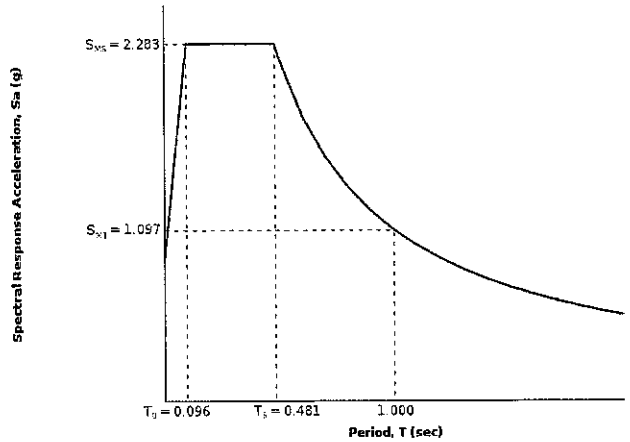
Figure 11.4–1: Design Response Spectrum



$$\begin{cases} T < T_0 : S_a = S_{DS}\,(0.4 + 0.6\,T / T_0) \\ T_0 \le T \le T_S : S_a = S_{DS} \\ T_S < T \le T_L : S_a = S_{D1} / T \\ T > T_L : S_a = S_{D1} T_L / T^2 \end{cases}$$

Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.872

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.872 = 0.872$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.872 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{R3} = 0.965

From Figure 22-18 [6] C_{R1} = 0.977

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.522 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.732 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

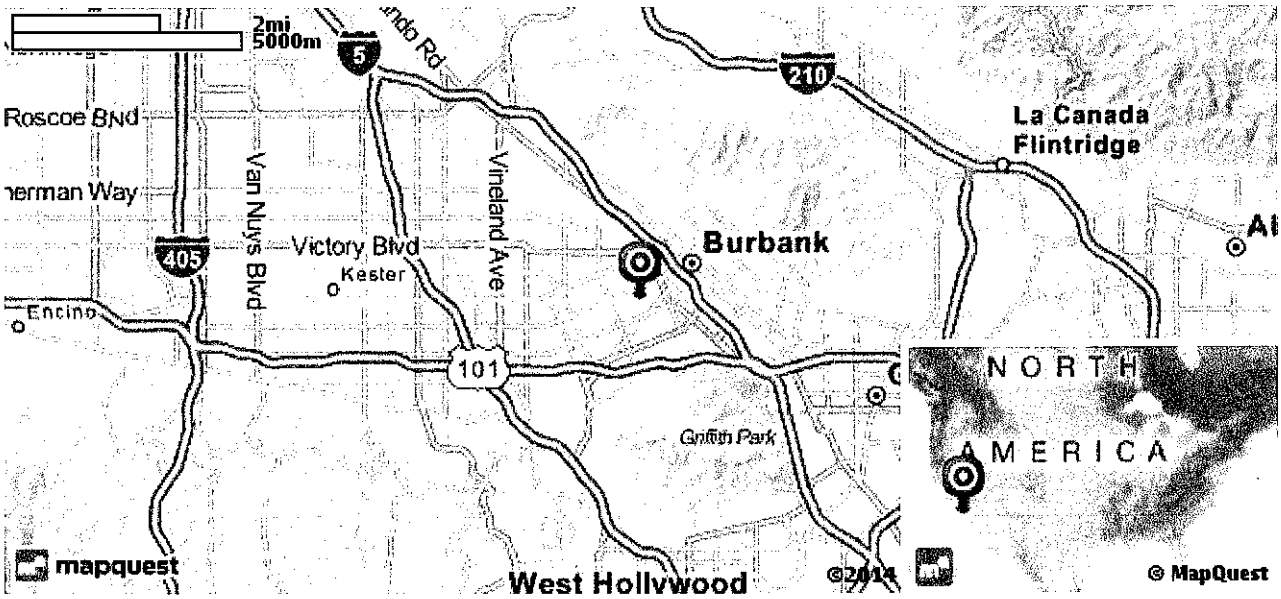
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-8)
Sun March 9, 2014 19:44:33 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1715°N, 118.3238°W

Site Soil Classification Site Class D – "Stiff Soil"

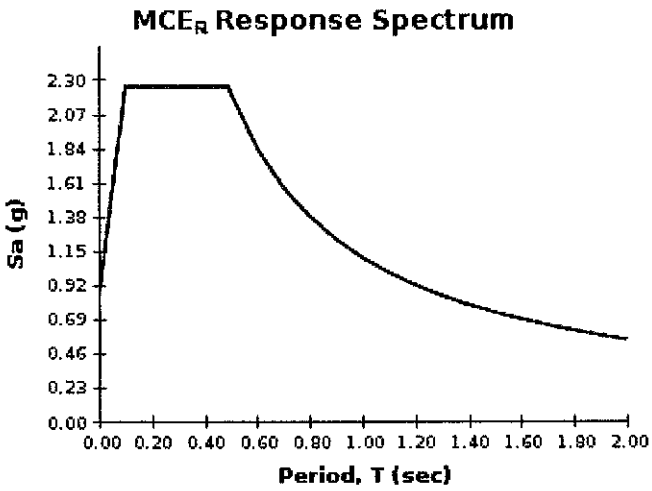
Risk Category I/II/III

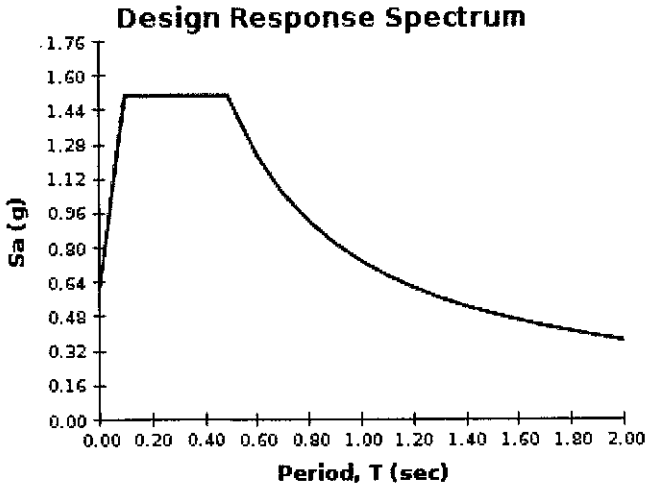


USGS–Provided Output

S_S =	2.259 g	S_{MS} =	2.259 g	S_{DS} =	1.506 g
S_1 =	0.737 g	S_{M1} =	1.106 g	S_{D1} =	0.737 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1715°N, 118.3238°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.259$ g
From Figure 22-2 [2]	$S_1 = 0.737$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity Index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.259$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.737$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.259 = 2.259$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.737 = 1.106$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

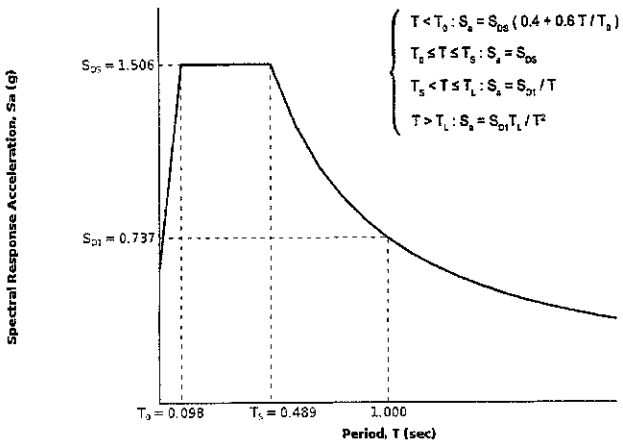
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.259 = 1.506$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.106 = 0.737$ g

Section 11.4.5 — Design Response Spectrum

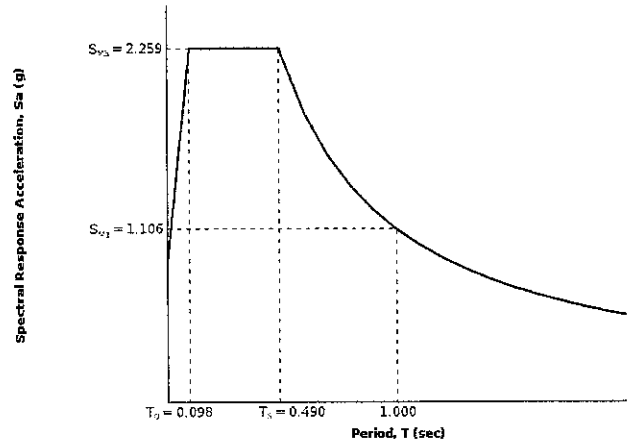
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.862

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.862 = 0.862$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.862 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.966

From Figure 22-18 [6] C_{R1} = 0.977

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.506 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.737 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

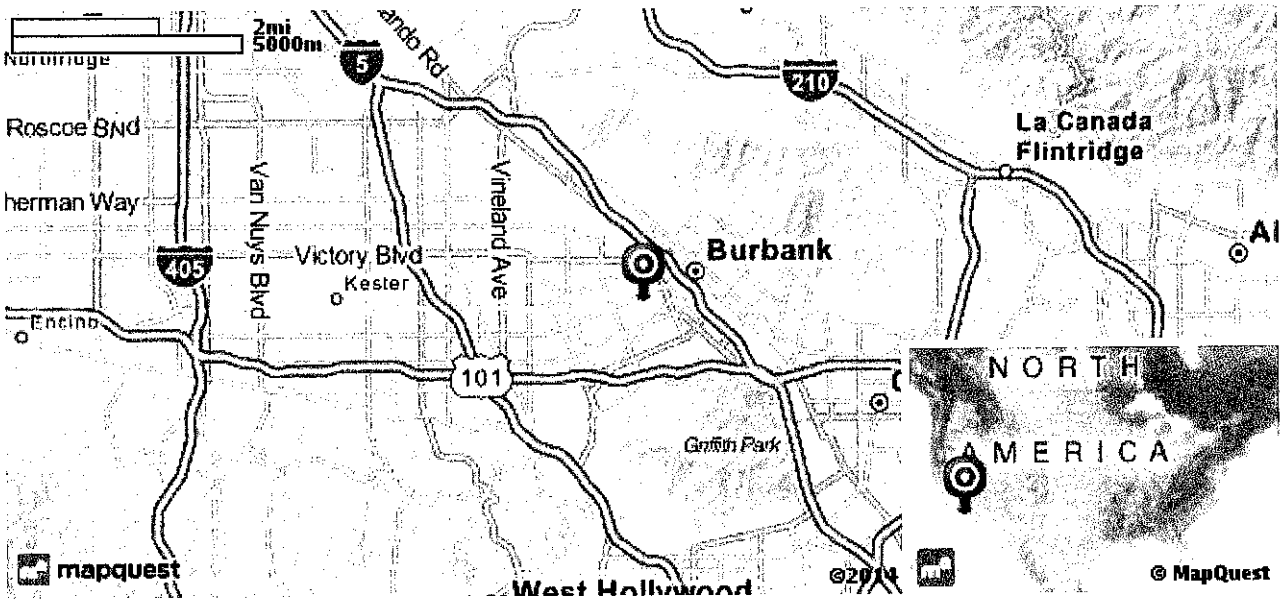
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-9)
Sun March 9, 2014 19:45:44 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1734°N, 118.3247°W

Site Soil Classification Site Class D – "Stiff Soil"

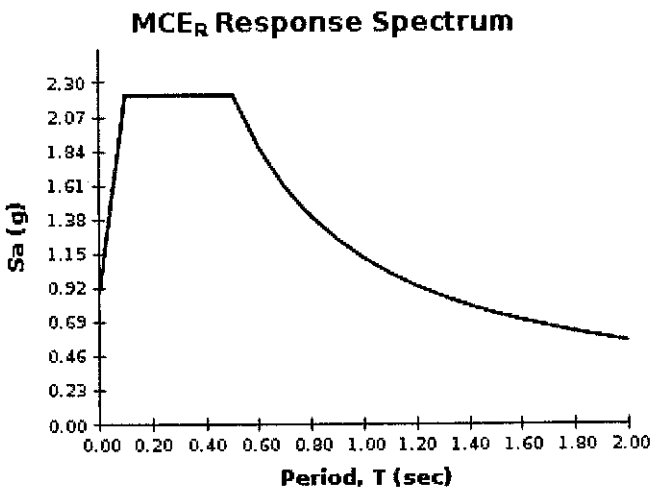
Risk Category I/II/III

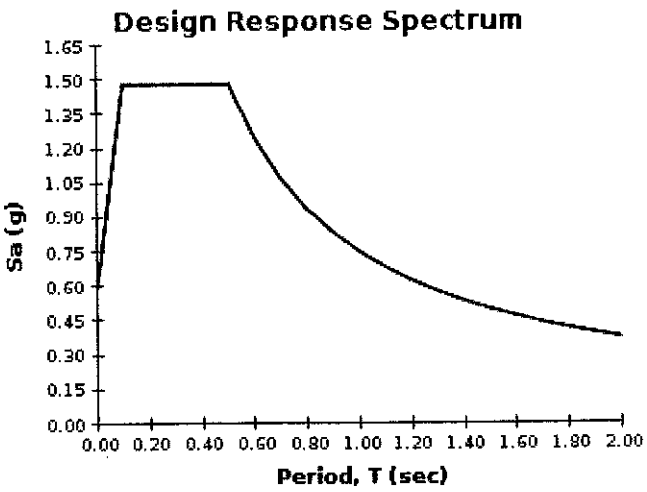


USGS–Provided Output

S_S =	2.216 g	S_{MS} =	2.216 g	S_{DS} =	1.477 g
S_1 =	0.747 g	S_{M1} =	1.120 g	S_{D1} =	0.747 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1734°N, 118.3247°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.216$ g
From Figure 22-2 [2]	$S_1 = 0.747$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_s = 2.216$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.747$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.216 = 2.216$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.747 = 1.120$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

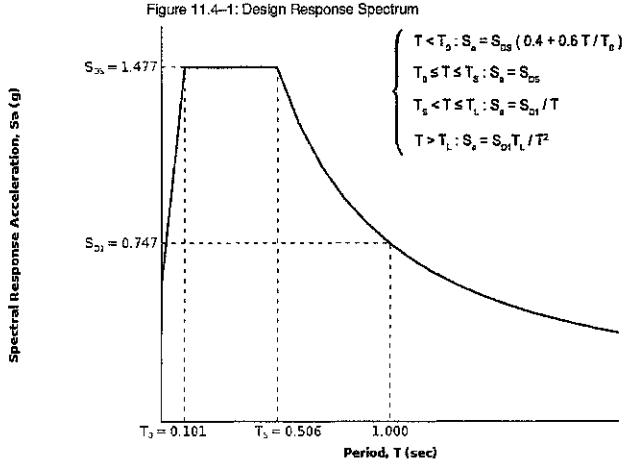
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.216 = 1.477$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.120 = 0.747$ g

Section 11.4.5 — Design Response Spectrum

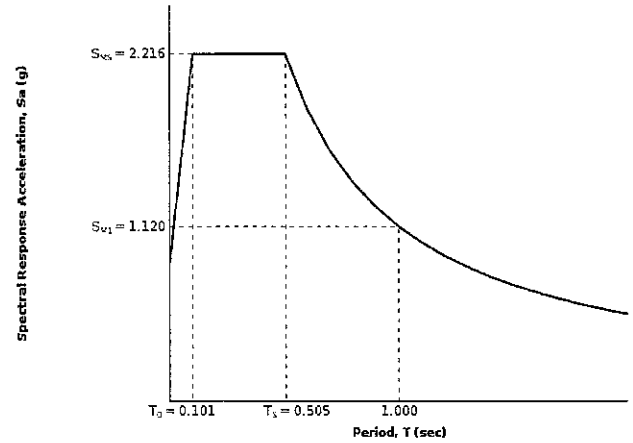
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7[4] PGA = 0.844

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.844 = 0.844$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.844 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17[5] C_{RS} = 0.968

From Figure 22-18[6] C_{R1} = 0.979

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.477 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.747 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

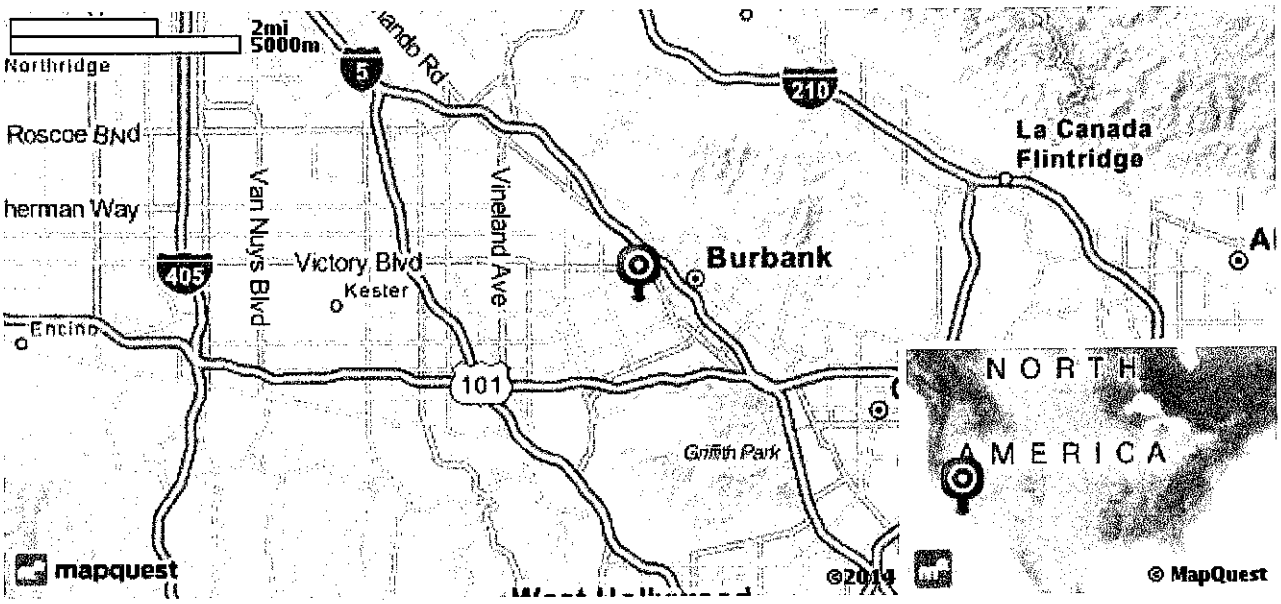
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-10)
Sun March 9, 2014 19:51:04 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1752°N, 118.3256°W

Site Soil Classification Site Class D – "Stiff Soil"

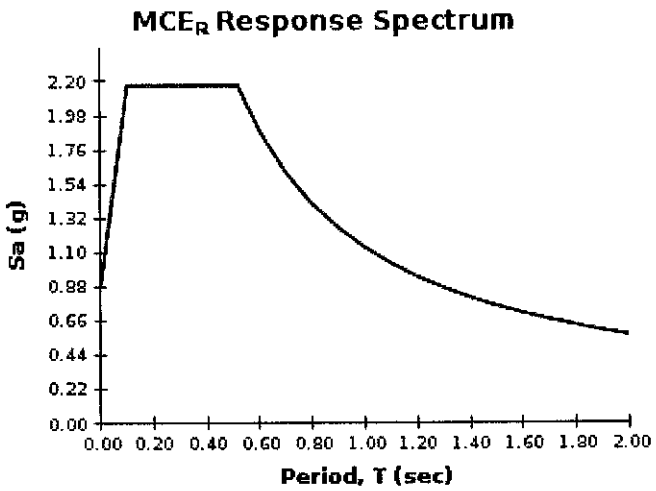
Risk Category I/II/III

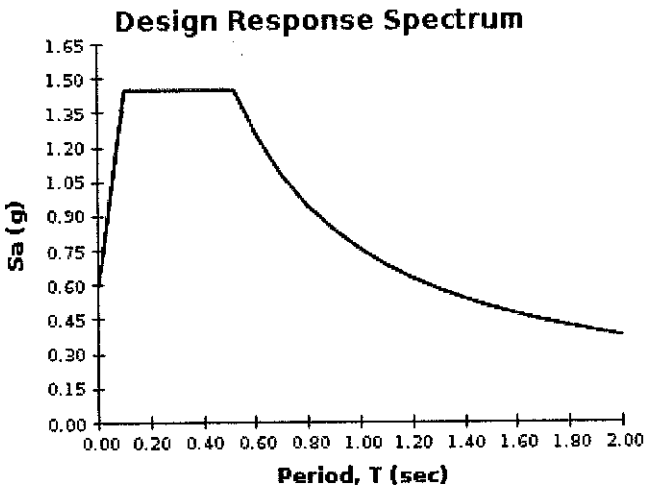


USGS–Provided Output

S_S =	2.174 g	S_{MS} =	2.174 g	S_{DS} =	1.449 g
S_1 =	0.755 g	S_{M1} =	1.132 g	S_{D1} =	0.755 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1752°N, 118.3256°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.174$ g
From Figure 22-2 [2]	$S_1 = 0.755$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 2.174 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.755 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.174 = 2.174$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.755 = 1.132$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

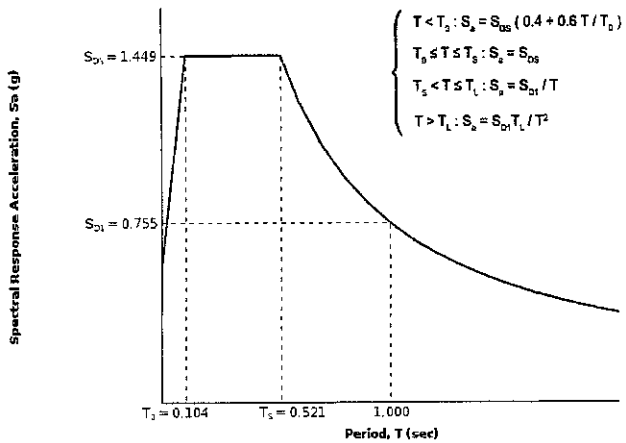
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.174 = 1.449$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 1.132 = 0.755$ g

Section 11.4.5 — Design Response Spectrum

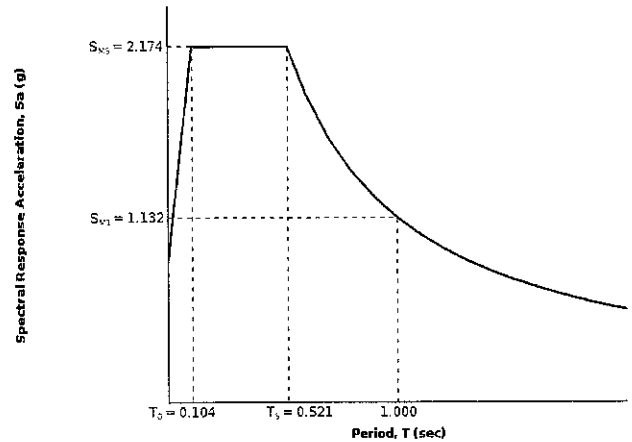
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.827

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.827 = 0.827$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.827 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.969

From Figure 22-18 [6] C_{R1} = 0.981

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.449 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.755 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

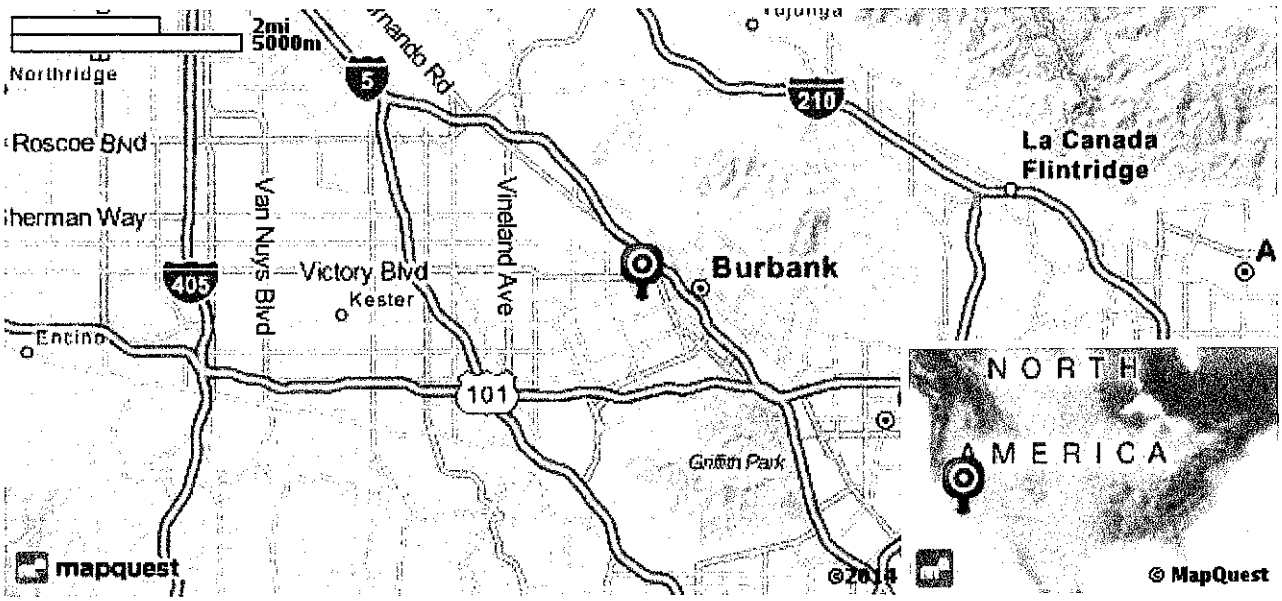
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-11)
Sun March 9, 2014 19:52:41 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1778°N, 118.3268°W

Site Soil Classification Site Class D – "Stiff Soil"

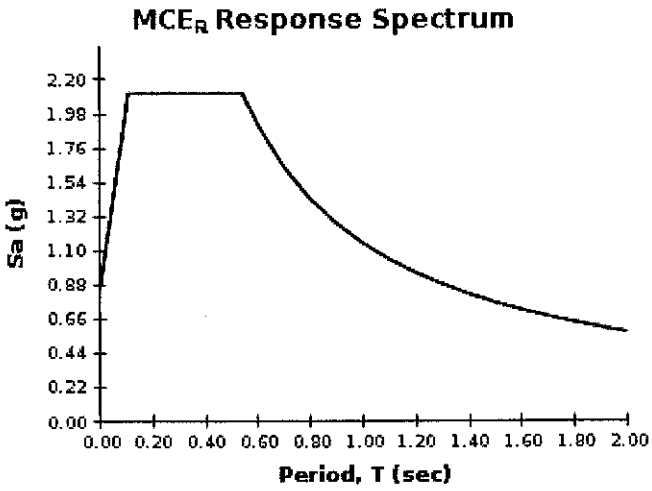
Risk Category I/II/III

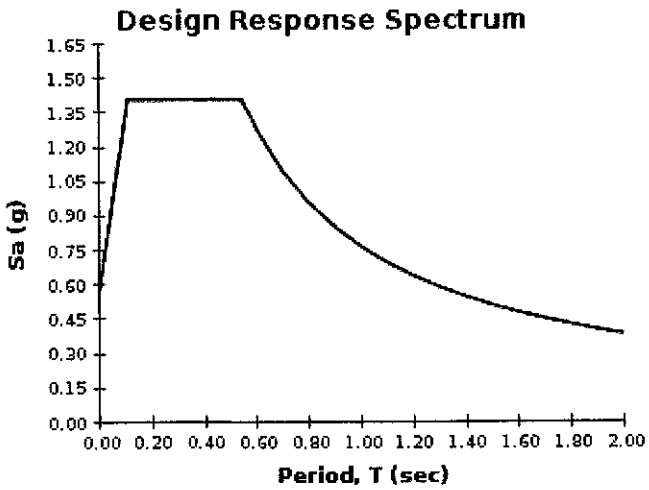


USGS–Provided Output

S_S =	2.111 g	S_{MS} =	2.111 g	S_{DS} =	1.407 g
S_1 =	0.765 g	S_{M1} =	1.148 g	S_{D1} =	0.765 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1778°N, 118.3268°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.111$ g
From Figure 22-2 [2]	$S_1 = 0.765$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.111$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.765$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.111 = 2.111$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.765 = 1.148$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

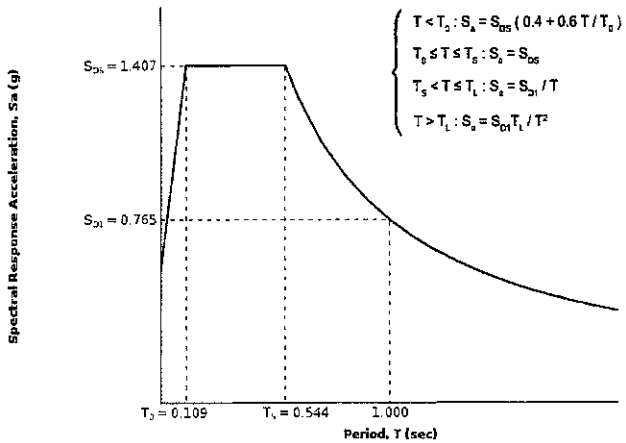
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.111 = 1.407$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.148 = 0.765$ g

Section 11.4.5 — Design Response Spectrum

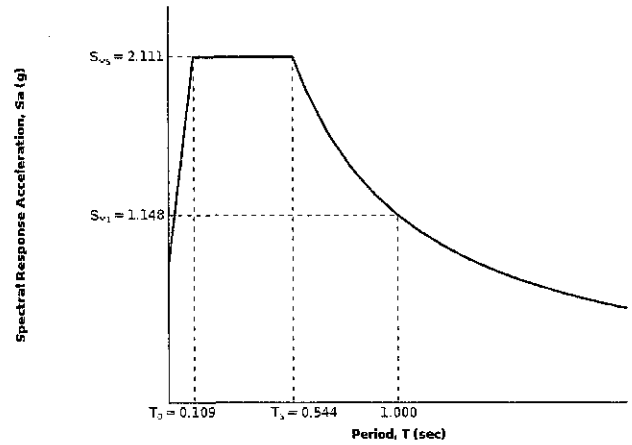
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.801

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.801 = 0.801$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.801 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] $C_{RS} = 0.971$

From Figure 22-18 [6] $C_{R1} = 0.983$

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.407 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.765 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

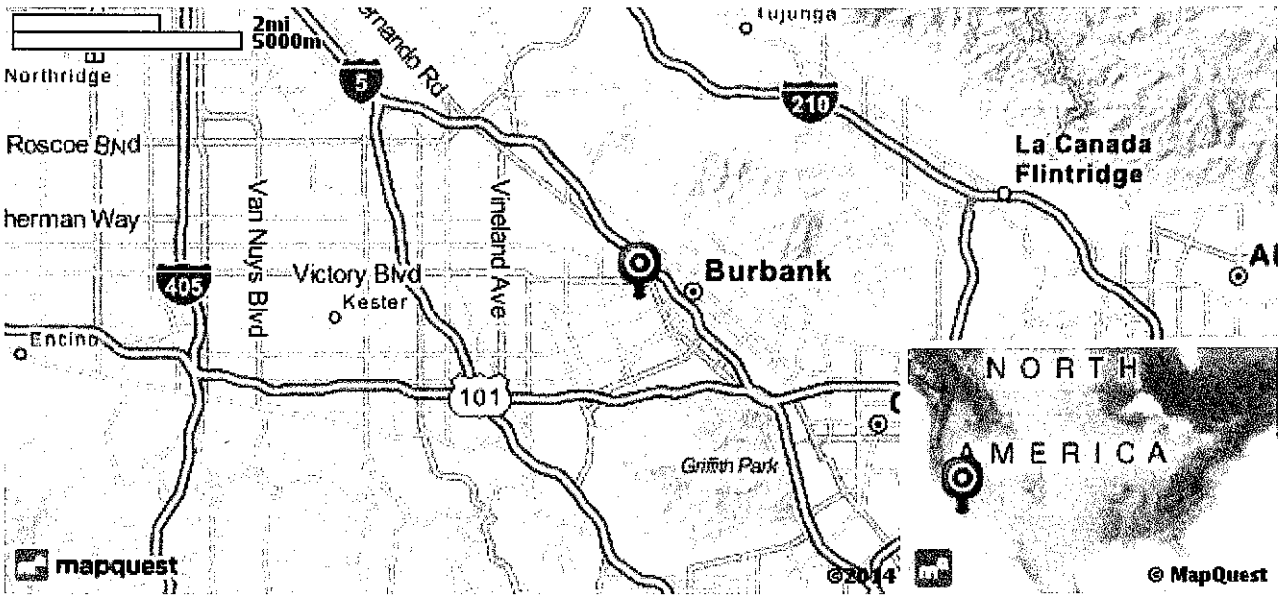
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-12)
Sun March 9, 2014 19:55:08 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1792°N, 118.3248°W

Site Soil Classification Site Class D – "Stiff Soil"

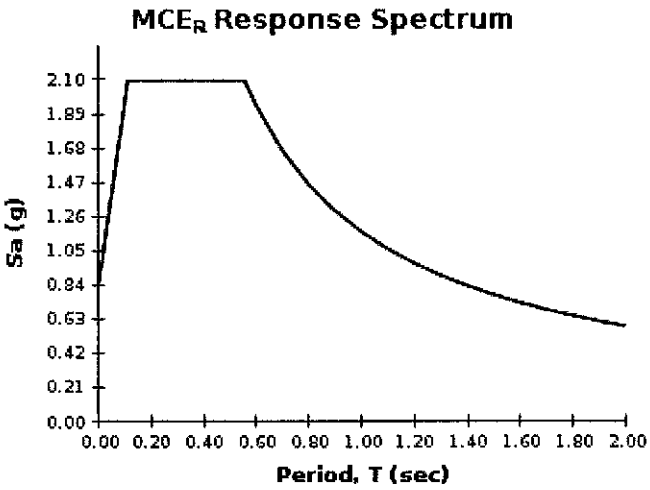
Risk Category I/II/III

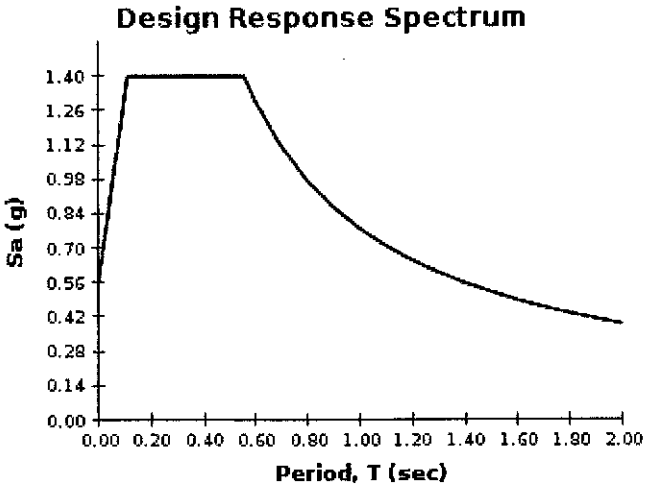


USGS–Provided Output

S_S =	2.093 g	S_{MS} =	2.093 g	S_{DS} =	1.396 g
S_1 =	0.778 g	S_{M1} =	1.167 g	S_{D1} =	0.778 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1792°N, 118.3248°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.093$ g
From Figure 22-2 [2]	$S_1 = 0.778$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 2.093 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.778 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.093 = 2.093$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.778 = 1.167$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

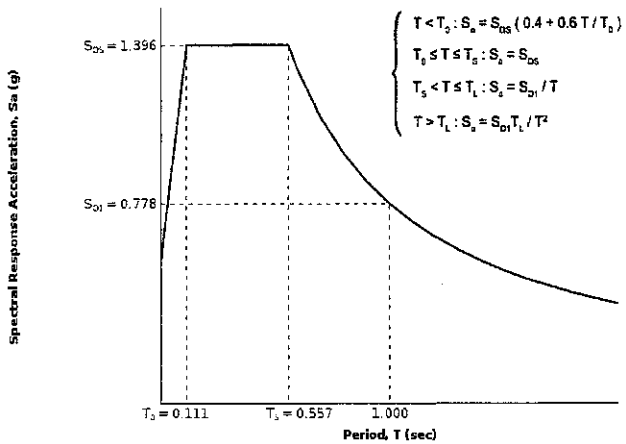
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.093 = 1.396$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.167 = 0.778$ g

Section 11.4.5 — Design Response Spectrum

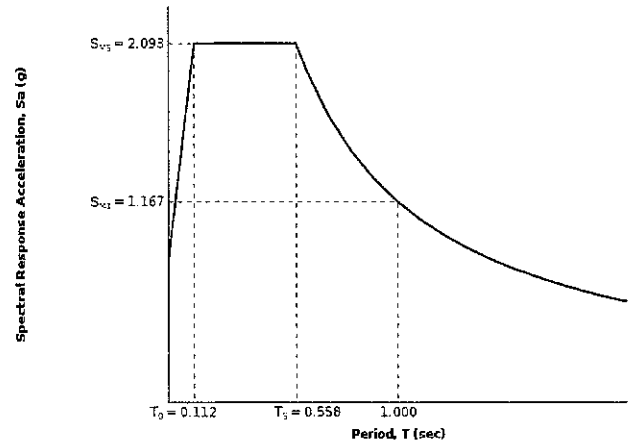
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.793

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.793 = 0.793$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.793 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.971

From Figure 22-18 [6] C_{R1} = 0.982

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.396 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.778 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

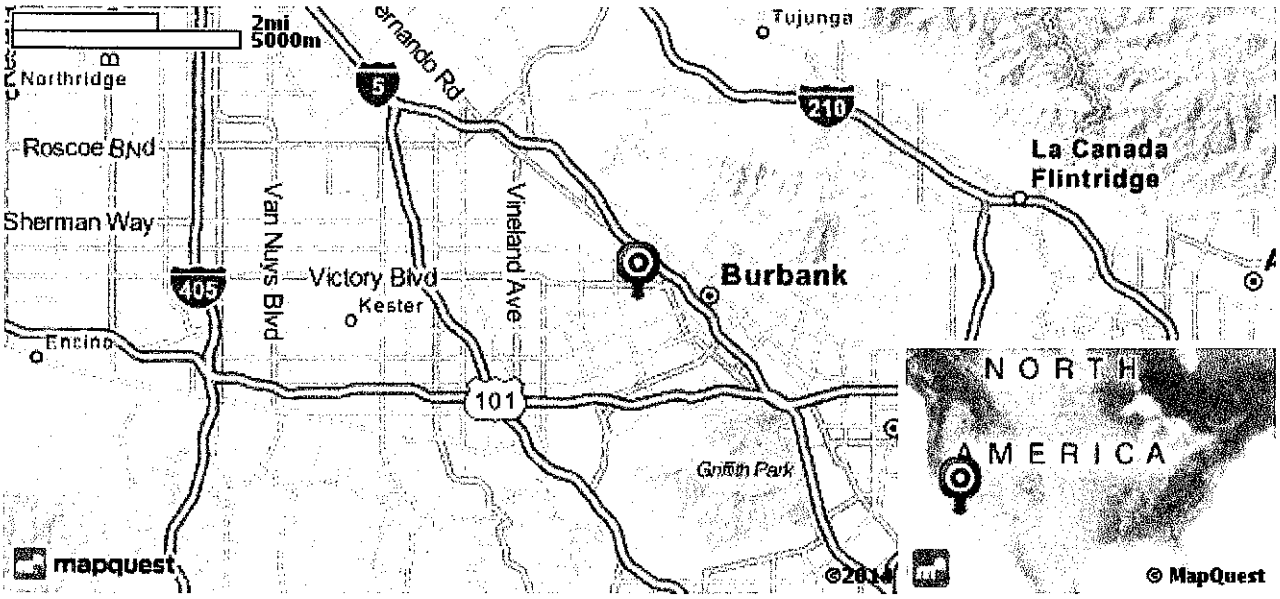
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-13)
Sun March 9, 2014 19:56:22 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1802°N, 118.3302°W

Site Soil Classification Site Class D – "Stiff Soil"

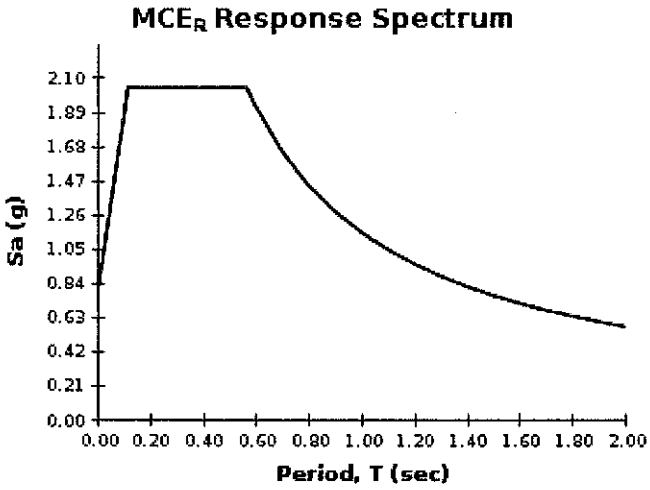
Risk Category I/II/III

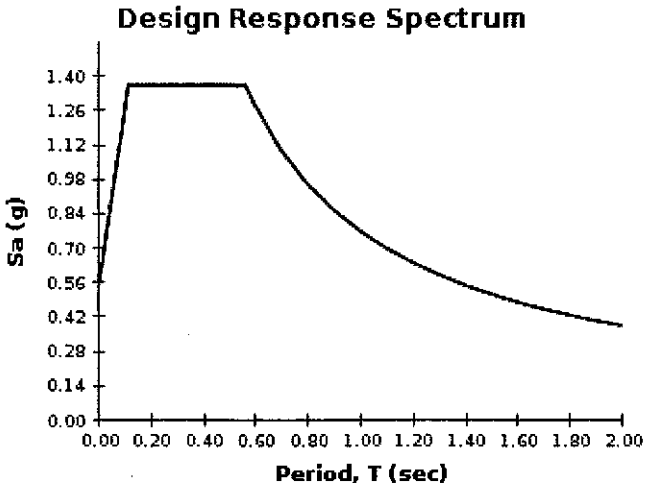


USGS–Provided Output

S_S =	2.044 g	S_{MS} =	2.044 g	S_{DS} =	1.363 g
S_1 =	0.768 g	S_{M1} =	1.152 g	S_{D1} =	0.768 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1802°N, 118.3302°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.044$ g
From Figure 22-2 [2]	$S_1 = 0.768$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.044$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.768$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.044 = 2.044$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.768 = 1.152$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

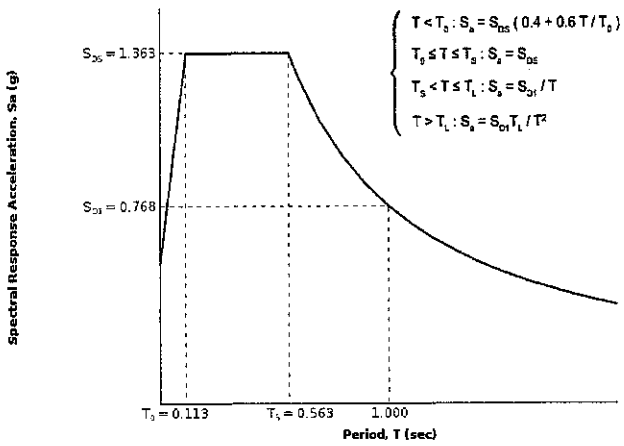
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.044 = 1.363$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 1.152 = 0.768$ g

Section 11.4.5 — Design Response Spectrum

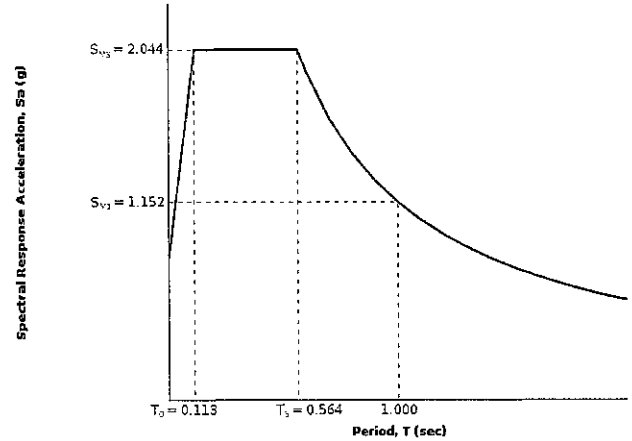
From Figure 22-12[8] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.774

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.774 = 0.774$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.774 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.974

From Figure 22-18 [6] C_{R1} = 0.986

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.363 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.768 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

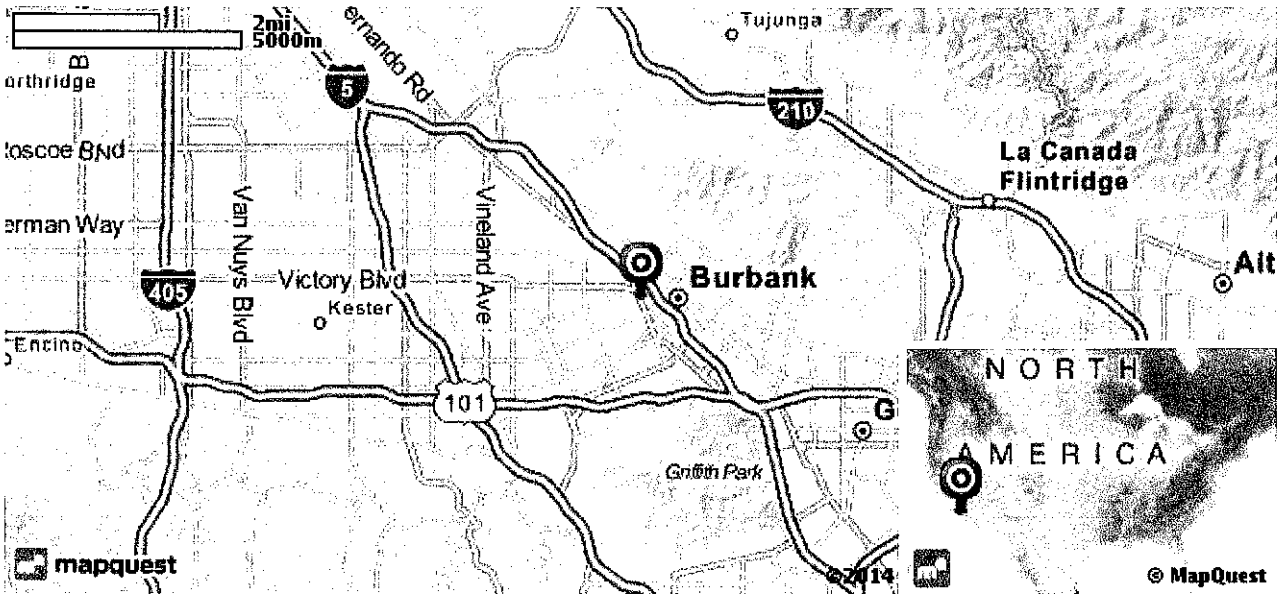
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-14)
Sun March 9, 2014 19:57:24 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1809°N, 118.3201°W

Site Soil Classification Site Class D – "Stiff Soil"

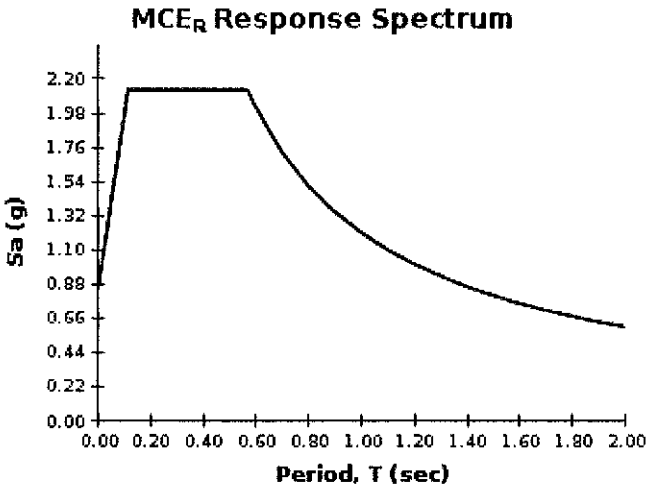
Risk Category I/II/III

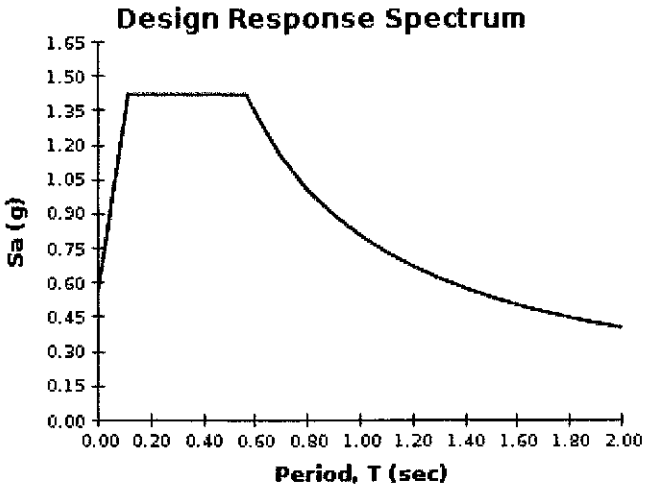


USGS–Provided Output

S_S =	2.129 g	S_{MS} =	2.129 g	S_{DS} =	1.420 g
S_1 =	0.807 g	S_{M1} =	1.210 g	S_{D1} =	0.807 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1809°N, 118.3201°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.129$ g
From Figure 22-2 [2]	$S_1 = 0.807$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_S = 2.129$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.807$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.129 = 2.129$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.807 = 1.210$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

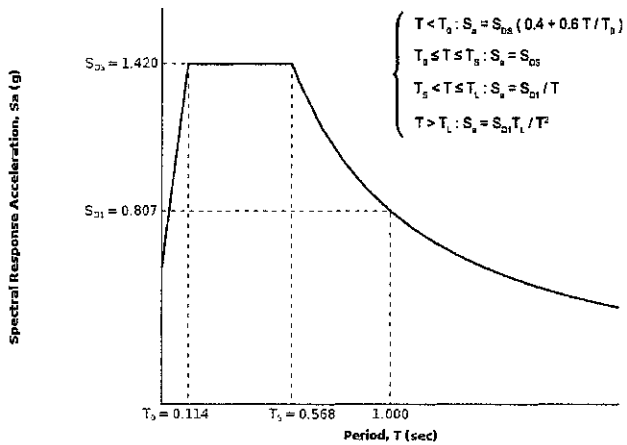
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.129 = 1.420$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 1.210 = 0.807$ g

Section 11.4.5 — Design Response Spectrum

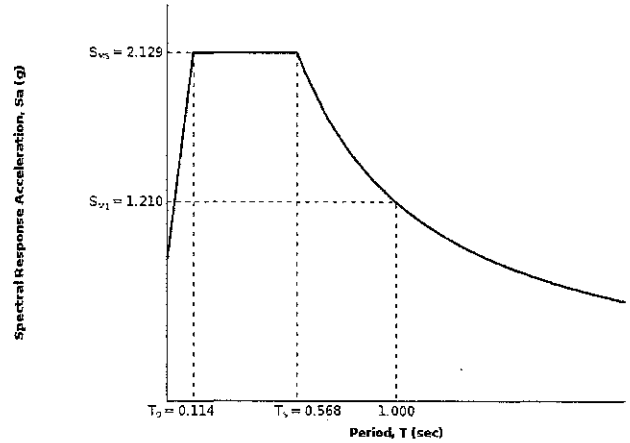
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.807

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.807 = 0.807$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.807 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] $C_{RS} = 0.970$

From Figure 22-18 [6] $C_{R1} = 0.980$

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.420 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.807 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is E for buildings in Risk Categories I, II, and III, and F for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

USGS Design Maps Summary Report

User–Specified Input

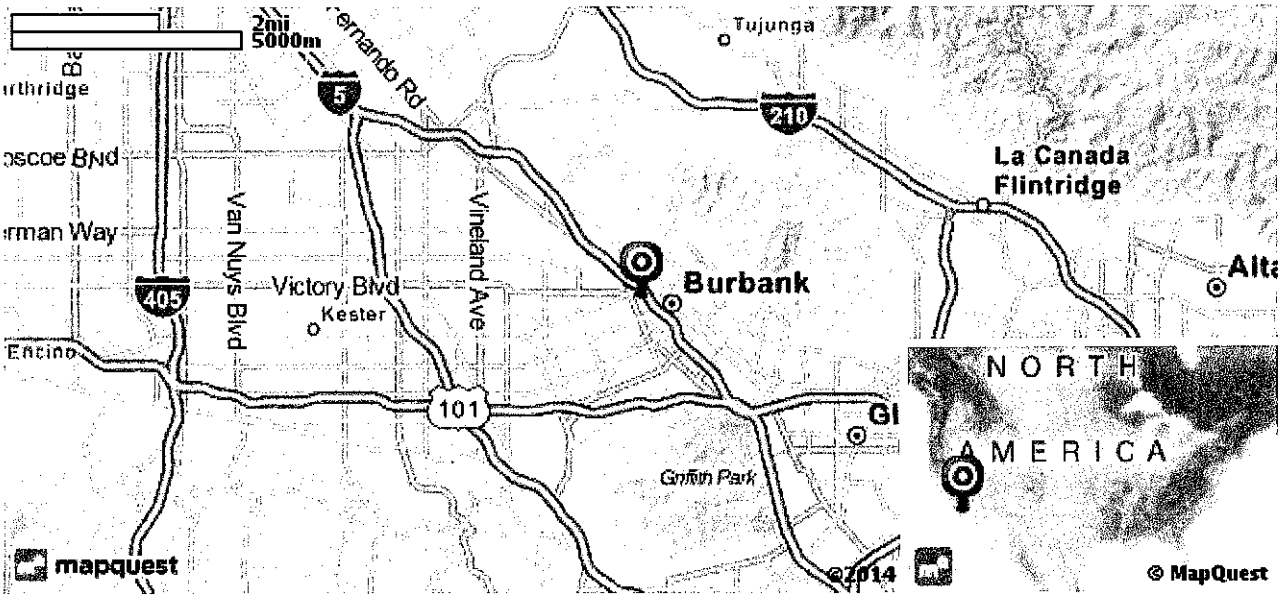
Report Title Beachwood Pump Station Upgrade & Force Main Replacement-Burbank (Boring B-15)
Sun March 9, 2014 19:58:22 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 34.1825°N, 118.3182°W

Site Soil Classification Site Class D – "Stiff Soil"

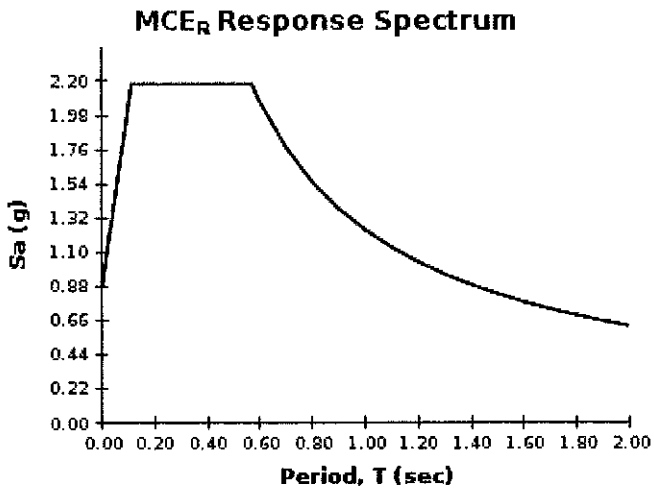
Risk Category I/II/III

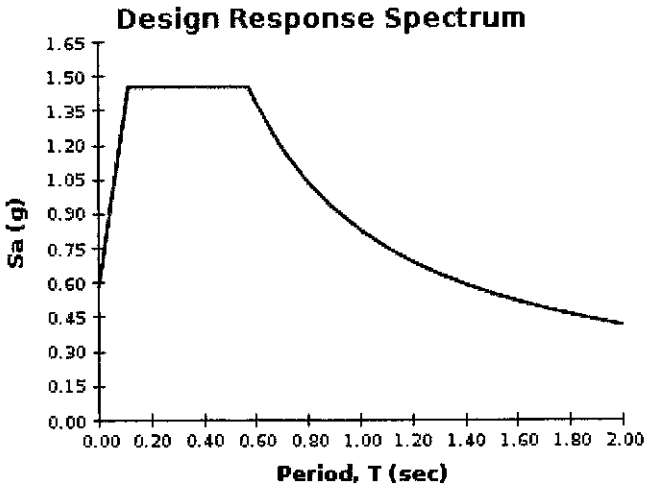


USGS–Provided Output

S_S =	2.181 g	S_{MS} =	2.181 g	S_{DS} =	1.454 g
S_1 =	0.830 g	S_{M1} =	1.244 g	S_{D1} =	0.830 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.1825°N, 118.3182°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	$S_S = 2.181$ g
From Figure 22-2 [2]	$S_1 = 0.830$ g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index $PI > 20$, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\bar{s}_u < 500$ psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and $S_s = 2.181$ g, $F_a = 1.000$

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.830$ g, $F_v = 1.500$

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.181 = 2.181$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.830 = 1.244$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

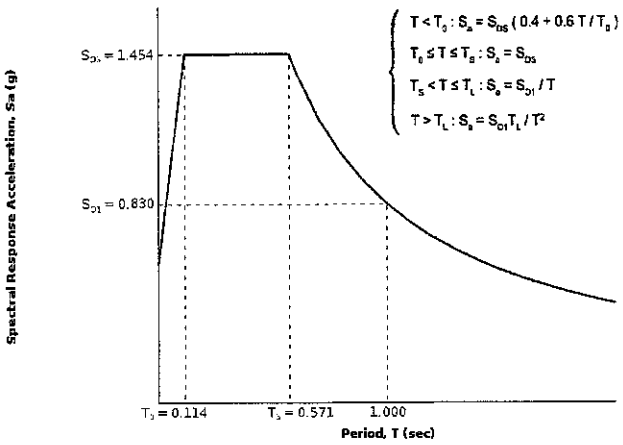
Equation (11.4–3): $S_{DS} = ⅔\, S_{MS} = ⅔ \times 2.181 = 1.454$ g

Equation (11.4–4): $S_{D1} = ⅔\, S_{M1} = ⅔ \times 1.244 = 0.830$ g

Section 11.4.5 — Design Response Spectrum

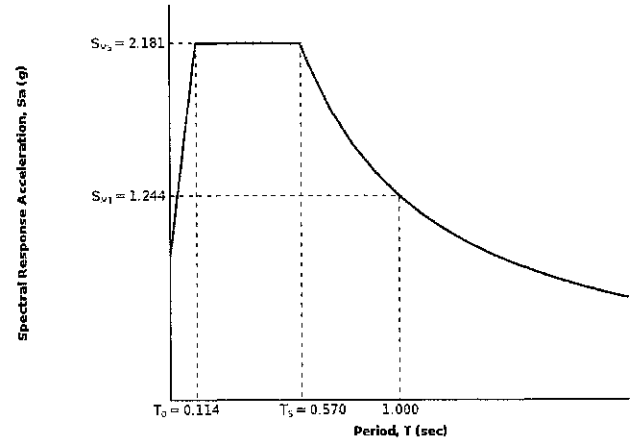
From Figure 22-12[3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.827

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.827 = 0.827$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.827 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.971

From Figure 22-18 [6] C_{R1} = 0.980

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
S_{DS} < 0.167g	A	A	A
0.167g ≤ S_{DS} < 0.33g	B	B	C
0.33g ≤ S_{DS} < 0.50g	C	C	D
0.50g ≤ S_{DS}	D	D	D

For Risk Category = I and S_{DS} = 1.454 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
S_{D1} < 0.067g	A	A	A
0.067g ≤ S_{D1} < 0.133g	B	B	C
0.133g ≤ S_{D1} < 0.20g	C	C	D
0.20g ≤ S_{D1}	D	D	D

For Risk Category = I and S_{D1} = 0.830 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category = "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

APPENDIX C - LIST OF REFERENCES

1. Blake, T.F., 2000, EQFAULT, A Computer Program for the Deterministic Predication of Peak Horizontal Acceleration from Digitized California Faults.

2. Sadigh, K., Chang C. – Y., Egan, J.A., Makdisi, F., and Youngs, R.R. (1997), "Attenuation Relations for Shallow Crustal Earthquakes Based on California Strong Motion Data," Seismological Research Letters, Vol. 68, No. 1, pp. 180-189.

3. California Division of Mines and Geology, (now California Geological Survey), 1999, Seismic Hazard Zones Official Map, Burbank Quadrangle, released March 25.

4. California Division of Mines and Geology, (now California Geological Survey), 1979, Special Studies Zones Official Map, Burbank Quadrangle, released January 1.

5. California Division of Mines and Geology, (now California Geological Survey), 1998, Seismic Hazard Zone Report 016, Seismic Hazard Report for the Burbank 7.5-Minute Quadrangle, Los Angeles County, California.

6. California Building Code, 2013 Edition: Sacramento, CA, California Building Standards Commission, 2 Volumes.

7. Soil Mechanics Design Manual 7.1 (NAVFAC DM-7.1), 1982, Department of the Navy, Naval Facilities Engineering Command, p. 347.

8. Foundation and Earth Structures Design Manual 7.2 (NAVFAC DM-7.2), 1982, Department of the Navy, Naval Facilities Engineering Command.

9. Winterkorn, H.F., and Fang, H.Y., 1976, Foundation Engineering Handbook: New York, NY, Van Nostrand Reinhold, 751 p.

10. California Code of Regulations, Title 8, Chapter 4, Division of Industrial Safety, Subchapter 4, Construction Safety Orders, latest edition, issued by California Department of Industrial Relations, Division of Occupational Safety and Health.

11. Minimum Design Loads for Buildings and Other Structures, 2010, American Society of Civil Engineers, ASCE Standard 7-10, 608p.

12. Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary, 2008, Published by American Concrete Institute, Farmington Hill, MI, 465p.

13. 2008 Interactive Deaggregations, Hazards Program, United States Geological Survey, website http:/equint.cr.usgs.gov/deaggint/2008/dndez.php.

APPENDIX C - LIST OF REFERENCES - continued

14. Cao, T., Bryant, W.A. Rowshandel, B., Branum, D., and Wills, C.J., 2003, the Revised 2002 California Probabilistic Seismic Hazard Maps, California Geological Survey.

15. Peterson, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic Seismic Hazard Assessment for the State of California, California Department of Conservation, Division of Mines and Geology, Open-File Report 96-706.

Appendix E
Noise Analysis Report

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May 1, 2014

Michael P. Donovan, PG, CHg
P S O M A S
Associate/Senior Hydrogeologist, Natural Resources
3 Hutton Centre Drive, #200
Santa Ana, CA 92707

Subject: **Noise Analysis Report for the City of Burbank Pump Station and Force Main Project City of Burbank, California**

Dear Mr. Donovan:

Attached is the noise analysis for the Burbank Pump Station and Force Main project. The analysis was performed in the format of the CEQA checklist that you provided. The modeling output, ambient sampling data and supporting information is included as an appendix to the analysis.

Please let me know if you have any questions. You can reach me at 714.508.4100, extension 1017, or email me at mhoulihan@brandman.com.

Sincerely,

Michael E. Houlihan, AICP
Associate Director, Environmental Services
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DRAFT
Noise Analysis
Pump Station and Force Main Project
City of Burbank, California

Prepared for:
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Date: April 30, 2014

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SECTION 1: INTRODUCTION

FirstCarbon Solutions (FCS) noise analysts have undertaken a noise analysis of the Burbank Force Main and Pump Station Project, which is located in the south-central portion of the City of Burbank, California. The purpose of this research is to determine whether there will be direct or indirect noise impacts during construction of the project.

SECTION 2: PROPOSED PROJECT

The City proposes to improve the existing Beachwood Pump Station located in Mountain View Park, and construct a new 24-inch force main line from the Beachwood Pump Station to the Burbank Water Reclamation Plant (BWRP). The project alignment map is provided as Exhibit 1. Each project component is discussed separately below.

2.1 - Beachwood Pump Station Upgrade

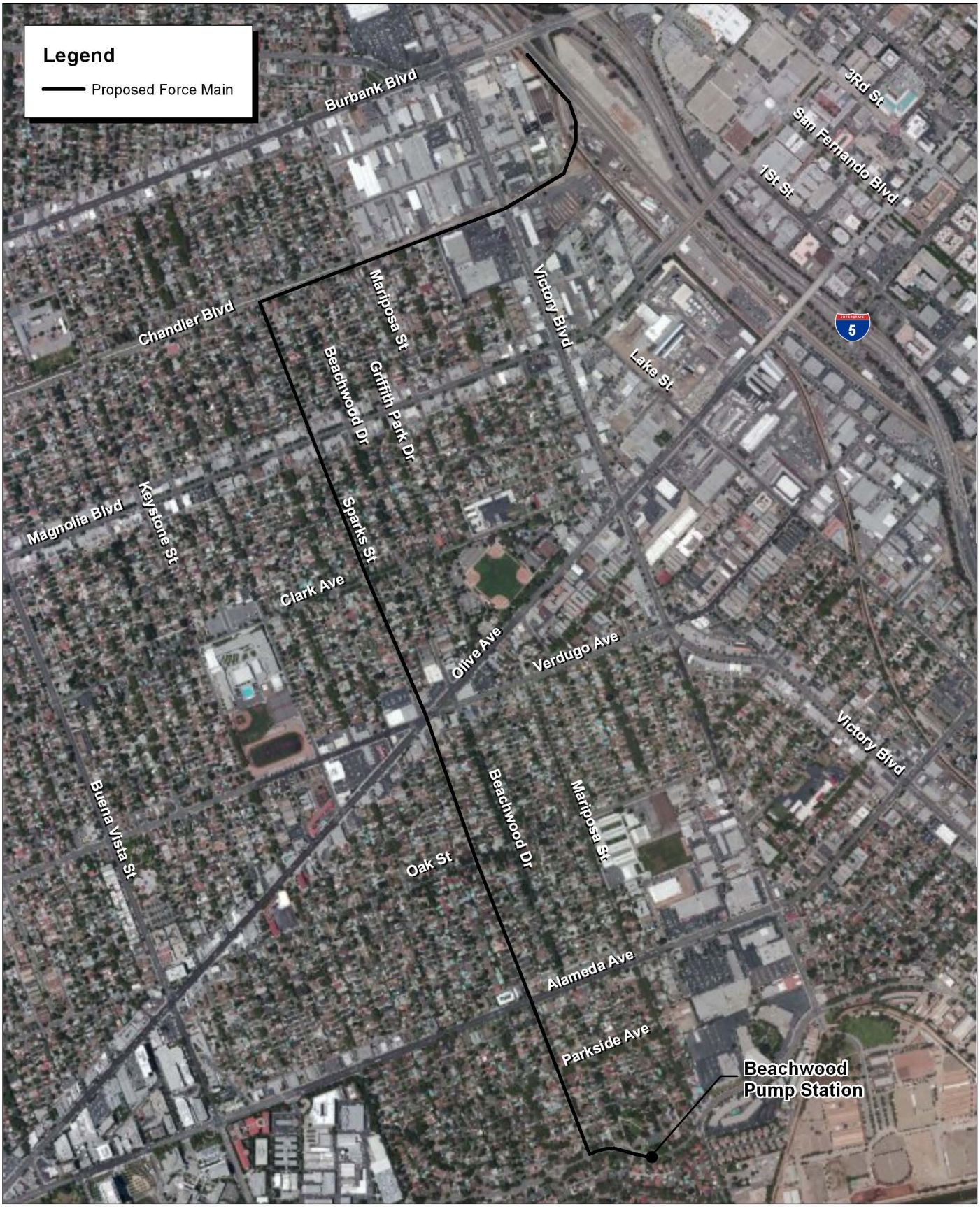
The Beachwood Pump Station receives wastewater from the southern portion of the City, and pumps the sewage to the BWRP via the Beachwood Force Main. Improvements to the Beachwood Pump Station consist of:

- Replacing three existing 150-horsepower (hp) pumps with three new 150-hp pumps,
- Installing custom fabricated fittings to retrofit new pumps into pipes designed for the old pump dimensions,
- Replacing suction and discharge isolation and check valves,
- Re-coating the existing wet well with a polymer liner,
- Improvements or modifications to existing odor control facilities, and
- Integrating the new pumps with the existing variable frequency drive (VFD) system.

2.2 - Beachwood Force Main Replacement

The existing Beachwood Force Main currently runs mostly beneath the pavement of Beachwood Drive between Mountain View Park and the BWRP. The Beachwood Force Main Replacement would construct a new force main mostly placed beneath North and South Sparks Street. The new force main alignment would begin at the Beachwood Pump Station and continue west on West Riverside Drive for approximately 500 feet to North Sparks Street. The new force main would then travel north in North Sparks Street for approximately 8,200 feet to West Chandler Boulevard. From the intersection of North Sparks Street and West Chandler, the new force main would turn east and parallel the existing Beachwood Force Main on West Chandler Boulevard for approximately 4,000 feet. The parallel alignment would continue into the BWRP until it discharges into the BWRP headworks located at the northeast side of the plant. A new magnetic flow meter in an underground vault will be constructed inside the BWRP site similar to the existing Beachwood Force Main discharge.

The construction of the proposed project would involve jacking and boring at the following intersections: Chandler Boulevard/Victory Boulevard, West Magnolia Boulevard/North Sparks Street, West Clark Avenue/North Sparks Street, and Verdugo Avenue/North Sparks Street. Excavation during the jackpit excavation phase could be at a maximum of 20 feet below grade. Boring will occur 10 to 15 feet below grade.



Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012.

Michael Brandman Associates

NORTH

1,200 600 0 1,200 Feet

Exhibit 1
Project Alignment Map

09140031 • 04/2014 | 1_project_alignment.mxd

P S O M A S • CITY OF BURBANK PUMP STATION AND FORCE MAIN PROJECT
NOISE ANALYSIS

2.3 - Construction Timing

The construction is anticipated to begin in September 2014, and be completed within approximately 12 months. Site restoration and pump station upgrades will be the final phases of the construction and is anticipated to be completed between August and September 2015.

SECTION 3: INITIAL STUDY QUESTIONS

The following are responses to the California Environmental Quality Act (CEQA) Guidelines environmental checklist questions for noise impacts. The responses are based on the information above.

Would the project	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

3.1 - Discussion

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit, which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies that are audible to the human ear.

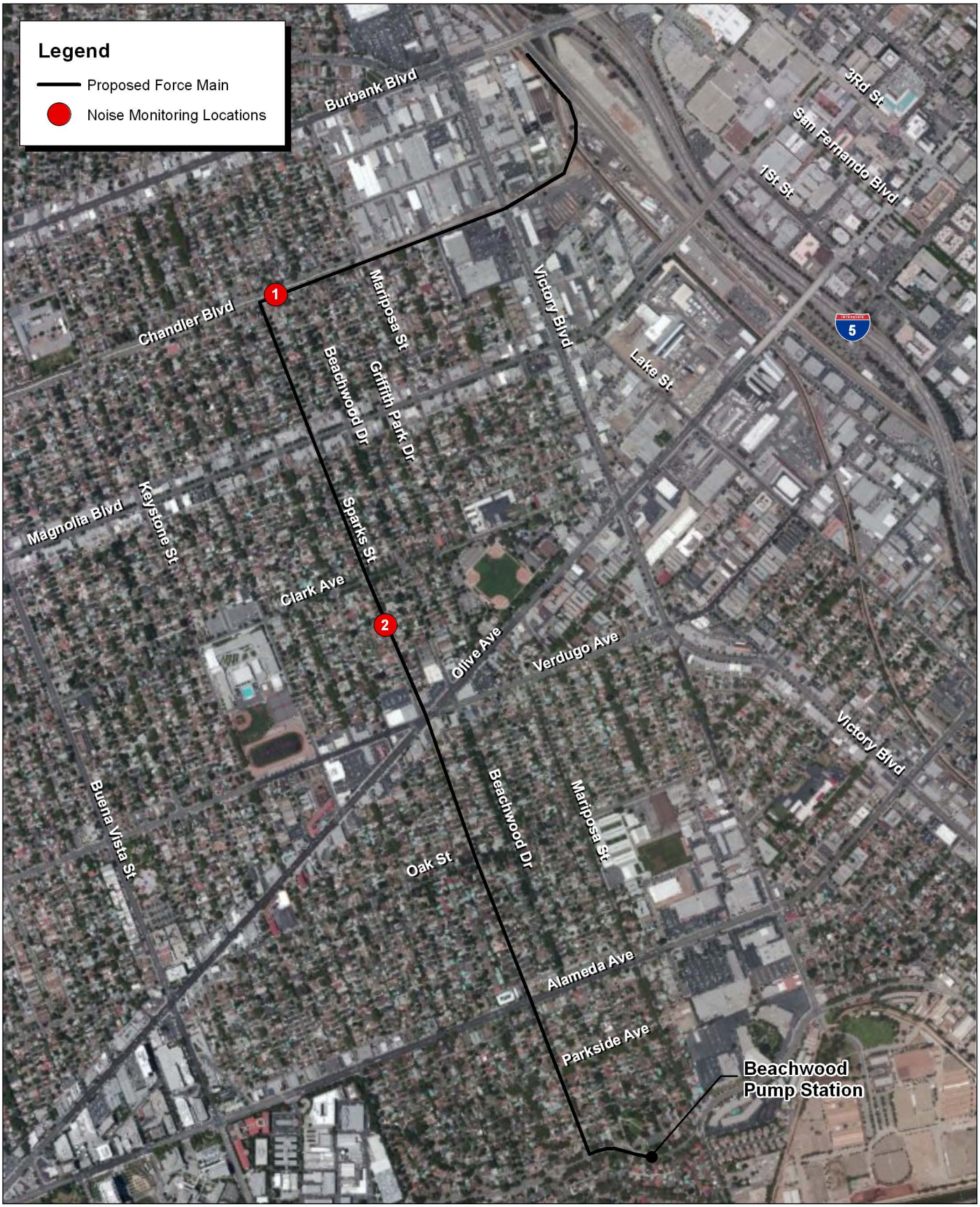
Noise Equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The L_{max} and L_{min} are the highest and lowest values measured by the sound level meter over a given period of time. They are based on the time-weighted sound level in dB.

Noise monitoring was performed using an Extech Model 407780 Type 2 integrating sound level meter. The Extech meter was programmed in “slow” mode to record the sound pressure level at 1-second intervals for in A-weighted form. The sound level meter and microphone was mounted approximately five feet above the ground and equipped with a windscreen during all measurements. The sound level meter was calibrated before monitoring using an Extech calibrator, Model 407766. The noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

The noise monitoring locations were selected in order to obtain noise measurements of the current noise sources impacting the project site and the project vicinity, and to provide a baseline for any potential noise impacts that may be created by development of the proposed project. The sites are shown in Exhibit 2. Exhibit 3 provides a photographic index of the study area and noise level measurement locations.

The noise measurements were recorded between 11:57 hours and 12:41 hours on Monday, July 16, 2012. At the start of the noise monitoring, the sky was partly cloudy with calm wind conditions (3-5 mph).

The noise measurements were taken at two (2) locations adjacent to the alignment. The results of the noise level measurements are provided below in Table 1.



Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data, 2012.

Michael Brandman Associates

NORTH

1,200 600 0 1,200 Feet

Exhibit 2
Noise Monitoring Locations

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P S O M A S • CITY OF BURBANK PUMP STATION AND FORCE MAIN PROJECT
NOISE ANALYSIS

Photograph 1: Between North Sparks Street and North Beachwood Drive along the center of East Chandler Boulevard adjacent to the Chandler Bikeway.

Photograph 2: East side of North Sparks Street adjacent to 212 N Sparks Street.

Source: Michael Brandman Associates, 2012.

Michael Brandman Associates

Exhibit 3
Noise Monitoring Photographs

Table 1: Existing Noise Level Measurements

Site Location	Description	L_{eq}	L_{MAX}	L_{MIN}
Site 1	Center of E Chandler Boulevard adjacent to the Chandler Bikeway. Between North Sparks Street and N Beachwood Drive.	63.3	76.1	46.9
Site 2	East side of North Sparks Street adjacent to 212 North Sparks Street.	60.4	82.6	44.2
Source: Michael Brandman Associates, July 2012.				

The nearest noise receptor is approximately 30 feet from the proposed construction activities; however, for the purpose of this noise analysis, a receptor distance of 25 feet from the proposed construction activities is used as a worst-case evaluation.

3.2 - Responses to Impact Questions

a) Would the project exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant Impact. The City of Burbank understands that construction is a necessary part of community development. Construction noise typically occurs intermittently; the amount of noise depends on the nature or phase of construction (e.g., demolition/land clearing, grading, and excavation, erecting structures). Activities such as site preparation, hauling of materials by trucks, pouring of concrete, and use of power tools can temporarily generate noise. Construction equipment, such as earthmovers, material handlers, and portable generators, also creates noise that reaches high levels for brief periods.

In the City of Burbank Municipal Code, construction noise that occurs between the hours of 7 a.m. and 7 p.m. Monday through Friday and 8 a.m. to 5 p.m. on Saturday is exempt from applicable noise standards. With this regulatory exemption, the City acknowledges that construction noise is an acceptable public nuisance when conducted during the least noise-sensitive hours of the day. The proposed project would abide by the time restrictions on construction activities as stated above. Therefore, the proposed project would be in accordance with the existing standards and noise ordinance, and the impact would be less than significant.

b) Would the project exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact. The City of Burbank Municipal Code contains requirements regarding operational vibration levels. Section 10-1-1704: Vibration states that "Every use shall be so operated that the ground vibration inherently and recurrently generated does not cause a displacement of the earth greater than three thousandths (.003) of one (1) inch as measured at any point along the line of determination as set forth in the specific zone."

The human response to vibration greatly depends on whether the source is continuous or transient. Continuous sources of vibration include certain construction activities, while transient sources include large vehicle movements. Generally, thresholds of perception and agitation are higher for continuous sources. Table 2 illustrates the human response to both continuous and transient sources of groundborne vibration.

Table 2: Human Response to Groundborne Vibration

Peak Particle Velocity (inches/second)		Human Response
Continuous	Transient	
0.40	2.00	Severe
0.10	0.90	Strongly perceptible
0.04	0.25	Distinctly perceptible
0.01	0.04	Barely perceptible
Source: California Department of Transportation, 2004.		

Construction equipment causes different peak particle velocities at 25 feet as shown in Table 3. The peak particle velocities have a corresponding vibration velocity that is commonly abbreviated as VdB.

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Offsite sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible groundborne noise or vibration as shown in Table 3.

Table 3: Vibration Levels Generated by Construction Equipment

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level (LV) at 25 feet
Pile driver (impact)	1.518 (upper range) 0.644 (typical)	112 104
Pile driver (sonic)	0.734 upper range 0.170 typical	105 93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall)	0.008 in soil 0.017 in rock	66 75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level (LV) at 25 feet
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58
Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.		

While long-term operations of the proposed project would not generate excessive groundborne vibration or groundborne noise levels, short-term construction could potentially introduce groundborne vibration to the project site and the surrounding area.

Construction activities such as trenching and jacking and boring can produce vibration that may be felt by adjacent uses. Jacking and boring has a greater potential to produce vibration compared to trenching. The construction of the proposed project would involve jacking and boring at the intersections of W. Chandler Boulevard and Victory Boulevard, W. Magnolia Boulevard and North Sparks Street, W. Clark Avenue and North Sparks Street, and W. Verdugo Road and North Sparks Street. Jacking and boring would have a similar vibration impact as drilling, 0.089 inch per second PPV at 25 feet, with an approximate vibration level of 87 VdB. Jacking and boring would occur only at locations where it is necessary to tunnel under main roads. These locations are mostly adjacent to commercial/industrial receptors. The only intersection with residential receptors adjacent to jacking and boring activities is Clark Avenue and North Sparks Street. Although the home on the southeastern corner of the intersection is the nearest residence to jacking and boring activities and is approximately 30 feet from the point where jacking and boring would occur, a distance of 25 feet is used in this analysis as a worst-case scenario. Although the vibration from the jacking and boring could be perceptible at residential boundaries, it would be intermittent, overshadowed by roadway activities, and cease once the pipeline has been installed under the road. According to the FTA, the construction damage criterion for non-engineered timber and masonry buildings is 0.2 PPV (in/sec). As shown above, the drilling (jacking and boring) vibration impact would be approximately 0.089 PPV. Drilling would need to occur within approximately 14 feet of homes in order to reach the 0.2 PPV construction damage criteria threshold. Therefore, no damage to homes is anticipated from construction activities. Vibration impacts from other construction-related equipment along the alignment are anticipated to be similar or less than those from jacking and boring.

As construction-related vibration is short-term and will not cause damage to homes, potential impacts associated with the vibration from construction equipment are considered to be less than significant.

c) Would the project cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

No Impact. The project consists of upgrades to the existing Beachwood Pump Station and the construction and installation of a force main sewer alignment which begins at the Beachwood Pump

Station and continues west on West Riverside Drive for approximately 500 feet, the alignment turns north and continues 8,200 feet on North Sparks Street up to West Chandler Boulevard. From there, the alignment turns east and parallels the existing Beachwood Force Main on West Chandler Boulevard for approximately 4,000 feet. The parallel alignment continues into the Burbank Water Reclamation Plant (BRWP) until it discharges into the BWRP headworks located at the northeast side of the plant. The majority of the project will occur underground and is part of the city's planned upgrade in order for the pump station to achieve its full design capability. Operational activities would consist of maintenance visits by BRWP maintenance personnel, which would occur at a similar frequency as the existing facilities. No permanent increase in ambient noise levels will occur as a result of project implementation.

d) Would the project cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant With Mitigation Incorporation. The noisiest phase of construction would be during the jacking and boring at major intersections along North Sparks Street and excavation of the trench. Jacking and boring would occur mostly adjacent to commercial/industrial receptors. The intersection with the nearest residential receptors adjacent to jacking and boring activities is West Clark Avenue and North Sparks Street. Although the home on the southeastern corner of the intersection is approximately 30 feet from the point where jacking and boring and excavation is likely to occur, a distance of 25 feet is used in this analysis as a worst-case scenario. Based on a distance of 25 feet to the nearest receptor, the jacking and boring equipment was modeled, together will other equipment that will be used along portions of the alignment. Modeling for construction-related noise was performed using the U.S. Department of Transportation Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM). The RCNM is the FHWA national model used for the prediction of construction-related noise and to determine compliance with noise limits for a variety of types of construction projects of varying complexity. The RCNM includes an extensive compilation of built-in reference noise levels for dozens of types of construction-related equipment based on manufacturer and actual monitored sources. Results from RCNM analysis are shown in Table 4Table 4.

Table 4: Construction Equipment Noise Levels

Equipment Description	Noise Level (L_{max} dBA) at 50 feet	Distance to Receptor[1] (feet)	Maximum Noise Level (L_{max} dBA) at Receptor	Average Noise Level (L_{eq} dBA) at Receptor
Horizontal Boring Hydraulic Jack	82	25	88	82
Dump Truck	76.5	25	82.5	78.5
Crane	80.6	25	86.6	78.6
Excavator	80.7	25	86.7	82.8
Generator	72.8	25	78.8	75.8
Backhoe	77.6	25	83.6	79.6

Equipment Description	Noise Level (L_{max} dBA) at 50 feet	Distance to Receptor[1] (feet)	Maximum Noise Level (L_{max} dBA) at Receptor	Average Noise Level (L_{eq} dBA) at Receptor
Front End Loader	79.1	25	85.1	81.2

Note:
[1] The nearest noise receptor is approximately 30 feet from the proposed construction activities; however, for the purpose of this noise analysis, a receptor distance of 25 feet from the proposed construction activities is used as a worst-case evaluation.
Source: FHWA Roadway Construction Noise Model (Appendix A).

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Although there would be a relatively high single event noise exposure potential, resulting in potential short-term intermittent annoyances, the effect in long-term ambient noise levels would be small when averaged over longer time (24 hours for CNEL). As shown by the ambient noise level measurements in Table 1, the maximum noise level in the project vicinity is already up to 82.6 dBA. The results in the Table 4 show that the construction equipment for the pipeline and pump station would generate maximum noise levels of 88 dBA (L_{max}) at a distance of 25 feet (distance of equipment use from sensitive receptors along the eastern side of North Sparks Street). The noise from construction equipment for the pipeline would be transitory, intermittent, and not a source of continuous noise. The installation and construction of the pipeline along the alignment will proceed at a speed of approximately 100 to 120 feet per day. Therefore, the disturbances will not be located directly adjacent to any one residence for the entire duration of construction, and the impacts will be transitory. The construction activities at the pump station will include various pieces of equipment such as an excavator, backhoe, generator, rubber tire loader, crane, dump truck, air compressor, plate compactors, forklifts, and crane. These pieces of equipment would be used during various stages of the construction activities at the pump station. The maximum construction noise levels at the pump station would be similar to the maximum noise levels during pipeline construction.

As stated previously, the City of Burbank Municipal Code, construction noise that occurs between the hours of 7 a.m. and 7 p.m. Monday through Friday and 8 a.m. to 5 p.m. on Saturday is exempt from applicable noise standards. With this regulatory exemption, the City acknowledges that construction noise is an acceptable public nuisance when conducted during the least noise-sensitive hours of the day. The City also acknowledges that construction noise could cause a substantial temporary increase in the ambient noise environment at nearby noise-sensitive receptors if construction occurs during the more noise-sensitive hours (i.e., evening, nighttime, early morning), or if construction equipment is not properly equipped with noise control devices. Therefore, in order to minimize the potential for construction noise impacts, the following mitigation measures are required.

MM NOI-1 All construction equipment shall use available noise suppression devices and properly maintained mufflers. All internal combustion engines used in the project area shall be equipped with the type of muffler recommended by the vehicle

manufacturer. In addition, all equipment shall be maintained in accordance with the manufacturer's specifications to minimize noise created by faulty or poorly maintained engine, drive train, and other components.

MM NOI-2 During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receptors and as far as possible from the boundary of sensitive receptors.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project within the vicinity of a private airstrip would the project expose people residing or working in the project area to excessive noise levels?

No impact. The project site is located approximately 1.9 miles southeast of Burbank airport. The site occurs well outside of the designated 65 dBA, noise contours.[1] Therefore, impacts associated with excessive airport noise levels are not anticipated.

No private airstrip occurs within 10 miles of the project site. As such, the proposed project would not expose workers to excessive noise levels from private airstrips. Therefore, no noise impacts associated with private airstrips would occur.

[1] Coffman Associates, Inc. 2003. Draft Revision to Noise Compatibility Program for Burbank-Glendale-Pasadena. October. Website: http://www.burbankairport.com/dmdocuments/11-06-03_Burbank-Glendale-PasadenaAirportNC.pdf.

Appendix A: Noise Modeling Data

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MIN Value=46.9
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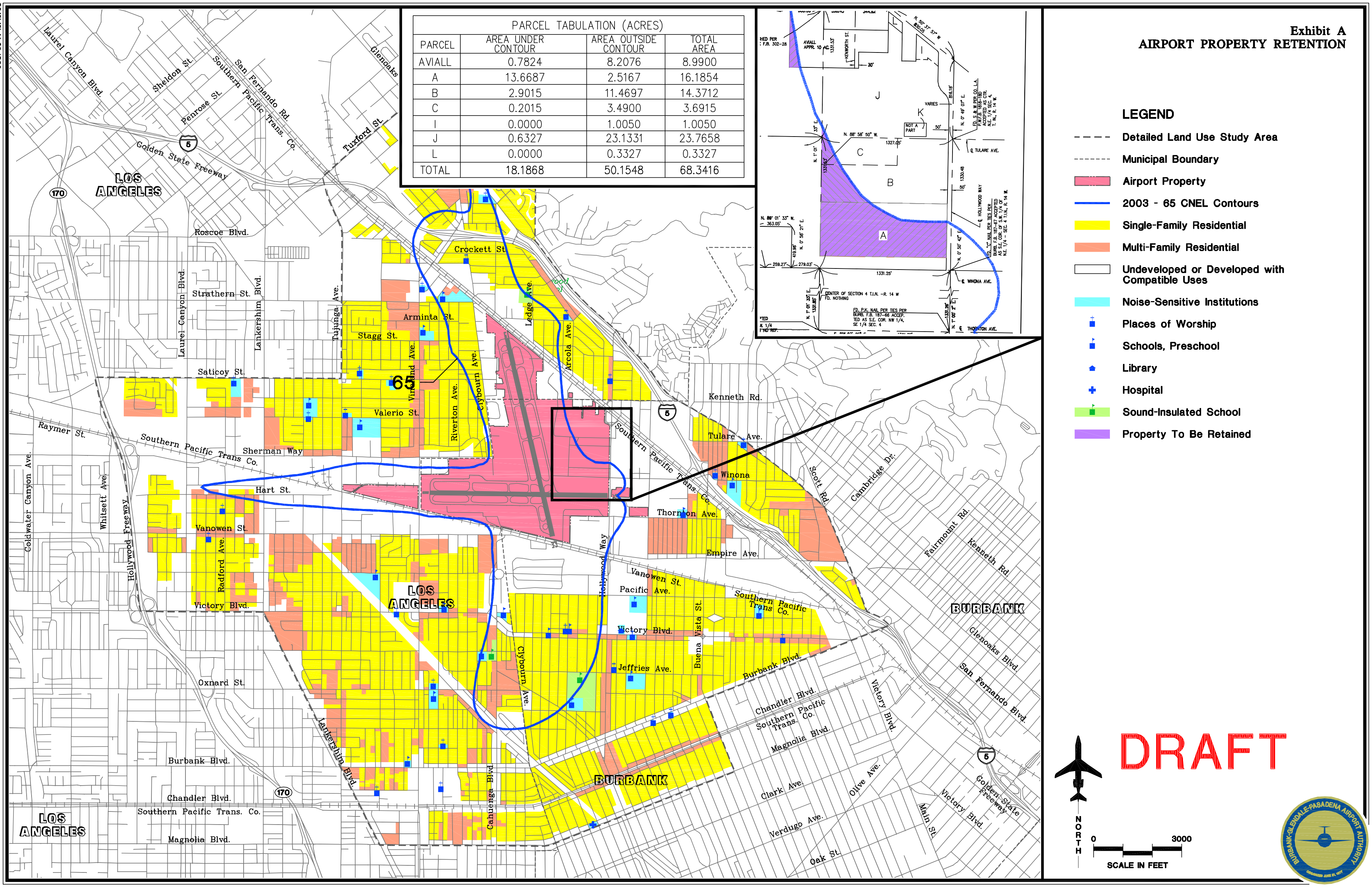
			Roadway Construction Noise Model (RCNM),Version 1.1												
Report dat	8/6/2012														
Case Desc	Burbank Sewer Pipeline Excavation/shoring/pipe install														
				---- Receptor #1 ----											
		Baselines (dBA)													
Descriptior	Land Use	Daytime	Evening	Night											
adjacent re	Residentia	55	60	45											
				Equipment											
				Spec	Actual	Receptor	Estimated								
		Impact		Lmax	Lmax	Distance	Shielding								
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)								
Horizontal Boring Hyd		No	25		82	25	0								
Dump Truck		No	40		76.5	25	0								
Crane		No	16		80.6	25	0								
Excavator		No	40		80.7	25	0								
Generator (<25KVA, V		No	50		72.8	25	0								
Backhoe		No	40		77.6	25	0								
Front End Loader		No	40		79.1	25	0								
				Results											
		Calculated (dBA)			Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Horizontal Boring Hyd		88	82	N/A	60	N/A	60	N/A	45	N/A	22	N/A	22	N/A	37
Dump Truck		82.5	78.5	N/A	60	N/A	60	N/A	45	N/A	18.5	N/A	18.5	N/A	33.5
Crane		86.6	78.6	N/A	60	N/A	60	N/A	45	N/A	18.6	N/A	18.6	N/A	33.6
Excavator		86.7	82.8	N/A	60	N/A	60	N/A	45	N/A	22.8	N/A	22.8	N/A	37.8
Generator (<25KVA, V		78.8	75.8	N/A	60	N/A	60	N/A	45	N/A	15.8	N/A	15.8	N/A	30.8
Backhoe		83.6	79.6	N/A	60	N/A	60	N/A	45	N/A	19.6	N/A	19.6	N/A	34.6
Front End Loader		85.1	81.2	N/A	60	N/A	60	N/A	45	N/A	21.2	N/A	21.2	N/A	36.2
	Total	88	88.8	N/A	60	N/A	60	N/A	45	N/A	28.8	N/A	28.8	N/A	43.8
		*Calculated Lmax is the Loudest value.													

03SP09-A-10/10/03

Exhibit A
AIRPORT PROPERTY RETENTION

PARCEL TABULATION (ACRES)

PARCEL	AREA UNDER CONTOUR	AREA OUTSIDE CONTOUR	TOTAL AREA
AVIALL	0.7824	8.2076	8.9900
A	13.6687	2.5167	16.1854
B	2.9015	11.4697	14.3712
C	0.2015	3.4900	3.6915
I	0.0000	1.0050	1.0050
J	0.6327	23.1331	23.7658
L	0.0000	0.3327	0.3327
TOTAL	18.1868	50.1548	68.3416



DRAFT

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