ARROYO SECO CANYON PROJECT AREAS 2 AND 3
INITIAL STUDY

TECHNICAL APPENDICES

Prepared for:

City of Pasadena Department of Water and Power
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OCTOBER 2019

Appendix A

Judgment and Peremptory Writ of Mandate, the City's Declaration in Support of the Judgment, the Statement of Decision on Petition for Writ of Mandate, and the Settlement Agreement

SUPERIOR COURT OF CALIFORNIA, COUNTY OF LOS ANGELES

DATE: 06/26/17			DEPT. 15
HONORABLE RICHARD FRUIN	JUDGE	E. GARCIA	DEPUTY CLERK
HONORABLE	JUDGE PRO TEM		ELECTRONIC RECORDING MONITOR
H. AVALOS, C.A.	Deputy Sheriff	NONE	Reporter

BS156207

SPIRIT OF THE SAGE COUNCIL ET A
VS
CITY OF PASADENA ET AL

CEQA
170.6 O'DONNELL - RESPONDENT

Plaintiff Counsel

NO APPEARANCES

Defendant Counsel

NATURE OF PROCEEDINGS:

THERESA E. FUENTES
PASADENA CITY ATTORNEY'S OFFICE
100 N. GARFIELD AVE., ROOM N210
PASADENA, CA 91109

BRYAN W. PEASE
LAW OFFICE OF BRYAN W. PEASE
3170 FOURTH AVE., SUITE 250
SAN DIEGO, CA 92103

MINUTES ENTERED
06/26/17
COUNTY CLERK

SUPERIOR COURT OF CALIFORNIA, COUNTY OF LOS ANGELES

DATE: 06/26/17			DEPT. 15
HONORABLE RICHARD FRUIN	JUDGE	E. GARCIA	DEPUTY CLERK
HONORABLE	JUDGE PRO TEM		ELECTRONIC RECORDING MONITOR
H. AVALOS, C.A.	Deputy Sheriff	NONE	Reporter

BS156207

Plaintiff Counsel

SPIRIT OF THE SAGE COUNCIL ET A VS CITY OF PASADENA ET AL

NO APPEARANCES

Defendant Counsel

CEQA
170.6 O'DONNELL - RESPONDENT

NATURE OF PROCEEDINGS:

NON-APPEARANCE CASE REVIEW;

The Court is in receipt of the Proposed Judgment Granting Peremptory Writ of Mandate and the Proposed Writ of Mandate.

The Court having reviewed the said documents, finds the judgment to be proper, and the said judgment is signed and filed this date. Counsel for the Petitioner to file Notice of Entry Judgment.

The Proposed Writ of Mandate is forwarded to Room 118, with the check for $25.00 for the Clerk's signature.

The Court also issues the following document: NOTICE OF ENTRY OF JUDGMENT AND PEREMPORTY WRIT OF MANDATE

Said document and the said judgment are both served on all sides via U.S. Mail.

CLERK'S CERTIFICATE OF MAILING

I, the below-named Executive Officer/Clerk of the above-entitled court, do hereby certify that I am not a party to the cause herein, and that on this date I served the minute order dated 6/26/17,

MINUTES ENTERED
06/26/17
COUNTY CLERK

SUPERIOR COURT OF CALIFORNIA, COUNTY OF LOS ANGELES

DATE: 06/26/17			DEPT. 15
HONORABLE RICHARD FRUIN	JUDGE	E. GARCIA	DEPUTY CLERK
HONORABLE	JUDGE PRO TEM		ELECTRONIC RECORDING MONITOR
H. AVALOS, C.A.	Deputy Sheriff	NONE	Reporter

BS156207

SPIRIT OF THE SAGE COUNCIL ET A
VS
CITY OF PASADENA ET AL

CEQA
170.6 O'DONNELL - RESPONDENT

Plaintiff Counsel: NO APPEARANCES

Defendant Counsel:

NATURE OF PROCEEDINGS:

upon each party or counsel named below by placing the document for collection and mailing so as to cause it to be deposited in the United States mail at the courthouse in Los Angeles, California, one copy of the original filed/entered herein in a separate sealed envelope to each address as shown below with the postage thereon fully prepaid, in accordance with standard court practices.

Dated: 6/26/17

Sherri R. Carter, Executive Officer/Clerk

By: _____
E. GARCIA, DEPUTY CLERK

TODD T. CARDIFF
LAW OFFICE OF TODD T. CARDIFF
1901 FIRST AVE., SUITE 219
SAN DIEGO, CA 92101

MINUTES ENTERED
06/26/17
COUNTY CLERK

NOTICE OF ENTRY OF JUDGMENT AND PEREMPTORY WRIT OF MANDATE

SPIRIT OF THE SAGE COUNCIL, PROJECT SOLITON v. CITY OF PASADENA, CITY OF PASADENA WATER AND POWER, Case No. BS 156207

The court issued its Statement of Decision on Petition for Writ of Mandate on March 20, 2017. The court thereafter received drafts for a Judgment and Peremptory Writ of Mandate from each side. The court held a hearing on April 24, 2017 to discuss and resolve the parties' differences as to the proposed draft Judgment and Peremptory Writ of Mandate.

The parties have since lodged revised drafts for the Judgment and Peremptory Writ of Mandate, and also objections to the drafts proposed by the other side. The principal issue dividing the parties has been the definition of those parts of the Project that are to be severed from the Peremptory Writ. The court's Statement of Decision, p. 16 provides:

The Project has separate components and petitioners have not challenged the City's approvals as to certain parts of the Project. The parties may consider whether a severance is appropriate under Public Resources Code section 21168.9(b) and submit a Writ providing for an appropriate severance. Any severance, however, must not prejudice full compliance with CEQA.

The City lodged a proposed Judgment and a proposed Peremptory Writ of Mandate on May 3, 2017. Petitioners lodged their objections and also submitted their proposed Judgment and Peremptory Writ of Mandate on June 1. The City filed its Further Memorandum and the Declaration of Gary Takara and lodged revised drafts for a Judgment and Peremptory Writ of Mandate on June 20. Petitioners filed their objections on June 22, and requested therein that the court hold another hearing to settle the form of the Judgment and Peremptory Writ of Mandate. The court declines to hold a further hearing. The City has proposed a Writ that defines a severance in a manner that "will not," the City promises, "prejudice complete and full compliance with CEQA." The definition of the parts of the project that may proceed are defined in detail in the Takara declaration and are sufficiently described in the proposed Peremptory Writ of Mandate. The court accordingly adopts the forms lodged by the City.

The court has signed, entered and herewith serves its Judgment and Peremptory Writ of Mandate.

DATED: June 26, 2017

Richard L. Fruin Jr.

RICHARD L. FRUIN, JR.
Superior Court of California
County of Los Angeles

SUPERIOR COURT FOR THE STATE OF CALIFORNIA

COUNTY OF LOS ANGELES - CENTRAL DISTRICT

SPIRIT OF THE SAGE COUNCIL, a California Public Benefit Corporation; PROJECT SOLITON, a California Public Benefit Corporation

Petitioners,

v.

CITY OF PASADENA, a public entity; CITY OF PASADENA WATER AND POWER; and DOES 1 through 25, inclusive;

Respondents.

Case No. BS 156207

Assigned for All Purposes to the Honorable Judge Richard Fruin Department 15

~~[PROPOSED]~~ JUDGMENT GRANTING PEREMPTORY WRIT OF MANDATE

This matter came on regularly for hearing on December 15, 2016, with additional hearings on January 13 and 18, 2017, in Department 15 of this Court, located at 111 N. Hill Ave., Los Angeles CA. Todd T. Cardiff and Bryan W. Pease appeared on behalf of petitioners Spirit of the Sage Council and Project Soliton, and Theresa E. Fuentes, Assistant City Attorney, appeared on behalf of respondent City of Pasadena and its Water and Power Department.

The Court, having reviewed the record of respondent's proceedings in this matter, the briefs submitted by all parties, and the oral argument of all counsel; the matter having been submitted for decision and the Court having ruled on the entirety of the matter as set forth in its Statement of Decision attached hereto; the Court having invited the parties to propose severance of the project pursuant to Public Resources Code Section 21168.9 and consistent with its Statement of Decision; and the Court having directed that judgment and a peremptory writ of mandate issue in this proceeding,

IT IS ORDERED THAT:

1. Judgment is entered in favor of petitioners in part.

2. A peremptory writ of mandate directed to respondent shall issue under seal of this Court, invalidating respondent's approval of Conditional Use Permit No. 6222 and certification of a Mitigated Negative Declaration with the exception of those specific project elements the Court found severable under Public Resources Code Section 21168.9(b), as set forth in the Writ.

3. Petitioners are entitled to costs of suit. This Court reserves jurisdiction over this matter to determine entitlement to attorneys' fees after proper notice and motion.

4. This Court also reserves jurisdiction over any return on the writ of mandate by respondent.

DATED: June 26, 2017 By: Richard Fruin
Honorable Judge Richard Fruin

PROOF OF SERVICE

STATE OF CALIFORNIA, COUNTY OF LOS ANGELES

I, CLAIRE A. VORHIS, hereby declare and state:

I am employed in the County of Los Angeles; I am over the age of eighteen years and not a party to the within entitled action. My business address is 100 North Garfield Avenue, Suite N210, Pasadena, California. My mailing address is PO Box 7115, Pasadena, CA 91109-7215.

On June 20, 2017, I served the foregoing document described as:

[PROPOSED] JUDGMENT GRANTING PEREMPTORY WRIT OF MANDATE

on the interested parties by placing a true copy thereof enclosed in a sealed envelope addressed as follows:

SEE ATTACHED SERVICE LIST

[ ] **BY FACSIMILE:** Based on an agreement of the parties to accept service by fax transmission, I faxed the documents to the persons at the fax number. No error was reported by the fax machine that I used. A copy of the record of the fax transmission, which I printed out is attached..

[ ] **BY MAIL:**

[ ] As follows: I am "readily familiar" with the City's practice of collection and processing correspondence for mailing. Under that practice it would be deposited with U.S. postal service on that same day with postage thereon fully prepaid at Pasadena, California, in the ordinary course of business. I am aware that on motion of the party served, service is presumed invalid if postal cancellation date or postage meter date is more than one day after date of deposit for mailing in affidavit.

[ ] I deposited such envelope in the mail at Pasadena, California. The envelope was mailed with postage fully prepaid.

[ ] **BY PERSONAL SERVICE:**

[ ] I delivered such envelope by hand to the offices of the addressee pursuant to CCP § 1011.

[X] BY EMAIL OR ELECTRONIC TRANSMISSION:

[X] Based on an agreement of the parties to accept service by e-mail or electronic transmission (with a courtesy hard copy should any document exceed 30 pages), I caused the documents to be sent to the persons at the e-mail addresses listed above. I did not receive, within a reasonable time after the transmission, any electronic message or other indication that the transmission was unsuccessful.

I declare under penalty of perjury under the laws of the State of California that the above is true and correct.

EXECUTED on June 20, 2017, at Pasadena, California.

CLAIRE A. VORHIS

ATTORNEYS' SERVICE LIST

SPIRIT OF THE SAGE COUNCIL, a California Public Benefit Corporation; PROJECT SOLITON, a California Public Benefit Corporation, Petitioners v. CITY OF PASADENA, a public entity; CITY OF PASADENA WATER AND POWER; and DOES 1 through 25, inclusive, Respondents.

City Attorney File No. 7534
Case No. BS 156207

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Attorneys for Defendant, CITY OF PASADENA
[FEE EXEMPT GOV. CODE §6103]

SUPERIOR COURT FOR THE STATE OF CALIFORNIA

COUNTY OF LOS ANGELES - CENTRAL DISTRICT

SPIRIT OF THE SAGE COUNCIL, a California Public Benefit Corporation; PROJECT SOLITON, a California Public Benefit Corporation

Petitioners,

v.

CITY OF PASADENA, a public entity; CITY OF PASADENA WATER AND POWER; and DOES 1 through 25, inclusive;

Respondents.

Case No. BS 156207

Assigned for All Purposes to the Honorable Judge Richard Fruin Department 15

DECLARATION OF GARY TAKARA IN SUPPORT OF CITY OF PASADENA'S [PROPOSED] JUDGMENT

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I, Gary Takara, declare:

1. I am an Engineering Manager in the City of Pasadena's ("City") Water and Power Department ("PWP"), and have held this position since June 2015. I started with the City in March 1994 as an Associate Engineer. I have over 27 years in water resource management and related engineering experience. In 1990, I received my Bachelor of Science from California Polytechnic, Pomona in Civil Engineering.
2. In my current capacity as Engineering Manager, my job duties include managing the PWP Water Supply and Water Quality groups. I supervise the project team for the Arroyo Seco Canyon Project ("Project") at issue in this case. I have been intimately involved in the planning, engineering, grant administration, and implementation of the Project. All of the physical work done to date on the Project has received my review and approval prior to implementation.
3. As a result of the Station Fire in 2009 and subsequent heavy rains in 2010, the Arroyo Seco experienced substantial debris flows and flooding that damaged existing PWP water diversion facilities in the Arroyo. In general, the Project involves removal of facilities in Area 1 (Arroyo Seco Headworks), repair and replacement of damaged and worn facilities in Area 2 (Arroyo Seco Intake), and repair, maintenance, construction of new facilities, and recreational improvements in Area 3 (JPL East Parking Lot).
4. I am aware of the court's Statement of Decision in this matter, and in particular of the court's "Comments for Hearing on April 24, 2017 at 10:00 A.M" wherein the court stated: "The court's Statement of Decision is not limited to increased water appropriations over the City's historical usage. It refers to any additional capacity to take stream water at Area 2 or any other location within the Project boundaries."
5. The purpose of my declaration is to provide expert opinion to distinguish between the specific Project elements that would facilitate to the City's capacity to take additional stream water so that those may be severed from the Project as appears to be the desire of the court, and the remainder of the Project related to either recreational/JPL

accommodating improvements, or repair, maintain, and operate of PWP facilities necessary to fully return back to normal operations.

6. None of the work in Area 1 is related to increasing PWP's capacity to take additional stream water. That work is related to removing facilities from the Arroyo Seco and conducting streambed repair necessary as a result of such removal.

7. In Area 2, all Project elements are directly related to PWP's ability to take additional stream water, with the exception of the access road improvement and related slope reconstruction and protective riprap. The road improvements are necessary to reach Area 1 with the construction equipment required to conduct the removal described above.

8. The work in Area 3 is of overlapping utility, and is best explained by reference to Table 3.1-1 of the Initial Study/Mitigated Negative Declaration at issue in this case, a copy of which is attached hereto as Exhibit A for the court's reference. None of the Project elements in the following rows have anything to do with increasing PWP's capacity to take additional stream water: JPL East Parking Lot; New public restroom; Bridge Crossing; Trails; Trailhead; Habitat restoration (none proposed as part of the Project); Pipeline Relocation and Demolition (further explanation provided below); Storm Drain Improvements (none proposed as part of the Project); Overlook (none proposed as part of the Project); Park Entrance (none proposed as part of the Project); Access Road; Pump-back system (none proposed as part of the Project); Water line; Overhead power and communications lines; Septic Tanks and Sewer lines; Security Gates; Lighting; and Public telephones (not proposed as part of the Project).

    a. The only Project elements in Area 3 related to increasing PWP's capacity to take additional stream water are found in the "Spreading Basins" row, and consist of "expand 4 existing basins" and "construct 2 [new] spreading basins." Those items are highlighted in yellow on Exhibit A for sake of clarity.

    b. In that same row, the Project element of "replace 2 sludge ponds with 2 new spreading basins" would <u>not</u> enable to take additional stream water. PWP currently operates the sludge ponds as spreading basins, so this work is necessary

to improve existing facilities to better serve the use for which they are currently operated.

c. Also in that same row, the Project element of "construct 2 sedimentation basins" is necessary as a result of the ruined state of the headworks in Area 1, as debris currently freely flows downstream and will eventually clog up PWP's existing facilities without proper management.

d. None of the Project elements in the row titled "Pipeline Relocation and Demolition" are related to an increased capacity to take stream water.

i. The Project element "replace and realign Hume line from the north end of parking lot to the spreading basins" is related to an existing pipeline that currently directs water to the spreading basins and is not intended to be increased in size but simply realigned to accommodate the proposed layout for improvements at Area 3.

ii. The Project element "relocate the JPL water line to the new access road" moves an existing line to be located out of the way to construct the 2 sedimentation basins. (See notation regarding "Relocate the 12-inch diameter Arroyo Booster pipeline to the new access road" in paragraph 10 below.) But even if the sedimentation basins were not constructed, PWP would want the water lines under the new road so as to minimize disruption from any future digging in the area.

iii. The Project element "demolish a portion of the influent and effluent line from the Behner Water Treatment Plant" is related to removal of portions of existing pipelines no longer in use.

iv. The Project element "Remove sludge lines" is simply removal of unnecessary piping and general cleaning up of the area.

9. For sake of clarity, the Project does not propose any new or increased piping capacity between Areas 2 and 3 that would eventually be of utility should PWP receive all

necessary regulatory and court approvals to increase its capacity to take water from the Arroyo Seco.

10. PWP did undertake some physical work in Area 3 during the pendency of this litigation as there was no court order to the contrary. Specifically, PWP constructed pipelines within the alignment of the proposed new road, including: a new 12-inch pipeline to serve a future groundwater well beside Basin F; a 16-inch utility line to serve existing offsite wells in the Arroyo and the existing Monk Hill Treatment Plant, a 12-inch discharge main for the existing Arroyo Booster located south of the site (this work was undertaken in place of "Relocate the 12-inch diameter Arroyo Booster pipeline to the new access road"), and relocation of the 12-inch potable water service to the NASA/JPL property. None of this work would enable an increase in the capacity to take stream water.

11. Finally, it is important to note that certain construction activity assumptions were included in the Project, and are set forth in Exhibit A in Table 3.2-1. The assumptions would remain the same in general, but scaled back in any particular Project Area consistent with any judgment issued by this court.

12. The City is facing delay costs associated with its inability to move forward with elements of the Project unrelated to additional capacity to take water out of the stream. Temporary bridges along the trail to Areas 1 and 2 must be installed to support the movement of construction equipment. The City began that work during the pendency of this litigation, but stopped once the court issued its Statement of Decision. Because the City does not yet know whether it can proceed with any part of the Project, it must extend the contract for the temporary bridges, at an additional cost of $30,000 over the original contract amount. On Monday, June 19, 2017, the City Council approved that additional expense. Attached hereto as Exhibit B is the staff report upon which Council acted, and which explains the delay costs.

13. I am personally familiar with the facts stated herein and if called upon to testify, I could and would competently testify thereto.

I declare under penalty of perjury that the foregoing is true and correct.

Gary Takara

EXHIBIT A

TABLE 3.1-1
AREA 3 IMPROVEMENTS

Area 3 Improvements	Description of Improvements		
	Hahamongna Watershed Park Master Plan	Final Master EIR for Arroyo Seco Master Plan* (Master EIR section)	Arroyo Seco Canyon Project
JPL East Parking Lot	Relocate JPL parking, remove southern ¾ of parking lot and convert northern ¼ into public parking.	6-story, 1,200-space parking structure on JPL west parking lot (2.3.1.11.1 and 3.1.4.1.1).	*(Note: This parking structure is under construction by JPL and is not part of the Project.)*
		Convert JPL parking to 200-space public parking (2.3.1.15.1).	Up to 100-space decomposed granite recreational parking lot. *(Note: This is 100 parking spaces fewer than the parking lot analyzed in the Master EIR.)*
New public restroom	New restroom (with 1 urinal and 1 stall for men and 2 stalls for women) at northern end of parking lot, with storage area, public telephone, underground power connection, and sewage lift station and force main leading to the JPL line across the JPL bridge.	New restroom (with 1 urinal and 1 stall for men and 2 stalls for women) at northern end of parking lot, with storage area, trash enclosure, emergency phone, sewage lift station, and force main leading to the sewer line at the JPL campus through JPL bridge (2.3.1.15.2).	New restroom at northern end of parking lot with 2 gender-neutral stalls and sewage lift station and sewer connection leading to the JPL sewer line across JPL bridge. *(Note: This is 1 urinal and 1 stall fewer than the restroom analyzed in the Master EIR.)*
Bridge Crossing	New bridge crossing for the North Perimeter Trail, vehicles, and utilities.	Northern Bridge Crossing across Arroyo Seco that is 12 feet wide and 150 feet long (2.3.1.16.3).	Not proposed, but the existing pedestrian access path across the JPL bridge will be maintained and will connect to the new parking lot.
Spreading Basins	Expand 4 existing basins.	Expand 4 existing basins into the JPL parking lot (2.3.1.4.5).	Expand 4 existing basins.
	Relocate 2 sludge ponds.	Relocate and expand 2 sludge basins (2.3.1.4.5).	Replace 2 sludge ponds with 2 new spreading basins.
	Build 2 new basins.	Build 2 new basins (2.3.1.4.5).	Construct 2 sedimentation basins and 2 spreading basins. *(Note: This is 2 basins more than analyzed in the Master EIR. While the basins would be located in the same area, the area would have a different basin configuration.)*
		Convert 2 basins into a lake (2.3.1.4.5 and 2.3.1.13).	Not proposed.

TABLE 3.1-1
AREA 3 IMPROVEMENTS

Area 3 Improvements	Description of Improvements		
	Hahamongna Watershed Park Master Plan	Final Master EIR for Arroyo Seco Master Plan* (Master EIR section)	Arroyo Seco Canyon Project
Trails	New trail that runs from the north end of the JPL parking lot to the Gabrielino Trail.	4 trail connections from East Rim Trail to Perimeter Trail, including a new trail at the north end of the parking lot (2.3.1.16.5).	Potential future pedestrian pathway from the north end of the parking lot through the slope area to Gabrielino Trail
	Extend East Rim Trail from Arroyo Well to VOC Water Treatment Plant and from Arroyo Well to both the Altadena Crest Trail and the Gabrielino Trail (along back of JPL parking lot).	East Rim Trail is approximately 2,600 linear feet of new trail that runs from the VOC Water Treatment Plant through Johnson Field to the Arroyo Well before ending at the Altacrest Trail on backside of the existing parking lot (2.3.1.16.4).	Pedestrian pathway/trail along the eastern edge of the parking lot, with a potential future extension north to join the Gabrielino Trail north of Area 3.
	Relocate existing trail to the maintenance road.	Relocate the existing trail to the maintenance road (2.3.1.18.2).	Proposed maintenance roads around new spreading basins will be open for public use.
Trailhead	Gabrielino Trailhead area with a new restroom, picnic tables, public parking, and interpretive signage.	Interpretive and picnic area at the intersection of the Arroyo Well and Johnson Field Road, with parking spaces (2.3.1.12.7).	Restroom, pet waste station, and signage proposed at the Gabrielino Trailhead area.
Habitat restoration	Realign stream corridor and restore habitat on banks west of the parking lot and basins.	Move, expand, and restore the stream corridor by the Altadena drain (2.3.1.18.1.1).	No improvements are proposed on the banks west of the parking lot.
	Establish habitat at spreading basins.	Habitat establishment at spreading basins (2.3.1.18.1.3).	Not proposed.
	Establish habitat at the East Entrance.	Habitat establishment at the East Entrance and at Sunset Overlook (2.3.1.18.1.5).	Not proposed.
Pipeline Relocation and Demolition	None specified.	None specified.	Replace and realign Hume line from the north end of parking lot to the spreading basins.
			Relocate the JPL water line to the new access road.
			Demolish a portion of the influent and effluent line from the Behner Water Treatment Plant
			Relocate the 12-inch diameter Arroyo Booster pipeline to the new access road.
			Remove sludge lines.

TABLE 3.1-1
AREA 3 IMPROVEMENTS

Area 3 Improvements	Description of Improvements		
	Hahamongna Watershed Park Master Plan	Final Master EIR for Arroyo Seco Master Plan (Master EIR section)	Arroyo Seco Canyon Project
Storm Drain Improvements	Shorten the Altadena storm drain and armor embankment to reduce erosion and restore habitat.	Shorten the Altadena drain and restore the stream corridor (2.3.1.4.6).	Not proposed.
	Extend the Altacrest storm drain as an underground pipe into the stream with inlets from the access road and the parking lot.	Extend the Altacrest drain as an underground drain between basins and that empties into the stream, with inlets to receive runoff from the parking lot (2.3.1.4.7).	Altacrest drain extension is not proposed
			County Storm Drain remains in place.
Overlook	Construct Sunset Overlook with interpretive signage and park amenities north of the East entrance.	Construct Sunset Overlook with picnic tables, seating, signage, and parking near east park entrance (2.3.1.14).	Not proposed.
Park Entrance	Relocate and improve the park entrance at Windsor/Explorer/Ventura intersection to Windsor/Mountain View.	Relocate the park entrance to Windsor/Mountain View, add a retaining wall, and restore habitat (2.3.1.3.1).	Not proposed.
	Relocate the parking area south of the entrance to the JPL parking lot	Relocate the parking area to the northern end of the JPL parking lot (2.3.1.3.1).	Not proposed.
		Reconstruct Windsor/Ventura intersection; add an interpretive area and a parking area (2.3.1.3.3)	Not proposed.
Access Road	Realign to the east side of the basins.	Realign along eastern edge of the parking lot (2.3.1.3.2).	Realign along eastern side of the basins and south and west of the new parking lot.
	Widen the road to Johnson Field.	Widen the Johnson Field Road to 2 lanes (2.3.1.3.3).	Not proposed.
Pump-Back system	Inlet at dam; pipe at the bottom eastern slope; and outlet at the highest east side basin and across the new bridge to the west side basins	Inlet, pump, and pipes to basins and lakes (2.3.1.4.2).	Not proposed.
Water line	Water line connections to new restrooms, campsite sinks, drinking fountains, and buildings.	None specified.	Connect the restroom and parking lot irrigation system to a metered service from the relocated JPL water main.

TABLE 3.1-1
AREA 3 IMPROVEMENTS

Area 3 Improvements	Description of Improvements		
	Hahamongna Watershed Park Master Plan	Final Master EIR for Arroyo Seco Master Plan* (Master EIR section)	Arroyo Seco Canyon Project
Overhead power and communication lines	Relocate to the North Bridge crossing or within the utility easement.	Relocate power and communication lines.	Not proposed.
	Power connections to new restrooms and pump-back system.	None specified.	Connect the restroom, irrigation controls, and basin metering structure to a new service drop using an existing overhead line in Area 3 (where the biggest load will come from the lift station).
	Underground PWP overhead distribution lines from the VOC Water Treatment Plant to Arroyo Well and from the VOC Water Treatment Plant to Johnson Field.	Underground 3,000 feet of power and communication lines from the VOC Water Treatment Plant to Arroyo Well and from the VOC Water Treatment Plant to Johnson Field (2.3.1.19.1).	Not proposed.
	Relocate SCE lines running from the JPL substation to the Windsor/Ventura intersection.	Realign the SCE power line across the basins to the North Bridge, Gabrielino Trail, Ventura Street, and ultimately to the existing line on Altadena Drive (2.3.1.19.2).	Not proposed.
Septic Tanks and Sewer lines	Abandon all septic tanks and construct a sewer collection system.	Connect a new restroom near Johnson Field to the sewer line on Lehigh Street (2.3.1.12.3) and connect a new restroom at the JPL parking lot to the sewer line in JPL campus (2.3.1.15.2).	Connect a restroom to sewer line in JPL campus.
Security gates	Add security gates at all vehicular entries and at the tunnel from the dam parking lot.	Add gates and fencing at the East Entrance and along west side of Windsor Avenue (2.3.1.20).	Not proposed.
		Add fencing at end of Altadena Drive (2.3.1.20).	Not proposed.
			Add security gates at the north end of the parking lot, with a roundabout and a guard house

TABLE 3.1-1
AREA 3 IMPROVEMENTS

Area 3 Improvements	Description of Improvements		
	Hahamongna Watershed Park Master Plan	Final Master EIR for Arroyo Seco Master Plan* (Master EIR section)	Arroyo Seco Canyon Project
Lighting	Add lighting on built structures and at major park entrances only.	Add safety lights at the new parking lots and at the new restrooms (3.1.4.1.1).	Add restroom interior and exterior lighting.
Public telephones	Add near improved restrooms and recreation amenities.	Add at the new restroom at north end of the public parking lot (2.3.1.15.2).	Not proposed.

JPL: Jet Propulsion Laboratory; VOC: volatile organic compounds; PWP: City of Pasadena Water and Power; SCE: Southern California Edison.

* Based on the Final Master EIR that includes Draft Master EIR and Clarifications and Revisions to Draft Master EIR (Section 12.0 of the Final Master EIR).

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As shown, the Project would implement some of the improvements proposed by the HWMP and analyzed in the Final Master EIR for the Arroyo Seco Master Plan. However, the Project proposes a recreational parking lot and a restroom that are smaller than those analyzed in the Final Master EIR. There is also a variation to the spreading basin configuration within the same location and area. Other proposed improvements in Area 3 (e.g., proposed trails, walkway, hume line relocation, JPL water line relocation, utility line demolition in the proposed basin area, water line connection, security gates, roundabout, and guard station at north end of parking lot) are not discussed in the HWMP or the Final Master EIR. At the same time, the Project does not preclude the future implementation of other improvements in Area 3 (e.g., storm drain improvements, trail relocation, pumpback system, and utility line relocations) as contained in the HWMP or analyzed by the Final Master EIR but not proposed by the Project. Accordingly, this IS/MND is a stand-alone document and does not tier off of the Master EIR.

3.2 PROJECT DEMOLITION AND CONSTRUCTION

Construction of the permanent Project improvements is anticipated to take approximately 16 months, starting in Summer 2015 with construction of the temporary bridges beginning one month before the start of construction activities in Areas 1 and 2. Designated staging areas will be fenced to prevent safety hazards, as well as deter to vandalism and theft. Project completion is expected by Fall 2016, with temporary bridge demolition occurring at the end of construction activities in Areas 1 and 2. Planned construction activities are broken out by Area below.

During grading activities in Area 3, a total of approximately 23,000 cy of cut materials is anticipated. In the interest of minimizing export from the Project site, the City may implement a mechanical shaker to sort and sift through excavated soils. The shaker would separate finer soils from larger rocks, thereby allowing for the beneficial reuse of the excavated soils as engineered fill materials during the construction of the spreading basins. The shaker would be in operation for 8-hour days over the last 2 months of grading activities. If the City utilizes the shaker option, approximately 23,000 cy of cut materials would be processed through the shaker, resulting in approximately 21,000 cy of material for fill (to be used on-site) and approximately 2,000 cy of larger rock materials. These 2,000 cy of rock materials may be used on-site for decorative/landscaping purposes throughout the Project study area, or may be exported off-site. For the sake of providing a conservative analysis, both the Air Quality, Noise and Traffic sections of the IS/MND assume export of these materials.

Table 3.2-1, Construction Activity Assumptions, summarizes the anticipated construction activities for each area.

TABLE 3.2-1
CONSTRUCTION ACTIVITY ASSUMPTIONS

	Area 1	Area 2	Area 3
Temporary Bridge Construction[a]			
Start	Summer 2015	Summer 2015	N/A
Length of activity	4 weeks	4 weeks	N/A
Equipment in use[b]	1 crane, 1 welder, 1 forklift	1 crane, 1 welder, 1 forklift	
Number of truckloads	10 truckloads	10 truckloads	N/A
Disposal site	Scholl Canyon Landfill	Scholl Canyon Landfill	N/A

TABLE 3.2-1
CONSTRUCTION ACTIVITY ASSUMPTIONS

	Area 1	Area 2	Area 3
Site Preparation – Clearing and Grubbing			
Start	Summer 2015	Summer 2015	Summer 2015
Length of activity	3 weeks	2 weeks	1 month
Equipment in use[b]	1 dozer, 2 dump trucks	1 dump truck	1 dozer, 1 excavator, 2 dump trucks
Amount of export	80 cy of debris	80 cy of debris	2,400 cy of debris
Number of truckloads for export	10 truckloads (16 cy truck- half loads)	10 truckloads (16 cy truck- half loads)	150 truckloads (16 cy trucks)
Disposal site	Scholl Canyon Landfill	Scholl Canyon Landfill	Scholl Canyon Landfill
Demolition			
Start	Fall 2015	Fall 2015	Fall 2015
Structures to be demolished	Headworks structure (1,800 sf)	Portions of diversion and weir structures and the retaining wall (500 sf)	Maintenance shed (100 sf), concrete vaults, head gates (300 sf), and paving on temporary access road (a portion of the 7 ac. Parking lot)
Length of activity	1 month	1 month	2 weeks
Equipment in use[b]	2 saws, 1 excavator with hammer, 2 dump trucks	2 saws, 1 excavator with hammer, 2 dump trucks	2 saws, 1 excavator with hammer, 2 dump trucks
Cubic Yards of Export	64 cy Demo wastes	16 cy of Demo wastes	4,000 cy of Demo wastes
Number of truckloads for export	8 truckloads (16 cy truck- half loads)	2 truckloads (16 cy truck- half loads)	250 truckloads (16 cy trucks)
Disposal site	Scholl Canyon Landfill	Scholl Canyon Landfill	Scholl Canyon Landfill
Grading			
Start	Fall 2015	Fall 2015	Fall 2015
Length of activity	4 months	1 month	5 months
Area to be graded	8 ac	9,000 sf	20 ac
Cut and fill	0	180 cy cut (road base)	23,000 cy cut and 21,000 cy fill (net cut of 2,000 cy)
Equipment in use[b]	1 excavator, 1 dump truck	1 excavator, 1 dump truck	2 excavators, 2 front-end loaders, 2 dump trucks For 2 months: 1 shaker and 1 front-end loader
Amount of export	0	180 cy	2,000 cy (rocks)
Number of truckloads[c]	0	36 truckloads (10 cy trucks half-load)	210 truckloads (10 cy trucks)
Disposal site	Scholl Canyon Landfill	Scholl Canyon Landfill	Scholl Canyon Landfill
Length of hauling	0	3 days	4 weeks
Underground Infrastructure/Utilities			
Start	N/A	Winter 2015	Fall 2015
Length of activity	N/A	3 months	4 months
Equipment in use[b]	N/A	1 excavator, 1 concrete truck, 1 concrete pumper truck, 1 crane	1 excavator, 2 dump trucks, 1 plate compactor

TABLE 3.2-1
CONSTRUCTION ACTIVITY ASSUMPTIONS

	Area 1	Area 2	Area 3
Paving			
Start	N/A	Spring 2016	Spring 2016
Length of activity	N/A	1 month	2 months
Pavement	N/A	asphalt	asphalt and DG
Area to be paved	N/A	5,000 sf	67,000 sf asphalt and 72,000 sf DG
Equipment in use[b]	N/A	1 vibratory roller, 1 paver, 1 grader, 1 belly dump, 1 dump truck	1 vibratory roller, 1 curb builder, 1 paver, 1 grader, 1 road striping machine, 1 belly dump, 1 dump truck
Building Construction			
Start	N/A	Summer 2016	Summer 2016
Length of activity	N/A	1 month	3 months
Equipment in use[b]	N/A	1 crane, 1 concrete truck	1 crane, 1 concrete truck, 1 concrete pumper truck
Architectural Coatings			
Length of activity	N/A	1 day interior	5 days interior
Temporary Bridge Demolition[a]	Fall 2016	Fall 2016	N/A
Start	Fall 2016	Fall 2016	N/A
Length of activity	4 weeks	4 weeks	N/A
Equipment in use[b]	1 crane, 1 welder, 1 forklift	1 crane, 1 welder, 1 forklift	
Number of truckloads	10 truckloads	10 truckloads	N/A
Disposal site	Scholl Canyon Landfill	Scholl Canyon Landfill	N/A

sf: square feet; ac: acres; cy: cubic yards; N/A: not applicable.

[a] Assumes 2 temporary bridges will be built, with a temporary bridge over Bridge No. 1 and another temporary bridge over Bridge No. 3.

[b] In addition to the listed equipment, the following equipment would be shared among any 1 of the 3 work areas: medium-duty trucks (<10), all-terrain forklift (1), front-end loader (1), water truck, portable generator, and hand tools (e.g., grinders, drills, compressors).

[c] In order to provide a conservative assessment to account for the unknown variation in the amount of soil that could be re-used onsite for engineered fill versus exported off-site, the number of truck trips was increased by assuming the use of 10 cy trucks instead of the standard 16 cy trucks.

Source: Carollo 2013.

Trucks hauling soils and debris to Scholl Canyon Landfill are expected to come to the site from I-210 at the Windsor Avenue off-ramp and head north on Windsor Avenue to Explorer Road into Area 3. From Area 3, trucks would turn southeast and north to the access road (North Arroyo Boulevard) to reach Areas 1 and 2. From these areas, the trucks would head south and pass through Area 3, Explorer Road, Windsor Avenue, and onto the westbound on-ramp on I-210. From I-210, trucks would head west on SR-134; exit at the Figueroa Street/Scholl Canyon Road off-ramp; head north-northeast toward the landfill. Trucks would come back from the landfill entering the eastbound on-ramp on the SR-134 at Figueroa Street and head east; trucks would then go west on I-210 to Windsor Avenue to Explorer Road and, ultimately, to the site.

EXHIBIT B

Agenda Report

June 19, 2017

TO: Honorable Mayor and City Council

FROM: Water and Power Department

SUBJECT: **AUTHORIZE THE CITY MANAGER TO AMEND CONTRACT NO. 30723 WITH TOBY B. HAYWARD, INC. TO FURNISH LABOR AND MATERIALS FOR CONSTRUCTION OF TEMPORARY BRIDGES AT ARROYO SECO CANYON**

RECOMMENDATION:

It is recommended that the City Council:

1. Acknowledge that a lawsuit was filed against the City seeking to invalidate the City's approval of the Initial Study Mitigated Negative Declaration ("IS/MND") for the underlying Arroyo Seco Canyon Project, the court issued a decision in March 2017 partially against the City, the City is currently awaiting the terms of a final judgment which may allow the work proposed herein to move forward, and such work will only move forward if in compliance with the judgment; and

2. Authorize the City Manager to amend Contract No. 30,723 with Toby B. Hayward, Inc. to extend the contract duration by an additional one year with an option for three additional one-year terms subject to the approval of the City Manager, and increase the contract not-to-exceed amount from $440,000 to $470,000 to provide labor and materials for the construction of the temporary bridges at Arroyo Seco Canyon.

3. To the extent this could be considered a separate procurement subject to the Competitive Selection process, grant the contract an exemption pursuant to Pasadena Municipal Code (PMC) Section 4.08.049(B), contracts for which the City's best interests are served.

BACKGROUND:

The Water and Power Department ("PWP") is proposing to repair and replace facilities within the Arroyo Seco Canyon area that were damaged by events related to the 2009 Station Fire. Through enhancements located in three areas of the Arroyo Seco, the project will also allow for the increased utilization of existing surface water rights held by the City, improve water quality in the canyon, improve biological habitats, restore hydrological

function, and improve ecosystem health. The proposed improvements are collectively referred to as the Arroyo Seco Canyon Project ("ASCP") and are scheduled for construction in 2017.

Two existing bridges in the Arroyo Seco Canyon do not have the capacity to support loads from construction equipment that will be needed for the ASCP. Specification WD-16-01 includes the construction of temporary structures that will allow transport of heavy equipment and materials over two existing bridges and provide protection to the railing of a third bridge in advance of the planned ASCP construction.

On September 12, 2016, City Council authorized the contract with Toby B. Hayward, Inc. to furnish labor and materials for construction of temporary bridges at Arroyo Seco Canyon based on competitive bid results. The contract was signed on November 21, 2016 for an amount not to exceed $440,000. Since the date of contract execution, Toby B. Hayward Inc. completed the construction of the first temporary bridge, and began procuring materials and fabrication for the construction of the second temporary bridge.

On July 2, 2015, two petitioners jointly filed a lawsuit against the City seeking to invalidate the City's approval of the California Environmental Quality Act ("CEQA") IS/MND. On March 23, 2017, the court issued a ruling that was unfavorable to the City; PWP instructed Toby B. Hayward Inc. to put the remaining construction of the second temporary bridge on hold, which otherwise would have been completed in approximately 45 days. On May 2, 2017, the City issued a proposed writ of mandate. However, as of May 30, 2017 the court had not issued the terms of the judgment, which would state which components of the ASCP, including the temporary bridges, will be allowed for construction.

Contract 30,723 with Toby B. Hayward Inc. expires on June 30, 2017. Staff recommends that the City Council approve an initial one-year extension to June 30, 2018 with an option for three additional one-year terms, and increase the contract amount from $440,000 to $470,000. The increased amount will cover remobilization costs resulting from the hold placed on the project and the extension of its duration. The additional costs include lease of equipment and materials, storage of materials that have been fabricated or partially fabricated, but not yet installed, and labor expenses representing the short period when the work was placed on hold, but believed to resume before contract expiration.

Staff's recommendation to extend the contract by at least one year will allow for a thorough evaluation of the City's options, which include permanent repair and strengthening of the bridge or to proceed with the temporary bridge as the preferred alternative. If the final ruling allows the work to move forward, and the evaluation of options leads to the conclusion that a continuation of the current contract remains in the best interest of the City, then the extension will also provide sufficient time to complete the second temporary bridge. Depending on the outcome of the final judgment, PWP may opt not proceed with the work, in which case staff will negotiate contract termination terms with the contractor. The optional one-year extensions may be needed depending on the timing of the final judgment and resulting additional delays to the work.

The contract amount includes a 15% contingency of $57,400 to accommodate any necessary change orders as a result of unforeseen conditions, including environmental mitigation and logistical challenges due to the location of the work in the Arroyo Seco. To date, $5,295 of this contingency has been committed. Not including contingency, the balance remaining on the contract for authorized work and retainage is $227,609.

COUNCIL POLICY CONSIDERATION:

The contract is consistent with the Public Facilities Element of the General Plan and supports the City Council's goal to improve, maintain and enhance public facilities infrastructure, and to implement capital improvements that will maintain and rehabilitate infrastructure.

ENVIRONMENTAL ANALYSIS:

In compliance with CEQA, an Initial Study ("IS") was prepared as documentation to support a Mitigated Negative Declaration ("MND") for the ASCP. The IS/MND was approved by the City's Hearing Officer at a public hearing on January 7, 2015. Subsequent appeals were filed challenging this decision, but ultimately City Council adopted the IS/MND after a public hearing on June 1, 2015. During the 30-day period set by filing the Notice of Determination, a lawsuit was filed against the City seeking to invalidate the City's approval of the IS/MND. The court issued a decision in March 2017, and the City is currently awaiting the terms of the judgment. The work provided for in this contract will only move forward in compliance with the terms of the judgment.

FISCAL IMPACT:

The cost of this action will be $309,720, which includes the balance of the contract amount of $227,609, plus remaining contingency of $52,105, plus additional costs of $30,000. Funding for this action will be addressed by the utilization of existing appropriations in the Water System Capital Improvement Program Budget Number 1040 – Arroyo Spreading Basins & Intake Structures. It is anticipated that 100% of the cost will be spent during fiscal year 2018. In addition, it is anticipated there will be $50,000 in additional costs for contract administration, and inspection as a result of this action. The total fiscal impact will be $359,720.

The following table presents the fiscal impact summary:

Remaining Authorized Work	$227,609
Proposed Increase	$30,000
Remaining Contingency	$52,105
Total FY18 Contract Amount	**$309,720**
Contract Administration	$ 30,000
Inspection	$ 20,000
Total Fiscal Impact	**$359,720**

The ASCP, including the temporary bridge work, is partially funded by a Proposition 84 grant from the California Department of Water Resources. It is not known at this time what effect the outcome of the lawsuit will have on reimbursement of temporary bridge costs. There is no anticipated impact to other operational programs or capital projects as a result of this action.

Respectfully submitted,

Gurcharan S. Bawa
General Manager
Water and Power Department

Prepared by:

Michael Tse
Associate Engineer

Approved by:

STEVE MERMELL
City Manager

PROOF OF SERVICE

STATE OF CALIFORNIA, COUNTY OF LOS ANGELES

I, CLAIRE A. VORHIS, hereby declare and state:

I am employed in the County of Los Angeles; I am over the age of eighteen years and not a party to the within entitled action. My business address is 100 North Garfield Avenue, Suite N210, Pasadena, California. My mailing address is PO Box 7115, Pasadena, CA 91109-7215.

On June 20, 2017, I served the foregoing document described as:

DECLARATION OF GARY TAKARA IN SUPPORT OF CITY OF PASADENA'S [PROPOSED] JUDGMENT

on the interested parties by placing a true copy thereof enclosed in a sealed envelope addressed as follows:

SEE ATTACHED SERVICE LIST

[ ] BY FACSIMILE: Based on an agreement of the parties to accept service by fax transmission, I faxed the documents to the persons at the fax number. No error was reported by the fax machine that I used. A copy of the record of the fax transmission, which I printed out is attached..

[ ] BY MAIL:

[ ] As follows: I am "readily familiar" with the City's practice of collection and processing correspondence for mailing. Under that practice it would be deposited with U.S. postal service on that same day with postage thereon fully prepaid at Pasadena, California, in the ordinary course of business. I am aware that on motion of the party served, service is presumed invalid if postal cancellation date or postage meter date is more than one day after date of deposit for mailing in affidavit.

[ ] I deposited such envelope in the mail at Pasadena, California. The envelope was mailed with postage fully prepaid.

[ ] BY PERSONAL SERVICE:

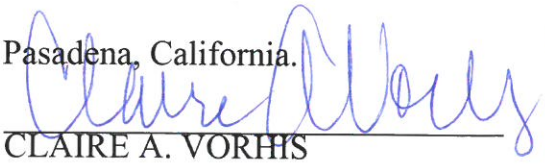
[ ] I delivered such envelope by hand to the offices of the addressee pursuant to CCP § 1011.

[X] BY EMAIL OR ELECTRONIC TRANSMISSION:

[X] Based on an agreement of the parties to accept service by e-mail or electronic transmission (with a courtesy hard copy should any document exceed 30 pages), I caused the documents to be sent to the persons at the e-mail addresses listed above. I did not receive, within a reasonable time after the transmission, any electronic message or other indication that the transmission was unsuccessful.

I declare under penalty of perjury under the laws of the State of California that the above is true and correct.

EXECUTED on June 20, 2017, at Pasadena, California.



CLAIRE A. VORHIS

ATTORNEYS' SERVICE LIST

SPIRIT OF THE SAGE COUNCIL, a California Public Benefit Corporation; PROJECT SOLITON, a California Public Benefit Corporation, Petitioners v. CITY OF PASADENA, a public entity; CITY OF PASADENA WATER AND POWER; and DOES 1 through 25, inclusive, Respondents.

City Attorney File No. 7534
Case No. BS 156207

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and -

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302 Washington Street, Suite 404
San Diego, CA 92103
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SUPERIOR COURT OF CALIFORNIA, COUNTY OF LOS ANGELES

DATE: 03/20/17			DEPT. 15
HONORABLE RICHARD FRUIN	JUDGE	E. GARCIA	DEPUTY CLERK
HONORABLE	JUDGE PRO TEM		ELECTRONIC RECORDING MONITOR
G. MACK, C.A.	Deputy Sheriff	NONE	Reporter

BS156207

Plaintiff Counsel

SPIRIT OF THE SAGE COUNCIL ET A
VS
CITY OF PASADENA ET AL

NO APPEARANCES

Defendant Counsel

CEQA
170.6 O'DONNELL - RESPONDENT

NATURE OF PROCEEDINGS:

RULING ON SUBMITTED MATTER;

The Court having taken the matter under submission on 1/18/17, now issues the following document:

STATEMENT OF DECISION ON PETITION FOR WRIT OF MANDATE;

Said document is served on both sides via U.S. Mail this date.

Notice by Clerk.

CLERK'S CERTIFICATE OF MAILING

I, the below-named Executive Officer/Clerk of the above-entitled court, do hereby certify that I am not a party to the cause herein, and that on this date I served the minute order dated 3/20/17, upon each party or counsel named below by placing the document for collection and mailing so as to cause it to be deposited in the United States mail at the courthouse in Los Angeles, California, one copy of the original filed/entered herein in a separate sealed envelope to each address as shown below with the postage thereon fully prepaid, in accordance with standard court practices.

MINUTES ENTERED
03/20/17
COUNTY CLERK

SUPERIOR COURT OF CALIFORNIA, COUNTY OF LOS ANGELES

DATE: 03/20/17			DEPT. 15
HONORABLE RICHARD FRUIN	JUDGE	E. GARCIA	DEPUTY CLERK
HONORABLE	JUDGE PRO TEM		ELECTRONIC RECORDING MONITOR
G. MACK, C.A.	Deputy Sheriff	NONE	Reporter

BS156207

SPIRIT OF THE SAGE COUNCIL ET A
VS
CITY OF PASADENA ET AL

CEQA
170.6 O'DONNELL - RESPONDENT

Plaintiff Counsel: NO APPEARANCES

Defendant Counsel:

NATURE OF PROCEEDINGS:

Dated: 3/20/17

Sherri R. Carter, Executive Officer/Clerk

By: _____
E. GARCIA, DEPUTY CLERK

TODD T. CARDIFF
LAW OFFICE OF TODD T. CARDIFF
1901 FIRST AVE., SUITE 219
SAN DIEGO, CA 92101

THERESA E. FUENTES
PASADENA CITY ATTORNEY'S OFFICE
100 N. GARFIELD AVE., ROOM N210
PASADENA, CA 91109

MINUTES ENTERED
03/20/17
COUNTY CLERK

STATEMENT OF DECISION ON PETITION FOR WRIT OF MANDATE

SPIRIT OF THE SAGE COUNCIL, PROJECT SOLITON v. CITY OF PASADENA, CITY OF PASADENA WATER AND POWER, Case No. BS 156207

Petitioners Spirit of Sage Council and Project Soliton ("petitioners") seek a writ of mandate to compel respondents City of Pasadena and the City of Pasadena Water and Power ("City") to set aside the June 1, 2015 approval of the Arroyo Seco Canyon Project (the "Project"). Petitioners allege the City approved the Project in violation of the California Environmental Quality Act ("CEQA"), Public Resources Code section 21000 et seq. because, petitioners argue, the City was required to prepare an environmental impact report ("EIR") for the Project. The City approved the Project with a mitigated negative declaration ("MND"), finding that the environmental impacts caused by the Project would be mitigated to a less than significant level by mitigation measures.

THE PROJECT IN AREA 2 WILL DIVERT WATER FROM THE ARROYO SECO:

Arroyo Seco Canyon channels a stream known as the Arroyo Seco. The Arroyo Seco carries rainwater runoff from the San Gabriel Mountains, north of Pasadena, to a reservoir created by Devil's Gate Dam, above the Rose Bowl. The City has legally adjudicated water rights permitting it to take water from the Arroyo Seco for City use.[1] The City diverts the water it takes from the Arroyo Seco through a pipeline to spreading basins that are located about 3,000 feet to the southeast, next to the JPL east parking lot. Water in the spreading ponds percolates into an aquifer (the Raymond Basin Aquifer) from which Pasadena draws well water. The recharging of the aquifer increases the safe yield that can be obtained from the aquifer, allowing Pasadena's municipally owned water system to obtain a greater share of its potable water from the local wells rather than by purchasing more expensive water from the Metropolitan Water District.

The City maintains a low dam (3 ft., 6 inches in height) across the Arroyo Seco to divert water into the pipeline for carriage to the spreading grounds. The proposed Project will install a weir that can be operated to raise the dam height

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[1] The City is authorized to take 18,096 acre feet of water per year from the Arroyo Seco, but the City's historical average diversion has been 2,532 acre feet per year.

and will upgrade the diversion intake so as to allow the City to take more water. The proposed Project will also expand the capacity of the spreading basins. These improvements are expected to increase the diversion from a current average of 2,532 acre feet/year by an additional 1,100 acre feet/year. (AR184.)

A major purpose of the Project is to repair and improve the City's water diversion facilities to "allow [for] the increased utilization of the surface water rights held by the City." (Quoted from the public hearing Notices, AR 8113, 8046, and 7966.)

The Arroyo Seco exits from the Canyon about a half mile below the diversion site, crosses alluvial soils for about another half mile and then is captured in the reservoir behind the Devil's Gate Dam. (AR 172.)

The Project proposes improvements in three geographical areas: in Area 1, at the Arroyo Seco headwaters; in Area 2, at the Arroyo Seco diversion intake; and in Area 3, at the spreading basins, as well as a temporary staging site. (AR 103.) The Project will also construct park amenities along the banks of the Arroyo Seco. The Project is not challenged as to the park amenities nor as to the improvements in Area 1.

Petitioners' principal challenge to the Project relates to Area 2. Petitioners challenge the Project because the improvements proposed at the dam site are intended to and will result in a greater water diversion from the Arroyo Seco. The diversion will reduce water availability downstream from Area 2 and will, as the City concedes, have significant impacts on the downstream biological communities.

SUMMARY OF COURT'S CONCLUSIONS:

CEQA requires the City to prepare an Initial Study to identify "potentially significant effects on the environment." Based on the Initial Study "[i]f there is substantial evidence, in light of the whole record ..., that the project may have a significant effect on the environment, an environmental impact report shall be prepared." However, a negative declaration is to be prepared if either: (1) there is no substantial evidence that the project will have a significant impact on the environment, or (2) the potentially significant environmental effects can be avoided or mitigated to a point "where clearly no significant effect on the environment would occur through mitigation measures agreed to by the applicant." Public Resources Code section 21080, subds. (c), (d) and (e).

Petitioners preliminarily argue that the notices for the public hearings did not "substantially comply" with Public Resources Code section 21092, subd. (b)(1) in requiring that the public notice shall contain "a brief description of the

proposed project and its location, the significant effects on the environment, if any, ..." The Court decides this issue in the City's favor.

Petitioners' main contention is that CEQA requires that the City prepare an EIR to evaluate the water diversion impacts caused by the improved dam/weir and enhanced ponding capacity. The court agrees that a "fair argument" is made that the reduced water flow caused by the improved diversion facility may have a significant and unmitigated effect on the environment. The Project, because it significantly reduces the water available to biological resources in the Arroyo Seco, requires the preparation of an EIR. Public Resources section 21151(a); Guidelines 15064(a)(1).

Petitioners argue that the mitigation measures required for the MND impermissibly defer the setting of mitigation standards to future actions and, therefore, are inadequate. The Court decides this issue in petitioners' favor.

ISSUE 1: CITY'S NOTICES OF PUBLIC HEARINGS SUBSTANTIALLY COMPLY:

Petitioners argue that the City's public notices for the Project hearings violated CEQA because they "omitted the construction of the Diversion Dam." Pet. Br. 7: 12-13. They further argue that the City's notices did not substantially comply "when it failed to inform the public the project would raise the height of the dam and increase diversions, potentially resulting in the downstream impacts to habitat and wildlife." Reply 2: 14-15. The Court rejects these contentions because the City's public notices substantially complied with the notice content required by CEQA.

A. The Substantial Compliance Standard.

CEQA specifies the content required for notices of public hearings for projects requiring CEQA compliance. Public Resources section 21092 provides:

> "(a) A lead agency that is preparing an environmental impact report or a negative declaration ... shall provide public notice of that fact ... prior to the certification of the... adoption of the negative declaration ....
>
> "(b) (1) The notice ... include the date, time, and place of any public meetings or hearings on the proposed project, **a brief description of the proposed project and its location, the significant effects on the environment, if any, anticipated as a result of the project** ....
>
> "(2) This section shall not be construed in any manner that results in the invalidation of an action because of the alleged inadequacy of the notice content **if there has been substantial compliance with the notice content requirements of this section**." [bolding added.]

The City's Notices challenged by the petitioners are the Notice of Public Hearing (before a hearing officer) on November 19, 2014 (AR 8113); the Notice of Public Hearing before the Board of Zoning Appeals on March 4, 2015 (AR 8046); and the Notice of Public Hearing before the City Council on June 1, 2015 (AR 7966). These three Notices use the same language to describe the physical Project, saying:

> "The applicant ... submitted a Conditional Use Permit application to allow the repair and replacement of facilities within the Arroyo Seco Canyon Area that were damaged or destroyed by Station Fire-related events of 2009. The improvements will also allow the increased utilization of surface water rights held by the City, and will improve water quality in the canyon; improve biological habitats ... through the following enhancements: [ ] 1) Naturalize the Arroyo Seco streambed; 2) Remove exposed portions of existing infrastructure designed for sediment removal; 3) Restore and improve intake facilities; 4) Expand recharge operations by creating additional spreading basins...."

The three Notices also refer readers who want more information to the City's website to view the Project documents. The City mailed the Notices to more than 90 organizations and to about 450 individuals and also posted the Notices in and around the Project sites. (SAR 22, 30-50.)

The Notices provided a sufficient description that the project would include water diversion from the Arroyo Seco and would repair existing structures in the stream bed for that purpose. The Project, the Notices said, would "Restore and improve the intake facilities" and "Expand recharge operations by creating additional spreading basins" so as to increase the City "utilization of surface water rights."

The Notices that were mailed to Pasadena organizations and residents, moreover, state: "The improvements will also allow the increased utilization of surface water rights held by the City" and to do that the Project would "restore and improve intake facilities." Pasadena readers can be assumed to have been aware of structures in the Arroyo Seco stream bed that were used in conjunction with the City's water system. It was not necessary that the Notices advise that the Project would include what petitioners refer to as "the construction of a Diversion Dam" because the diversion dam already existed. The Project will add a weir to the dam and, thus, heighten the barrier.

Petitioners correctly state that the repaired dam plus the new weir when raised will increase the height of the diversion structure by three feet, to approximately 5 feet, 10 inches above the stream bed. (SAR 147.) Petitioners appear to argue that this fact should have been included in the information

provided in the Notices. See, Reply 4:14. There is no evidence that the diversion structure will be significantly more visible, however. The record indicates that the dam and proposed weir are at the bottom of a narrow, steep-sided canyon and will be attached to an existing 9 foot high retaining wall. (AR 105, 80 and 8666.) The Initial study finds: "The Project will not lead to major permanent changes in the visual quality of the Arroyo Seco Canyon." AR (293.) The height of the weir at the bottom of the Canyon is a detail that was not required to mentioned specifically in the public Notices.

The Court concludes that petitioners do not establish that the public Notices violate Public Resources Code section 21092 (b)(1).

B. Exhaustion of Administrative Remedies Defense.

The City also raised the exhaustion of administrative remedies defense. Ans.,1st Aff. Defense; Opp. p. 9. "No action or proceeding may be brought ... unless the alleged grounds for noncompliance with this division were presented to the public agency orally or in writing during the public comment period ... or prior to the close of the public hearing on the project before the issuance of the notice of determination." Pub. Resources Code section 21177(a). The exhaustion of administrative remedies is jurisdictional. *Sierra Club v. City of Orange* (2008) 163 Cal.App.4th 523, 535.

The issue raised by petitioners—the asserted inadequacy of the public notices to state the height and purposes of the weir that was to be added to the existing dam—was not preserved for trial. No objection on this basis was made before the Project was approved. The California Department of Fish and Wildlife in a letter suggested that the description be clarified (SAR 128), but its recommendation does not establish that the Notices lacked the "substantial compliance" required by statute. Petitioner Spirit of the Sage Council complained about the project description but that concerned a different issue, namely the removal of native sage at the spreading basins. (AR 4132.) The issue of the height or the purposes of the dam and weir structure not having been raised, the issue was not preserved for this proceeding. "The petitioner bears the burden of demonstrating that the issues raised in the judicial proceeding were first raised at the administrative level." *Ibid.* at 536.

ISSUE 2: THE PROJECT DESCRIPTION IN THE MND IS NOT INADEQUATE:

Petitioners similarly argue that the MND violates CEQA because it fails to the highlight the height of the dam plus the weir (when raised) will be three feet higher than the existing dam. See, Reply 4:14, citing AR 124. This argument is not persuasive. The entire thrust of petitioners' argument is that because the weir will add to the height of the dam more water can be captured and diverted

by the Project. That the Project will capture more water because of the added weir is thoroughly discussed under other headings by the MND.

The Court also agrees with the City's argument that the issue has not been administratively adjudicated because it was not raised in the administrative record. Opp. p. 9. Petitioners in their reply refer to various statements that they argue could have alerted the City to revise its description in the MND/IS. Reply p. 4. The purpose of raising the issue during the review period is to notify the City of something that an objector thinks is important. *Sierra Club v. City of Orange*, 163 Cal.App.4th, *supra*, at 535 ("The exact issue must have been presented to the administrative agency ....") Petitioners failed to do this, and thus waived the argument.

BIOLOGCIAL RESOURCES WILL BE IMPACTED BY REDUCED STREAM WATER:

The City in its Initial Study made findings that the Project would have "potentially significant effects on the environment" in the stream bed below Area 2.

> "Project objectives include restoring the diversion capacity to its pre storm-drainage level, as well as increasing diversions to capture an additional 1,100 acre-feet annually. As a result, Project flows downstream from the diversion point in Area 2 will be reduced to some degree relative to both current and historic conditions." (AR 183.)

The Initial Study indicates the effect of the reduced water flow below Area 2 will continue until the Arroyo reaches "the riparian woodland of the [Devil Gate] reservoir [where] the species richness and population size is expected to increase substantially." (AR 183.) The Initial Study states that the stream bed leaves the Canyon near the JPL site, thereafter flowing "across alluvial deposits with limited vegetation until reaching a large (0.25 mile by 0.40 mile) riparian woodland that occupies the occasionally flooded alluvial deposits behind Devil's Gate Dam." Id. The court concludes from this description that the section of the stream bed where vegetation and species are potentially affected by the reduced flows after the diversion point is limited to a linear distance of about one-half mile, e.g. the distance between Area 2, where the diversion occurs, to location where the stream bed exits the Canyon and enters a "sandy wash" with sparser vegetation is about 0.40 of a mile.

The biological resources downstream of Area 2 in the Canyon are described as "abundant" and "rich." The Arroyo Seco supports a variety of plants and many wildlife species. (AR 109-110.) The Initial Study states:

> "Plant and wildlife resources between the diversion point and the canyon mouth are expected to be very similar to those described for Areas 1 and

2. Due to the abundance of native vegetation, undeveloped lands, and riparian resources, the area is generally rich in native wildlife species diversity and abundance. A large portion of these species is likely to be dependent specifically on the stream and riparian habitat as a core resource. Exiting the canyon and crossing approximately 0.75 mile of mostly unvegetated sandy wash, plant and wildlife diversity is expected to drop off substantially as the area is suitable for fewer species and lower numbers of individuals." (AR 183.)

(About one quarter mile downstream from the diversion site, another, smaller stream known as Millard Creek joins the Arroyo Seco and contributes new water to the Arroyo Seco stream. (AR 105.) The Court did not find data in the administrative record as to the significance of the quantity of water that Millard Creek adds to the Arroyo Seco downstream from the diversion site.)

THE ARROYO SECO STREAM IS SUBJECT TO VARIABLE WATER FLOWS:

The quantity of water flowing through the Arroyo Seco depends solely on rainfall runoff from its catchment area. The rainfall, as typical in Southern California, is seasonal (concentrated in the winter months) and cyclical (highly variable year by year). The City for its Initial Study hired the preparation of a hydrology study (AR 6359 et seq.) and, earlier, a conceptual design report.

The record at AR 8613 provides a hydrology chart showing, for a 22 year period (1990-2011), the historic water volumes and diversion volumes for the Arroyo Seco. The City then, from this 22 years of data, prepared a bar chart titled "Average Year Stream Volume and Diversion Volume" that reports the average volume of water by month that is (a) received in the Arroyo Seco and (b) diverted for City use. (AR 763.)

As the bar chart demonstrates, the Arroyo Seco receives most of its rain runoff from winter storms in December, January, February and March. The City, in those months, diverts only about a quarter of the water flow. That is because the rain runoff from storm events in the winter months often carries heavy sediment, and the City deems such water as unsuitable for deposit in the spreading basins. (See, AR 8613, bottom.)

The Arroyo Seco receives little runoff water in the months of July, August, September, October and November. The City diverts little or no water in those months, according to the bar chart.

The greatest diversion from existing water flow caused by the Project improvement will occur in the months of April, May and June. According to the averages shown on the bar chart (again, AR 763), when the diversion facility is

completed and operating, it will permit the City to take for City use most of the Arroyo water flow in April and May and all of the water flow in June.

The data permits these conclusions based on 22-year averaging. At present the Arroyo Seco downstream from Area 2 receives no stream water flow because the City diverts the available water in the months of July, August, September, October and November. And, when the Project is complete and put into its planned operation to allow greater diversion, the Arroyo Seco below Area 2 will, additionally, receive no stream water in June and substantially less stream water in April and May. The City will then impound and divert all stream water reaching Area 2 during the months of June, July, August, September, October and November, depriving the downstream of any replenishment water in those months. (AR 7630.)

These conclusions, it should be cautioned, are based on rainfall runoff and diversion quantities that have been averaged from 22 years of data. There is significant variability in the underlying data. (See, AR 8613.) The average will not predict what will occur in any given year, and it is what occurs in particular years that will impose actual impacts on the downstream habitats. Species, and, to a lesser degree, plants, rely upon the moisture that is available when needed rather than on average moisture calculations that may be derived from multi-year data.

The plants and species in the Arroyo have experienced dry years in which water flow below the diversion site has been limited to the winter months with most of that flow occurring in the single month of February. And, with the increased diversion allowed by proposed Project, there will be no water flow past the diversion site except for February in those dry years. See bar chart titled "Average Dry Year Volume and Diversion Volume" showing water flow and diversion by month for the water years 1990, 2002, 2004 and 2007. (AR 759.)

ISSUE 3: BASELINE WATER AVAILABILITY IS PROPERLY BASED ON AVERAGE RAINFALL DATA:

The determination of the baseline water flow in the Arroyo Seco is critical to evaluating the degree to which an increase in the water diversion at the intake facility will produce impacts downstream from Area 2. The parties dispute the manner in which the baseline should be determined.

The City's MND used water data over a 22 year period to determine average water flows in the Arroyo Seco, as well as to determine water flow averages in "dry," "average" and "wet" years. Petitioners argue that the City improperly utilized historical water data to obtain water flow averages rather than using the actual flow from a single year (which petitioners claim will establish "existing conditions"). Pet. Br., Part D, pp. 12-13.

The Court finds that there is substantial evidence supporting the City's averaging methodology because the environmental impacts being measured are influenced by factors such as rainfall that vary significantly year to year. The environmental impacts downstream from Area 2 on biological resources will be determined initially from the rainfall in the catchment areas. The City describes the diversion amounts taken from the water flow as "highly variable through the years" and states that such variability is affected by "available stream flows, season of availability, recharge basin saturation, flow volume, water rights thresholds, and other [factors]." (AR 183-184.) As a result:

> "The effect of these reduced flows on biological communities downstream is difficult to measure. Reduced flows in general can cause shorter distances of available surface water; short duration of pooling; reduced extent of moist soils moving away from the stream bed and reduced stream velocities resulting in reduced sediment transport. These and other effects may impact species and vegetation communities depending on such resources and processes." (AR 184.)

As the downstream habitats of the biological resources are greatly affected by water availability, and that availability varies significantly year to year (AR 6369 et seq.), the best evidence of water availability is derived from multi-year records.

The California Department of Fish and Wildlife Services ("CDFW") recognizes the variability of water flow in the Arroyo Seco over time and for that reason recommended that the City obtain data over a multi-year period. The Service, in its letter to the City dated November 14, 2014, cautioned against relying on single site visits and recommended:

> "The Department recommends that Post-project riparian impact monitoring be conducted over a period of time that includes a wide range of expected precipitation cycles (drought, average and above average) during which the riparian vegetation response can be evaluated to represent a more accurate response to reduced flows from the Project." (SAR 121.)

This CDFW recommendation refers to the monitoring that is to occur after the Project is completed, but the CDFW letter nonetheless recognizes that Southern California rainfall is highly variable, and, therefore, requires consideration of physical conditions that are affected by the water available from such rainfall over a period of time.

The Guidelines recognize this issue through the insertion of the word "normally" when referring to obtaining data for baseline purposes. Guidelines section15125 provides that in the preparation of an EIR a description of the

physical environmental conditions must be prepared "as they exist at the time the notice of preparation is published." This direction, however, is qualified by the assumption that that baseline "will normally constitute the baseline physical conditions [to] determine whether an impact is significant." Here, because the water flows in Arroyo Seco are determined by rainfall, and annual rainfall varies significantly, the Guidelines allow that the baseline may be established over a suitable period of time to reflect the variable rainfall conditions. The Court concludes that the City has appropriately used a multi-year period to determine the water flow in the Arroyo Seco.

ISSUE 4: THE INCREASED WATER DIVERSION CAUSED BY THE PROJECT REQUIRES THE PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT:

A. The Non-Deferential "Fair Argument" Standard Applies:

The preparation of an EIR is required when a project "may have a significant effect on the environment." Public Resources sections 21080(d) and 21151(a); Guidelines 15064(a)(1). Conversely, an agency may adopt a negative declaration only if there is no substantial evidence that the project "may have a significant effect on the environment." Public Resources section 21080(c)(1) and (2); Guidelines 15070(a).

The City concedes that the project will have a significant environmental impact because the proposed dam/intake facility will divert significantly more water than at present and, thus, will decrease the water availability downstream, particularly during the summer and fall months, causing impacts to biological resources. (AR 183-184.) The City argues that the preparation of an EIR is not required because with the implementation of specified mitigation measures the adverse environmental impact will be reduced to a level that is not significant. Opp., p. 17, citing AR 6365-6366, relying on Public Resources section 21080(c); Guidelines 15070(b).

This Court is to review the agency's decision to adopt a negative declaration using the "fair argument" test, under which the agency is to prepare an environmental impact report if substantial evidence supports a fair argument that the proposed project "may have a significant effect on the environment." If such evidence is found, it cannot be rebutted or overcome by substantial evidence to the contrary. *Gentry v. City of Murrieta* (1995) 36 Cal.App.4th 1359, 1399-1400.

Whether the agency's record contains substantial evidence that would support a fair argument that the project may have a significant effect on the environment is a question of law. See, *Consolidated Irrig. Dist. v. City of Selma* (2012) 204 Cal. App.4th 187, 207. Where there is a genuine dispute as to the sufficiency of mitigation measures approved in an MND, an EIR is required

because it is the function of an EIR, and not a negative declaration, to resolve conflicting claims as to the environmental effects of a project. *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 935; see also, *Friends of "B" Street v. City of Hayward* (1980) 106 Cal.App.3d 998, 1002.

An agency that approves a project with a negative declaration or a mitigated negative declaration in the face of substantial evidence supporting a fair argument that the project may have a significant environmental effect abuses its discretion under the law, requiring the court to void the approval of the MND. *Gentry v. City of Murrieta*, 36 Cal.App.4th *supra* at 1412.

B. **There Are "Fair Arguments" that Reduced Water Flow Will Adversely Impact the Downstream Biological Communities:**

The City's Project will reduce water flows in the Arroyo Seco below Area 2. While it is agreed that diminished water flows will have impacts on the biological communities downstream of Area 2, the extent of those impacts and their significance to the biological communities are not explained in the administrative record. The significance of those impacts to the biological communities, therefore, is open to "fair arguments" that, if supported by substantial evidence, require the preparation of an EIR.

Petitioners argue that the effects on the downstream habitats from the Project will be significant. Pet. Br., pp.17-18. This argument is supported by substantial evidence. Arroyo Seco's habitat downstream from Area 2, like the upstream habitat, is abundant in native plants and wildlife. (AR 183.) "A large portion of these species is likely to be dependent specifically on the stream and riparian habitat as a core resource." (AR 183.) "The effect of these reduced flows on biological communities downstream is difficult to measure. ... These and other effects may impact species and vegetation communities dependent on such resources and effects." (AR 184.) The MND does not provide a baseline from which any adverse impacts on the biological communities caused by the reduction in water flows can be measured. Given the uncertainty of the Project's effect, the impact on biological resources including vegetation and wildlife species that may occur, must be considered potentially significant. (AR 184.)

The preservation of fish and wildlife, in all of its variety, is a CEQA goal. Public Resources section 21001(c). Petitioners argue that the Project may have significant impacts on special status species. Pet. Br., pp. 18-19. This argument is supported by substantial evidence. Adverse impacts are predictable due to reduced water flows for particular wildlife species that may be present in the Arroyo Seco. The MND states that habitat currently exists for southwestern pond turtle. (S120, S483.) Live trapping surveys are needed to confirm or deny the presence of pond turtles in the Arroyo Seco. (S120.) Loss of individual

southwestern pond turtles would be considered significant because of a recent decline in their range and populations. (S120.) Reduced stream flow can impact the habitat for southwestern pond turtles and other special species of concern. (S120.)

The MND identifies habitat and potential presence of two special status bird species: the Least Bell's Vireo and the Southwestern Willow Flycatcher. (AR 178, 182.) According to the federal and state resource agencies, the Least Bell Vireo has been observed nesting behind the dam and depends on riverine system for their habitat. (S96, S119.) Southwestern Willow Flycatcher is dependent on surface water to support insect life. (S96.) Water diversion can reduce both vegetation and aquatic habitat. (S96.)

Petitioners argue that the diversion of greater water flows will cause a further fragmentation of wildlife habitat. Pet. Br., pp. 20-21. The current dam is low and passable by wildlife. (AR 1934.) The proposed structure will be 5 ft., 10 inches on the upstream with a 12 foot drop on the downstream when the weir is up. (AR 124.) There may be a significant impact to fish and wildlife movement. The opinion of the U.S. Fish and Wildlife Service is that realistic pathways for fish and wildlife movement should be designed and included in the project. (S140.) The Project may create a physical divide of the Arroyo Seco at Area 2, with the upper reaches retaining their historic environmental habitat fostered by a natural water flow and the lower areas having an impacted habitat because of the greater diversion caused by the Project.

C. There Is No Substantial Evidence that the Mitigation Measures Will Reduce the Adverse Impacts to a Level Less than Significant:

The City proposed seven biological mitigation measures to mitigate the downstream impacts from the additional water diversions from the Project. These mitigation measures are found at AR 197-210. The City finding required for the MND states:

> "Given the uncertainty in the Project's level of effect, the impact on biological resources, including vegetation types and special status species potentially occurring, is considered potentially significant. Implementation of MM BIO-6, which requires monitoring the Arroyo Seco stream and associated riparian habitat from the intake structure (i.e. diversion point) downstream to Devil's Gate Dam and subsequent compensatory mitigation or corrective action to avoid or reduce any identified downstream impacts of the Project, would reduce this impact to a level considered less than significant." (AR 184)

MM-BIO-1, 2 and 3 apply to protect the special status bird species during the construction phases. MM BIO-4 requires a restoration project for any special

status vegetation that is affected. MM-BIO-5 provides that the restoration plan for jurisdictional resources "shall be prepared in accordance with the requirements specified in permits/agreements issued by the USACE, the RWQCB, and the CDFW." MM BIO-5 provides that any mitigation for loss of "jurisdictional resources" shall be negotiated with the resources agencies and shall "ensure that mitigation to compensate for permanent impacts on jurisdictional resources is equivalent or superior to biological functions and values impacted by the Project." The compensating mitigation options may include relocation of special status species; payment into a mitigation bank; and/or restoration of a riparian habitat on site or at a different site.

The major mitigation measure is MM BIO-6, and it reads in part as follows:

> "A team of qualified specialists in hydrology and plant and wildlife biology will monitor the Arroyo Seco stream and associated riparian habitat from the intake structure (i.e. the diversion point) downstream to Devil's Gate Dam....Monitoring will begin with an initial baseline assessment to be conducted within six months prior to the start of increased diversions. Thereafter, monitoring will continue quarterly for a duration of five years....Data will include surface flow measurements; surface water extent mapping; vegetation mapping; a vegetation health assessment; active channel location mapping; and a plant and wildlife habitat suitability assessment. Data will be compiled into an annual report...."

The annual report shall be submitted to the City. The annual report "will provide recommendations for corrective actions, if deemed necessary to avoid or reduce downstream impacts attributable to the Project. Reports will be submitted to the City of Pasadena for review and approval of recommended corrective actions, if any." The City is not required to take the recommended corrective actions, but, if the City does not, it must "mitigate any loss of vegetation at a minimum 1:1 replacement ratio."

MM-BIO-6 improperly defers the formulation of a mitigation plan until after the Project is approved. No specific standards are imposed to be achieved for mitigation. The baseline itself against which the Project's environmental impacts are to be measured are to be established by an "assessment to be conducted within six months prior to the start of increased diversions." This proposal does not provide a specific plan for mitigation and, therefore, defers commitment to any mitigation plan.

The City, moreover, proposes to mitigate only to the extent that diversions it attributes to its Project have adversely affected the biological

communities. BIO-6 provides that: "The City shall only be required to mitigate for those impacts attributable to the City's increased diversions." The City does not indicate how impacts "attributable to the City's increased diversions" are to be determined. The City concedes "the effect of these reduced flows on biological communities is difficult to measure." (AR 184.) The mitigation plan cannot be evaluated until the City specifies the manner in which it will calculate under a variety of rainfall conditions the downstream water reduction attributable to the Project.

For instance, the City in the MND estimated the Project will "result in an average increase of 17 percent under average year hydrologic conditions." (AR 184.) If the City, in its mitigation plan, is proposing that the water reduction "attributable to the City's increased diversions" will be a set percentage, maybe the 17 percent figure, that metric would not reflect the variability of the rain water flow into the Arroyo Seco. In the drier years, the increased diversion permitted by the Project will divert 100% of the water flow received by the downstream habitats for ten out of 12 months of the calendar year. (AR 144, 184.)

More than that, MM BIO-6 does not commit the City to take effective responsive action. BIO-6 requires only that the City decision-makers shall be made aware of the annual reports. "Reports will be submitted to the City of Pasadena for review and approval of recommended corrective measures, if any." (AR 201.) The City assumes no commitment other than to replace lost vegetation on a 1:1 basis at another location. There is no provision for trapping and relocating species that are harmed. The California Department of Fish and Wildlife recommend trapping and relocating. (S120.)

Finally, there is no public process to hold the City accountable for performance of the proposed mitigation measures.

This mitigation measure--MM-BIO-6 is the core of the City's promised mitigation—improperly defers the formulation of any mitigation plan and prescribes no standards to measure whether there will be any mitigation accomplished (apart from relocation of vegetation). The City abused its discretion in adopting the mitigated negative declaration in reliance on that condition. The City's abuse of discretion would be prejudicial but for the Court's independent finding that the MND is void due to the existence of "fair arguments" supported by substantial evidence that the Project will have significant environmental effects that require under CEQA the preparation of an environmental impact report.

ISSUE 5: THERE IS NO SUBSTANTIAL EVIDENCE THAT CONTAIMINATION IN AREA 3 REQUIRES THE CITY TO PREPARE AN EIR:

The Initial Study noted that JPL from 1941 to 1960 had disposed of solid and liquid chemical waste in pits on JPL property "and off property in Arroyo Seco Wash." (AR 487.) These locations are designated a Superfund site but the concern is the remediation of groundwater contamination in a zone 300 feet or more below the surface. JPL reported to the City that JPL's past practices did not result in ground contamination even where the chemicals had been buried. (AR 942.) JPL campus is located on the west side of the Arroyo Seco, while Area 3 is on the east side of the Arroyo Seco. (AR 103.) There is no evidence of ground contamination in Area 3, where the City as part of the Project will use construction equipment to enlarge the spreading basins. The City, nonetheless, has approved a hazard mitigation measure to caution its construction workers to watch for discolored soil. See, MM HAZ-2 at AR 234.

Petitioners make an argument that the fact that locations on the JPL property are being remediated for below ground contamination requires that the City prepare an EIR before commencing construction work in Area 3. Petitioners' argument does not satisfy the fair argument standard because they point to no substantial evidence that Area 3 has ground contamination or even that hazardous chemicals were deposited there. That the City approved a mitigation measure in the event the construction workers find discolored soil—a measure that petitioners characterize as a "scratch and sniff test"--is not evidence that dangerous contamination likely exists where the City's construction crews will be enlarging the spreading basins. Petitioner rests its argument on the fact that not all of the locations of the JPL waste chemical pits were adequately documented (Reply, p. 14 citing AR 472), but, even so, an argument that contamination likely exists in Area 3 is a supposition. No evidence for it is cited in the record. Petitioners' argument is unavailing because it is not supported by substantial evidence in the record.

PREPARATION OF JUDGMENT AND WRIT OF MANDATE:

The Court concludes the City abused its discretion in adopting a mitigated negative declaration for the Project in the face of substantial evidence supporting a fair argument that the Project, even as mitigated, may have significant adverse environmental effects on biological resources in the Arroyo Seco that are downstream from the proposed water diversion facility.

The Court shall grant Judgment for the petitioners on their First Amended Petition and issue a Peremptory Writ of Mandate to reverse the approval of the Arroyo Seco Canyon Project, the adoption of the Mitigated Negative Declaration, Conditional Use Permit # 6222 and other approvals granted for the Project. The

Project has separate components and petitioners have not challenged the City's approvals as to certain parts of the Project. The parties may consider whether a severance is appropriate under Public Resources Code section 21168.9(b) and submit a Writ providing for an appropriate severance. Any severance, however, must not prejudice full compliance with CEQA.

The Court requests that the petitioners' counsel prepare, serve, and lodge a form of Judgment and Peremptory Writ of Mandate that is consistent with the Court's Statement of Decision within five court days. The City shall have ten days to serve and file objections to the proposed Writ and Judgment. The City, if it wishes, may prepare an alternate form of Judgment and Writ.

Promptly after a Judgment is signed and the Writ issued, the parties are to retrieve (and retain in their offices for any post-judgment proceeding) the administrative record and any binders that have been provided to the Court.

The Clerk is directed to serve this STATEMENT OF DECISION ON PETITION FOR WRIT OF MANDATE on the parties by U.S. Mail this date.

DATED: March 20, 2017

Richard L. Fruin Jr.

RICHARD L. FRUIN, JR.
Superior Court of California
County of Los Angeles

SETTLEMENT AGREEMENT AND RELEASE
SPIRIT OF THE SAGE COUNCIL ET. AL V. CITY OF PASADENA ET. AL.
LA SUPERIOR COURT CASE NO. BS156207

Whereas, on July 2, 2015, Spirit of the Sage Council and Project Soliton (together, Petitioners) filed a CEQA action against the City of Pasadena and Pasadena Department of Water and Power ("City" or Respondents) challenging the approval of what is commonly known as the Arroyo Seco Canyon Project;

Whereas, on March 20, 2017, after extensive briefing and oral argument, the Court issued a Statement of Decision granting the writ of mandamus and ordering the preparation of an EIR for the project, but proposing severance of certain portions of the project;

Whereas, on June 26, 2017, after further briefing, objections, oral argument, and additional evidence, the Court granted severance under Public Resources Code section 21168.9(c), in the manner proposed by the City of Pasadena;

Whereas, Petitioners object to the order severing certain portions of the project and the Court's consideration of additional evidence without the opportunity for Petitioners to formally respond; and

Whereas, all parties wish to resolve the remaining issues, and obtain certain assurances as to future actions of the parties, and have agreed to the following:

1. IMPLEMENTATION OF THE WRIT

The Writ (along with the Judgment, attached hereto as Exhibit A) shall be implemented as ordered by the Court with the following modifications:

a. **No new ponds or basins in Area 3**: The City will not perform any of the tasks described in Table 3.1-1 of the IS/MND ("MND") under the heading "spreading basins", until fully analyzed, and mitigated to the extent feasible, in an EIR

b. **Maintenance activities permitted**: The City shall have the right to perform maintenance activities, including tilling and grading of existing spreading basins and sludge ponds to re-establish historical percolation rates.

i. Petitioners waive the right to challenge maintenance activities that involve "negligible or no expansion of use" as described in the Class 1 exemption from CEQA. (Cal. Code of Regs. Title 14, § 15301.) Petitioners expressly do not waive the right to challenge activities that do not fall within this limitation.

ii. Prior to performance of maintenance activities, the City shall describe the work in a written document in a manner that allows Petitioners or the public to determine whether the activity falls within the CEQA Class 1 exemption, including an estimate of the quantity of any soil to be removed. Nothing in this section requires additional public notice, except as required by law.

iii. The City shall not perform work that enlarges any of the ponds or increases its ability to take surface water above and beyond its historical withdrawal, unless an EIR is prepared consistent with the Judgment/Writ.

c. The City shall remove the temporary bridges within six months of completion of the Arroyo Seco Canyon Project, unless the City decides to make such bridges permanent structures. If the City determines to make the bridges permanent structures, it must describe the bridge construction in the future EIR for the Arroyo Seco Canyon Project and analyze, and mitigate to the extent feasible, the environmental impacts of such construction.

2. NO WIDENING OF TRAILS FOR HEAVY EQUIPMENT ACCESS TO AREA 1

The City shall not widen the trail, raise the trail above ground level, pave trails (but may replace/repair any existing or damaged pavement), or allow habitat loss for the movement of heavy equipment to Area 1 (including no grading or cutting of slope). The City may perform the road work, including the slope improvements described in Area 2 and excavation and grading necessary for the temporary bridges as described in Table 3.2-1 of the MND. Trails, roads and bridges shall not be used to redirect natural surface water flows (hydrology). Nothing in this section prohibits the trail work in Area 1.

3. WAIVER OF FUTURE LEGAL CHALLENGES

In exchange for the consideration described in Paragraph 4 below, Petitioners agree to the following:

a. Petitioners waive the right to file an appeal or otherwise challenge the Judgment and Writ in *Spirit of the Sage Council et al v. City of Pasadena* (BS156207).

b. Petitioners waive the right to file any legal challenges to the EIR that will be prepared for the Arroyo Seco Canyon Project.

c. Petitioners waive the right to legally challenge the Streambed Alteration Agreement or any future permits that are granted in favor of the City for the Arroyo Seco Canyon Project.

d. Petitioners reserve the right to fully participate in the CEQA process, including submitting scoping comments and commenting on any draft or final EIR and submitting objections to the Arroyo Seco Canyon Project , including submitting objections to the draft or final Streambed Alteration Agreement.

e. Spirit of the Sage Council and Project Soliton, including their respective board members, shall be prohibited from providing any monetary or nonmonetary support to any legal actions challenging the EIR or future permits for the Arroyo Seco Canyon Project. The board members of Spirit of the Sage Council and Project Soliton are specifically prohibited from forming new organizations to mount challenges to the EIR, Streambed Alteration Agreement or future permits for the Arroyo Seco Canyon Project.

4. CONSIDERATION

a. The City shall pay $25,000 to Spirit of the Sage Council within 30 days of execution of this agreement.

b. The City shall pay $25,000 to Project Soliton within 30 days of execution of this agreement.

c. The City shall not speak or communicate any negative commentary about Petitioners, the Judgment/Writ, or this agreement. Likewise, Petitioners and their board members shall not speak or communicate any negative commentary about the City, the Judgment/Writ, or this agreement.

These payments shall be issued in the name of each petitioner and mailed to the Law Office of Todd Cardiff. These payments are non-refundable if the City decides to not move forward on the Arroyo Seco Canyon Project.

5. PAYMENT OF ATTORNEYS FEES AND COSTS

Nothing in this agreement is intended to waive or impact Petitioners' Attorneys right to move for attorneys' fees and costs, unless otherwise agreed to in a separate agreement.

6. NO WAIVER OF THE RIGHT TO ENFORCE 2004 SETTLEMENT AGREEMENT

This agreement is not intended to waive or impact, in any manner, the right to enforce the 2004 settlement agreement between Spirit of the Sage Council and the City of Pasadena.

7. NO WAIVER OF RIGHT TO OBJECT TO RETURN TO WRIT

Petitioners reserve the right to object to the return of the writ and discharge if the City fails to comply or has not fully complied with the writ.

8. PERSONS BOUND

This agreement shall be binding on all parties, their principles, agents, successors, assigns, board members, officers and employees. This agreement is specifically enforceable against Petitioners' board members who are: Leeona Klippstein, Sharee Hemphill, Ilse Asplund, Doug Doepke and Doug Lewis.

9. GENERAL PROVISIONS

a. **Integration and Interpretation**: This agreement shall constitute the entire agreement between the parties and shall supersede any prior promises or agreements whether oral or in writing. This agreement may only be amended in a writing signed by the party against whom enforcement is sought. This agreement was jointly negotiated and drafted by the parties. Any judicial interpretation of this agreement shall be in favor of the mutual intent of the parties and not in favor of or against any particular party. The parties warrant that they have had a chance to discuss the language of the agreement with their attorneys.

b. **Severance**: This agreement shall be interpreted in manner that renders it enforceable to the extent allowed by law. If any portion of this agreement is ruled to be unenforceable, the remainder of the agreement shall remain in effect.

c. **Authority**: The signatories to this agreement warrant that they have obtained the necessary authority to bind their respective organizations.

d. **Counterparts**: This agreement may be signed in counterparts, which may be faxed or delivered electronically. A copy of this agreement, with all signatures, whether original or electronic, shall be considered enforceable as if it was an original.

DATE:

SPIRIT OF THE SAGE COUNCIL

Leona Klippstein
President

DATE:

PROJECT SOLITON

Sharee Hemphill
President

DATE: 7/31/17

CITY OF PASADENA

Steve Mermell
City Manager

Approved as to form:

DATE: 7/28/2017

LAW OFFICE OF TODD T. CARDIFF

Todd T. Cardiff, Esq.
On behalf of Petitioners
Spirit of the Sage Council
Project Soliton

DATE: 7-28-17

ASSISTANT CITY ATTORNEY
CITY OF PASADENA

Theresa Fuentes, Esq.
On behalf of Respondents
City of Pasadena and its
Department of Water and Power

DATE: 7/28/2017

SPIRIT OF THE SAGE COUNCIL

Leona Klippstein
President

DATE:

PROJECT SOLITON

Sharee Hemphill
President

DATE:

CITY OF PASADENA

[NAME]
[TITLE]

DATE:

PASADENA DEPT. OF WATER AND POWER

[NAME]
[TITLE]

Approved as to form:

DATE:

LAW OFFICE OF TODD T. CARDIFF

Todd T. Cardiff, Esq.
On behalf of Petitioners
Spirit of the Sage Council
Project Soliton

DATE:

DEPUTY CITY ATTORNEY OF PASADENA

Theresa Fuentes, Esq.
On behalf of Respondents
City of Pasadena
Pasadena Dept. of Power and Water

DATE:

SPIRIT OF THE SAGE COUNCIL

_____
Leona Klippstein
President

DATE: 7/27/2017

PROJECT SOLITON

_____
Sharee Hemphill
President

DATE:

CITY OF PASADENA

_____
[NAME]
[TITLE]

DATE:

PASADENA DEPT. OF WATER AND POWER

_____
[NAME]
[TITLE]

Approved as to form:

DATE:

LAW OFFICE OF TODD T. CARDIFF

_____
Todd T. Cardiff, Esq.
On behalf of Petitioners
Spirit of the Sage Council
Project Soliton

DATE:

DEPUTY CITY ATTORNEY OF PASADENA

_____
Theresa Fuentes, Esq.
On behalf of Respondents
City of Pasadena
Pasadena Dept. of Power and Water

Appendix B

Geotechnical Feasibility Study Report

Converse Consultants
Geotechnical Engineering, Environmental & Groundwater Science, Inspection & Testing Services

GEOTECHNICAL FEASIBLITY STUDY REPORT
Proposed Public Restroom, Roadway Improvement and Stormwater Sediment Basin Project
Arroyo Seco Canyon
Pasadena, California

Converse Project No. 13-31-199-01

August 23, 2013

PREPARED FOR

Carollo Engineers, Inc.
199 South Los Robles Avenue, Suite 530
Pasadena, CA 91101

222 East Huntington Drive, Suite 211, Monrovia, California 91016-3500
Telephone: (626) 930-1200 ♦ Facsimile: (626) 930-1212 ♦ e-mail: converse@converseconsultants.com

Converse Consultants
Geotechnical Engineering, Environmental & Groundwater Science, Inspection & Testing Services

August 23, 2013

Ms. Inge Wiersema
Carollo Engineers, Inc.
199 South Los Robles Avenue, Suite 530
Pasadena, CA 91101

Subject: **GEOTECHNICAL FEASIBILITY STUDY REPORT**
Proposed Public Restroom, Roadway Improvement, and Stormwater Sediment Basins Project
Arroyo Seco Canyon
Pasadena, California
Converse Project No. 13-31-199-01

Dear Ms. Wiersema:

Converse Consultants (Converse) is pleased to present this Geotechnical Feasibility Study Report for the proposed Public Restroom, Roadway Improvement, and Stormwater Sediment Basins Project located at Arroyo Seco Canyon in Pasadena, California. Our services were performed in accordance with our proposal dated June 10, 2013.

The purpose of this study is to perform preliminary engineering geologic and geotechnical explorations to characterize the project sites, evaluate the feasibility of on-site wastewater treatment system at the planned public restroom sites, and provide geotechnical recommendations for restroom foundations and roadway improvement. Please be advised that our geotechnical recommendations for foundations and roadway improvement can be used for structural design. However, the preliminary percolation study for OWTS will not be sufficient for actual design and submission for the LA County review because the design-level information is not available to us at this time.

We appreciate the opportunity to be of service to the Carollo Engineers, Inc. If you should have any questions, please do not hesitate to contact us at (626) 930-1200.

CONVERSE CONSULTANTS

William H. Chu, P.E., G.E.
Senior Vice President/Principal Engineer

Dist: 4/Addressee
MM/SCL/WHC/amm

222 East Huntington Drive, Suite 211, Monrovia, California 91016-3500
Telephone: (626) 930-1200 ♦ Facsimile: (626) 930-1212 ♦ e-mail: converse@converseconsultants.com

PROFESSIONAL CERTIFICATION

This feasibility report for the proposed Improvement, and Stormwater Sediment Basins Project located at Arroyo Seco Canyon in Pasadena, California has been prepared by the staff of Converse under the professional supervision of the individuals whose seals and signatures appear hereon. This feasibility report may require additional geotechnical studies and may not contain sufficient information for design and construction.

The findings, recommendations, specifications or professional opinions contained in this report were prepared in accordance with generally accepted professional engineering and engineering geologic principles and practice in this area of Southern California. There is no warranty, either expressed or implied.

In the event that changes to the property occur, or additional, relevant information about the property is brought to our attention, the conclusions contained in this report may not be valid unless these changes and additional relevant information are reviewed and the recommendations of this report are modified or verified in writing.

_____ _____

Sean C. Lin, P.E., G.E. Mark Schluter, P.G., C.E.G.
Senior Engineer Senior Geologist

_____

William H. Chu, G.E.
Principal Engineer, Senior Vice President

EXECUTIVE SUMMARY

The following is the summary of our geotechnical study, findings, conclusions, and recommendations, as presented in the body of this report. Please refer to the appropriate sections of the report for complete conclusions and recommendations. In the event of a conflict between this summary and the report, or an omission in the summary, the report shall prevail.

- The project consists of three separate areas within a 2-mile stretch along the Arroyo Seco Canyon in the City of Pasadena, California. The elements that require geotechnical analyses consist of a public restroom with onsite wastewater treatment system (OWTS), roadway improvement and associated retaining wall, and stormwater sediment basins.

- Site No. 1 and Site No. 2C are the potential candidate sites for the planned public restroom and OWTS. The planned roadway improvement is located at Site No. 2A. The planned stormwater sediment basins are located at Site No. 3.

- Fourteen (14) exploratory borings (BH-1 through BH-14) were drilled within the project sites from July 8 to July 12, 2013. The borings were advanced using a limited access rig with 12-inch and 24-inch diameter bucket augers, and truck mounted 8-inch diameter hollow stem auger drill rig to depths ranging from 2.5 to 21 feet below the existing ground surface (bgs).

- Borings BH-2, BH-5 and BH-9 through BH-14 were utilized for percolation tests prior to backfill. Percolation test results are presented in Appendix C, *Percolation Testing Data*.

- Site No. 1 is acceptable to construct the leach lines as onsite wastewater treatment system in accordance with the Los Angeles County requirements based on our preliminary percolation testing.

- Site No. 1 is located in close proximity of a 50-year floodplain. The Arroyo Seco Canyon is subject to periodic flooding following periods of heavy rainfall. Drilled caissons with grade beam system should be used as the restroom foundation. Flood protection measures are recommended for new structures.

- Roadway improvement at Site No. 2A should be supported by a retaining wall with cast-in-drill-hole pile foundations. The original roadway section was washed away by flooding in the Arroyo Seco Canyon. Flood protection measures are recommended for new structures.

- Site No. 2C is not feasible to construct the onsite wastewater treatment system based on our preliminary percolation testing. The site is underlain by shallow hard bedrock.

- The upper 5 feet of soils within Site No. 3 have high to very high percolation rates. It is our opinion that the percolation rates presented on our table demonstrate the good percolation capacity of the onsite soils without considering fine sediment clogging. For planning or design purposes, it is recommended to consider the lowest percolation rates among the tests because the percolation test holes are located at only a few scattered points over a fairly large area. Fine sediment clogging should be also considered into the design and maintenance plan.

- Based on the slope stability analyses, the proposed new Sediment Basin A is located in the area having 1.5 factor of safety or greater for slope stability, and the slope near the creek has factor of safety greater than 1.25, which exceed the minimum required factor of safety in common geotechnical practice.

- At all of the project sites studied in this report, the onsite materials will contain large amounts of gravels, cobbles and boulders. Based on our field exploration, the earth materials at the site may be excavated with conventional heavy-duty earth moving and trenching equipment in general. Difficult drilling and excavation conditions will be encountered during construction and should be anticipated and other suitable equipment and methods should be used.

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TABLES

DRAWINGS

APPENDICES

1.0 INTRODUCTION

The project consists of four separate areas within a 2-mile stretch along the Arroyo Seco Canyon in the City of Pasadena, California. The elements that require geotechnical analyses consist of a public restroom with onsite wastewater treatment system (OWTS), roadway improvement and associated retaining wall, and stormwater sediment basins. An aerial view of the site is illustrated on Drawing No. 1, *Overall Project Site Plan.*

Based on the information provided to us, the Site No. 1 and Site No. 2C are the potential candidate sites for the planned public restroom and OWTS. The planned roadway improvement is located at Site No. 2A. The planned stormwater sediment basins are located at Site No. 3. The enlarged maps for these four sites are shown on Drawing Nos. 2a thru 2d.

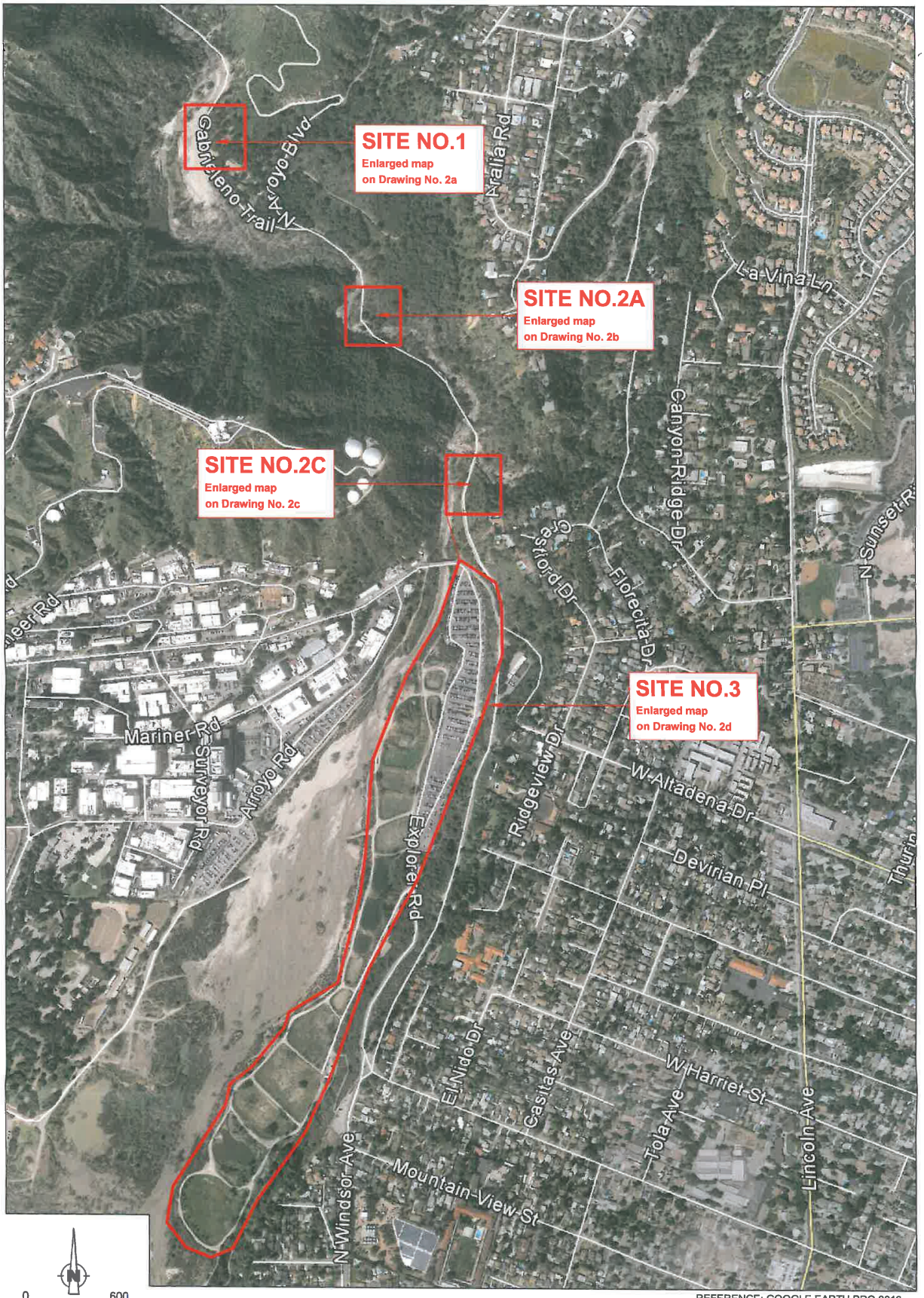
The purpose of this study is to perform preliminary engineering geologic and geotechnical explorations to characterize the project sites, evaluate the feasibility of on-site wastewater treatment system at the planned public restroom sites, and provide geotechnical recommendations for restroom foundations and roadway improvement. Please be advised that our geotechnical recommendations for foundations and roadway improvement can be used for structural design. However, the preliminary percolation study for OWTS will not be sufficient for actual design and submission for the LA County review because the design-level information is not available to us at this time.

This report for geologic and geotechnical design parameters for the project described herein and is intended for use solely by the Carollo Engineers, Inc. This report should not be used as a bidding document but may be made available to the potential contractors for information on faculty data only. For bidding purposes, the contractors should be responsible for making their own interpretation of the data contained in this report.

2.0 SITE NO. 1 – 1ST CANDIDATE SITE FOR PUBLIC RESTROOM

2.1 Site Description

Site No. 1 is located at the northernmost part of the project, near the National Forest Ranger's Station. The planned restroom building site is located at a flat ground on the east side of the Gabrieleno Trail near an existing trail monument at the toe of an approximate 20 feet high ascending 2H:1V slope to a terrace pad .



REFERENCE: GOOGLE EARTH PRO 2013

OVERALL PROJECT SITE PLAN

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.	Drawing No.
13-31-199-01	1

REFERENCE: GOOGLE EARTH PRO 2013

N

0 50

APPROXIMATE SCALE IN FEET

LEGEND

APPROXIMATE LOCATION OF BORING

SITE NO. 1 BORING LOCATION MAP

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.	Drawing No.
13-31-199-01	2a

REFERENCE: GOOGLE EARTH PRO 2013

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APPROXIMATE SCALE IN FEET

LEGEND

APPROXIMATE LOCATION OF BORING		Qoa	OLDER ALLUVIAL SOIL
APPROXIMATE LIMIT OF ROAD EROSION		gr	GRANITIC BEDROCK
GEOLOGIC CONTACT			

SITE NO. 2A BORING LOCATION MAP

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. 2b

REFERENCE: GOOGLE EARTH PRO 2013

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APPROXIMATE SCALE IN FEET

LEGEND

APPROXIMATE LOCATION OF BORING

SITE NO. 2C BORING LOCATION MAP

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.	Drawing No.
13-31-199-01	2c

SITE NO. 3 BORING LOCATION MAP

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.
13-31-199-01

Drawing No.
2d

The planned restroom building site is located on the edge of the Arroyo Seco Canyon floodplain and is subject to potential flooding following periods of heavy rainfall.

The planned onsite wastewater treatment system (seepage pit or leach field) area is located on the upper terrace pad east of the planned restroom and north of the Ranger's Station. The surface conditions consist of unpaved trail, grass and some mature trees.

The restroom site elevation is about 1233 feet above Mean Sea Level (MSL). The onsite wastewater treatment system site elevation is about 1262 feet MSL. The coordinates for the project site are: North latitude: 34.2102 degrees and West longitude: 118.1713 degrees. The project site is depicted on Drawing No. 2a, *Site No. 1, Boring Location Map*.

2.2 Scope of Work

The scope of our present study includes site reconnaissance, subsurface exploration, soil sampling, laboratory testing, engineering analysis, and preparation of this report. Details of the tasks are addressed in the following sections:

2.2.1 Project Setup and Site Reconnaissance

A Converse geologist conducted a site reconnaissance on June 20, 2013. The purpose of the reconnaissance was to evaluate site conditions with respect to the location of the borings and drill rig accessibility. The Underground Services Alert (USA) was notified on June 28, 2013 within 14 calendar days prior to field exploration

2.2.2 Subsurface Exploration and Percolation Testing

Three (3) borings, including one boring (BH-1) within the planned restroom area and two borings (BH-2 and BH-2A) within the planned wastewater treatment system area, were drilled to a maximum depth of 7 feet below existing ground surface on July 8 and 9, 2013. The borings were drilled with a limited access drill rig equipped with 12-inch and 24-inch diameter bucket augers for soil sampling. Each boring was visually logged and sampled at regular depth intervals and at changes in subsurface soils. The borings were backfilled with soil cuttings . All three borings encountered refusals at shallow depths due to numerous cobbles, and boulders larger than 12 inches in diameter. The boring BH-2A was an additional attempt after refusal at BH-2. The locations of borings are shown on the attached *Drawing No. 2a, Site No. 1, Boring Location Map.*

California Modified Sampler (Ring samples), and bulk soil samples were obtained for laboratory testing. The bore holes were backfilled and compacted with soil cuttings after the completion of field testing.

Boring BH-2 was utilized for percolation tests prior to backfill. Percolation test procedures and test results are further discussed in Section 2.6.1, Preliminary OWTS Feasibility Evaluation. The raw data of percolation testing is presented in Appendix C, *Percolation Testing Data*.

2.2.3 Laboratory Testing

Representative samples of the site soils were tested in the laboratory to aid in the classification and to evaluate relevant engineering properties. The tests performed included:

- *In situ* moisture contents and dry densities (ASTM Standard D2216)
- Grain-Size Analysis (ASTM D422)
- Maximum dry density and optimum-moisture content relationship (ASTM Standard D1557)
- Direct shear (ASTM Standard D3080)
- Consolidation (ASTM Standard D2435)
- Soil corrosivity tests (Caltrans 643, 422, 417 and 532)

The detailed description of the laboratory test methods and test results are presented in Appendix B, *Laboratory Testing Program*.

2.2.4 Analyses and Report

Data obtained from the exploratory fieldwork and laboratory-testing program were analyzed and evaluated with respect to the proposed development. Recommendations for foundations, earthwork, and feasibility evaluation of OWTS are provided.

2.3 Subsurface Conditions

2.3.1 Subsurface Soil Profile of Project Site

Based on our exploratory soil boring (BH-1) at the restroom site, stream deposits (Map symbol: Qg) consisting of primarily light brown silty sand with some cobbles and boulders were encountered to a maximum explored depth of 7 feet below existing ground surface (bgs). The stream deposits are generally moderately dense to very dense.

Based on our exploratory soil borings (BH-2 and BH-2A) at the wastewater treatment system site, older alluvium (Map symbol: Qoa) consisting of primarily brown silty sand with some cobbles and boulders was encountered to a maximum explored depth of 5 feet below existing ground surface (bgs). The older alluvium is generally moderately dense to dense. The detailed descriptions of the borings are presented in Appendix A, Field Exploration.

Based on large amount of cobbles and boulders encountered during our exploratory borings, difficult drilling conditions are expected during construction. Therefore it is our opinion that leach lines are more feasible than seepage pits for the onsite wastewater treatment system.

2.3.2 Groundwater

Groundwater was not encountered in our exploratory borings to a maximum depth of 7 feet. In accordance with the Seismic Hazard Zone Report for the Pasadena Quadrangle (CDMG, 1998), the historic highest groundwater level contours are not defined at this location. However, the restroom site is adjacent to existing creek. Seasonal high groundwater is anticipated to be shallow.

2.3.3 Subsurface Variations

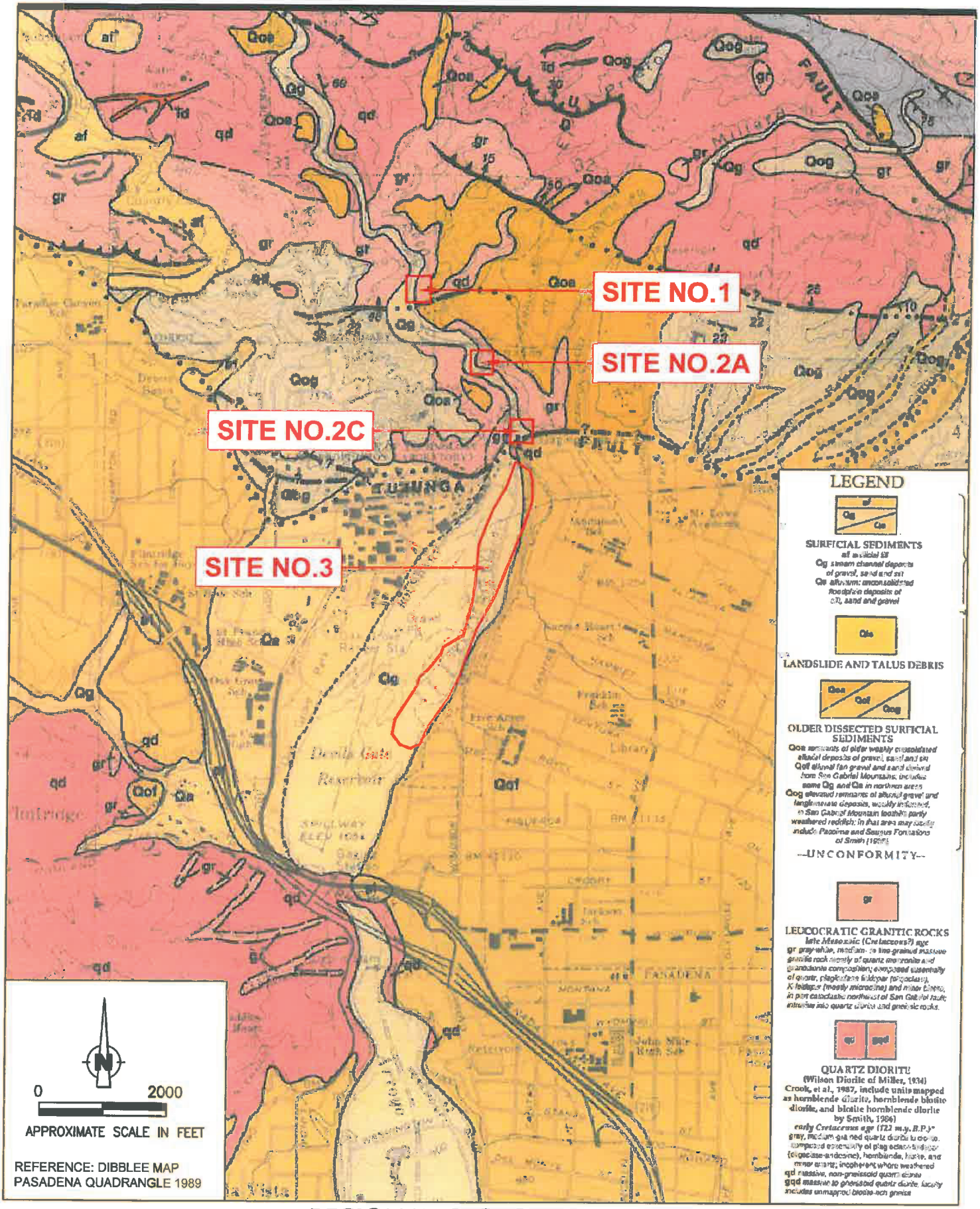
Based on results of the subsurface exploration and our experience, some variations in the continuity and nature of subsurface conditions within the project site should be anticipated. Because of the uncertainties involved in the nature and geologic characteristics of the earth material at the site, care should be exercised in interpolating or extrapolating subsurface conditions between or beyond the boring locations. If during construction, subsurface conditions differ significantly from those presented in this report, this office should be notified immediately so that recommendations can be modified, if necessary.

2.4 Faulting and Geologic Hazards

Geologic hazards are defined as geologically related conditions that may present a potential danger to life and property. Typical geologic hazards in Southern California include earthquake ground shaking, fault surface rupture, landslides, and liquefaction.

2.4.1 Fault Surface Rupture and Active Faults

The project site is not located within a currently designated State of California Earthquake Fault Zone (formerly Alquist-Priolo Special Studies Zones) for surface fault rupture. Based on Drawing No. 3, *Regional Geologic Map (Dibblee, 1989)*, a splay of Tujunga Fault is



REGIONAL GEOLOGIC MAP

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.	Drawing No.
13-31-199-01	3

located at approximate 100 feet south of the project site.

2.4.2 Liquefaction

Liquefaction is the sudden decrease in the strength of cohesionless soils due to dynamic or cyclic shaking. Saturated soils behave temporarily as a viscous fluid (liquefaction) and, consequently, lose their capacity to support the structures founded on them. The potential for liquefaction decreases with increasing clay and gravel content, but increases as the ground acceleration and duration of shaking increase. Liquefaction potential has been found to be the greatest where the groundwater level and loose sands occur within 50 feet of the ground surface. The site is located within a mapped Seismic Hazard Zone for liquefaction (CDMG, 1998) as shown in Drawing No. 4, *Seismic Hazard Zones Map*.

Based on the results of our subsurface exploration, very dense gravelly sand with cobbles and boulders was encountered underneath the proposed restroom site, it is our professional opinion that the site is not susceptible to liquefaction and seismically-induced settlement to be negligible.

2.4.3 Landslides

The site is not located within a Seismic Hazard Zone for required investigation for earthquake-induced landsliding (CDMG, 1999). The restroom site is relatively flat and the ascending 2H:1V, 20-foot-high slope at the east is covered by well developed vegetation. Based on our field explorations and gradient of slope, it is our opinion that this ascending slope is considered stable statically and seismically. The proposed restroom building should be set back at least 10 feet away from the toe of slope in accordance with CBC 2010.

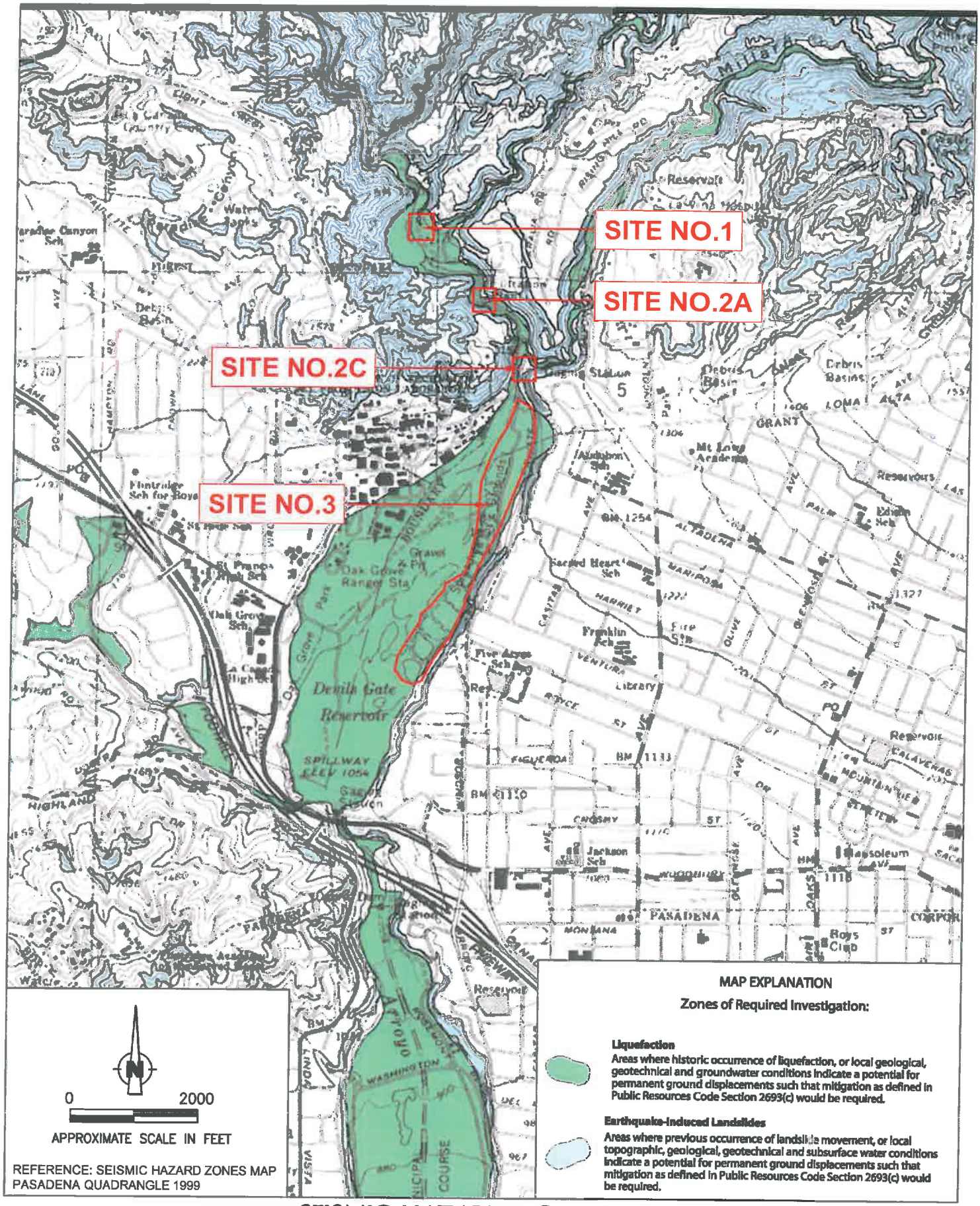
2.4.4 Flood Zone

Based on the information provided by Carollo Engineers, the restroom site is located near a 50-year floodplain. The effects of flood should be considered in the design of restroom building. Flood protection measures are recommended for new structures.

2.5 Seismic Analysis

2.5.1 CBC Seismic Design Parameters

Seismic parameters based on the 2010 California Building Code are calculated using the United States Geological Survey computer program *Seismic Hazards Curves,*



SEISMIC HAZARD ZONE MAP

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.	Drawing No.
13-31-199-01	4

Response Parameters and Design Parameters, Version 5.1.0a. The seismic parameters are presented below.

Table No. 1, 2010 CBC Seismic Parameters For Site No. 1

Seismic Parameters	
Site Class	D
Mapped Short period (0.2-sec) Spectral Response Acceleration, S_S	2.660g
Mapped 1-second Spectral Response Acceleration, S_1	0.976g
Site Coefficient (from Table 1613.5.3(1)), F_a	1.0
Site Coefficient (from Table 1613.5.3(2)), F_v	1.5
MCE 0.2-sec period Spectral Response Acceleration, S_{MS}	2.660g
MCE 1-second period Spectral Response Acceleration, S_{M1}	1.464g
Design Spectral Response Acceleration for short period, S_{DS}	1.773g
Design Spectral Response Acceleration for 1-second period, S_{D1}	0.976g
Seismic Design Category	D

2.5.2 Deaggregated Seismic Source Parameters

Based on our analyses utilizing the USGS 2008 NSHM PSHA Interactive Deaggregation web site, the mean and modal earthquake magnitudes for a return time of 2475 years are calculated to be 6.68 and 7.02, respectively. The earthquake magnitude of 7.02 should be considered for seismic analyses at the project site.

2.6 Conclusions and Recommendations

2.6.1 Preliminary OWTS Feasibility Evaluation

Based on large amounts of cobbles and boulders encountered during our exploratory borings, difficult drilling conditions are expected during construction. Therefore it is our opinion that leach lines are more feasible than seepage pits for the onsite wastewater treatment system.

Boring BH-2 at Site No. 1 was utilized to perform percolation testing on July 8 and 9 to evaluate the feasibility of onsite wastewater treatment system (OWTS). The bored hole was cased using a four-inch diameter perforated PVC casing surrounded with filter gravel pack. Water was added to the borehole until the water level was at the ground surface and allowed to pre-soak for one day. After pre-soak, the hole was filled with water again to 12 inches above the bottom, and allowed adequate time for the water level to drop. As the water level drops, each one inch of drop was recorded. The percolation data was presented in Appendix C, Percolation Testing Data.

In accordance with the LA County guidelines, the size of the dis persal field shall be determined by the Ryon Formula utilizing the slowest elapsed time required for the water to drop form th e 5th to the 6th inch. We have performed a preliminary capacity estimation based on our percolation test results as presented below:

Assume:
A 50' x 50' leach field is planned for 100% design capacity
Leach line consists of 3-foot wide trench wit h 1 foot of filter material below the perforated pipe
Five 50-foot long leach lines are installed within leach field

Ryon Formula: A = (T+6.24)*C/58
where A = square feet of leach lines = 3'*50'*5 = 750 ft^2
T = time for the 6th inch of water to drain =11 minutes

Therefore, the calculated maximum septic tank capacity, C = 2523 gal

Site No. 1 is acceptable to construct t he leach lines near Borings 2 for onsite wastewater treatment system in accordance with the LA County requirements. It should be advised that percolation testing was perfo rmed at only one location for the current feasibility study, which is not fully in compliance with the minimum three testing locations required by the LA County. A comprehensive percolation testing program should be conducted once the site is selected for the planned public restroom.

2.6.2 Foundation Recommendations for Public Restroom

Based on the results of our liter ature review, subsurface explor ation, laboratory testing, geotechnical analyses, and understandi ng of the planned site im provements, it is our opinion that the proposed public restroom is feasible fr om a geotechnical standpoint, provided the following conclus ions and reco mmendations are incorporated into the project plans, specifications, and are followed during site construction.

The restroom site is located in close proximity of a 50-year floodplain. The effects of base flood elevation should be c onsidered in the des ign of restroom building. W e recommended the restroom build ing be supported by drilled caissons with grade beam system. Caissons should be at least founded at least 4 feet below lowest adjacent final grade into dense soils and at least 24 inches in diameter. Bearing capacity of caisson can be calculated by an allowable skin friction of 350 psf. The allowable value indicated above is obtained by apply ing a factor of safety of 2.0 to the ultimate value. The actual reinforcement of caisson should be determined by the structural engineer.

As an alternative, conventional spread footings can be used. Isolated footing should be at least 24 inches square, and continuous footings should be 12 inches wide. Footings should be embedded at least 4 feet below the lowest adjacent grade into dense native soil. Conventional footings with the minimum sizes can be designed for a net allowable bearing pressure of 3,500 psf for dead-plus-live loads.

Resistance to lateral loads can be provided by friction acting at the base of the foundation and by passive earth pressure. A coefficient of friction of 0.35 may be assumed with normal dead load forces. An allowable passive earth pressure of 350 psf per foot of depth up to a maximum of 3,500 psf may be used. The values of coefficient of friction and allowable passive earth pressure include a factor of safety of 1.5.

The static settlement is anticipated to be less than 0.5 inch. Differential settlement is expected to be up to one-half of the total settlement over a 30-foot span.

The above vertical bearing may be increased by 33% for short durations of loading which will include the effect of wind or seismic forces. The allowable passive pressure may be increased by 33% for lateral loading due to wind or seismic forces.

2.6.3 Slab-on-grade

Slabs-on-grade should be supported on compacted fill and have a minimum thickness of four (4) inches nominal for support of normal ground-floor live loads. Minimum reinforcement for slabs-on-grade should be No. 3 reinforcing bars, spaced at 18 inches on-center each way. The thickness and reinforcement of more heavily-loaded slabs will be dependent upon the anticipated loads and should be designed by a structural engineer. A static modulus of subgrade reaction equal to 150 pounds per square inch per inch may be used in structural design of concrete slabs-on-grade.

It is critical that the exposed subgrade soils should not be allowed to desiccate prior to the slab pour. Care should be taken during concrete placement to avoid slab curling. Slabs should be designed and constructed as promulgated by the ACI and Portland Cement Association (PCA). Prior to the slab pour, all utility trenches should be properly backfilled and compacted.

In areas where a moisture-sensitive floor covering (such as vinyl tile or carpet) is used, a 10-mil-thick moisture retarder/barrier between the bottom of slab and subgrade that meets the performance criteria of ASTM E 1745 Class A material. Retarder/barrier sheets should be overlapped a minimum of six inches, and should be taped or otherwise sealed per the product specifications.

2.6.4 Earth Pressures for Retaining Walls

The following design values can be used for the proposed retaining walls, if any. The earth pressure behind any buried wall depends primarily on the allowable wall movement, type of soil behind the wall, backfill slopes, wall inclination, surcharges, and any hydrostatic pressure. The following earth pressures are recommended for vertical walls with no hydrostatic pressure.

Table No. 2, Lateral Earth Pressures for Retaining Wall Design

Backfill Slope (H:V)	**Cantilever Wall** (triangular pressure distribution) **Equivalent Fluid Pressure (pcf)**	**Restrained Wall** (uniform pressure distribution) **(psf)**
Level	32	23H
2:1	45	30H

The recommended lateral pressures assume that the walls are fully back-drained to prevent build-up of hydrostatic pressure. Adequate drainage could be provided by means of permeable drainage materials wrapped in filter fabric installed behind the walls. The drainage system should consist of perforated pipe surrounded by a minimum one (1) square feet per lineal feet of free draining, uniformly graded, ¾-inch washed, crushed aggregate, and wrapped in filter fabric such as Mirafi 140N or equivalent. The filter fabric should overlap approximately 12 inches or more at the joints. The subdrain pipe should consist of perforated, four-inch diameter, rigid ABS (SDR-35) or PVC A-2000, or equivalent, with perforations placed down. Alternatively, a prefabricated drainage composite system such as the Miradrain G100N or equivalent can be used. The subdrain should be connected to solid pipe outlets, with a maximum outlet spacing of 100 feet.

Walls subjected to surcharge loads located within a distance equal to the height of the wall should be designed for an additional uniform lateral pressure equal to one-third or one-half the anticipated surcharge load for unrestrained or restrained walls, respectively. These values are applicable for backfill placed between the wall stem and an imaginary plane rising 45 degrees from below the edge (heel) of the wall footings.

Although not anticipated, retaining walls greater than 12 feet should be designed to resist additional earth pressure caused by seismic ground shaking. A seismic earth pressure of 15H (psf), based on an inverted triangular distribution, can be used for design of wall.

2.6.5 Soil Corrosivity Evaluation

Based on our review of soil corrosivity test results (see Appendix B), the pH, chloride content and saturated resistivity are not in the corrosive range to ferrous metal. The soluble sulfate concentration is not in the corrosive range to concrete. Mitigation measures to protect concrete in contact with the soils are not anticipated.

A corrosion engineer may be consulted for appropriate mitigation procedures and construction design, if needed. General considerations for corrosion mitigation measures may include the following:

- Steel and wire concrete reinforcement should have at least three inches of concrete cover where cast against soil, unformed.
- Below-grade ferrous metals should be given a high-quality protective coating, such as 18-mil plastic tape, extruded polyethylene, coal-tar enamel, or Portland cement mortar.
- Below-grade metals should be electrically insulated (isolated) from above-grade metals by means of dielectric fittings in ferrous utilities and/or exposed metal structures breaking grade.

2.6.6 Site Drainage

Adequate positive drainage should be provided away from the structure foundations to prevent ponding and to reduce percolation of water into the foundation soils. We recommend that any landscape areas immediately adjacent to the foundation shall be designed sloped away from the foundation with a minimum 2 percent slope gradient for at least 10 feet measured perpendicular to the face of the foundation. Impervious surfaces within 10 feet of the structure foundation shall be sloped a minimum of 1 percent away from the structure.

2.6.7 Earthwork and Site Grading

The earthwork anticipated for the restroom building includes foundation excavations and subgrade preparation. To prepare the subgrade underneath the slab, we recommend scarify the subgrade at least 6 inches, moisture conditioned as needed to near optimum moisture content, and compacted to 90 percent relative compaction for slab support. Deeper removal will be needed if soft soil conditions expose at the excavation bottom.

All engineered fill should be placed on competent, scarified and compacted bottom as evaluated by the geotechnical engineer and in accordance with the recommendations presented in this section. Excavated site soils, free of deleterious materials and rock

particles larger than three (3) inches in the l argest dimension, should be sui table for placement as compacted fill. Any proposed import fill should be evaluated and approved by Converse prior to import to the site. Import fill material should have an expansion index less than 20.

The onsite materials will contain large amount of gravels, cobbles and boulders. Based on our field exploration, t he earth materials at the site may be excavated wit h conventional heavy-duty earth moving and tr enching equipment in general. Difficult drilling and excav ation conditions should be also anticipated and other suitable equipment and methods should be used.

Prior to compaction, fill materials should be thoroughly mixed and moisture conditio ned within two (2) percent above the optimum moisture content. Fill soils sha ll be evenly spread in maximum 8-inch lifts, watered or dried as necessary, mixed and compacted to at least the density specified b elow. Th e fill sha ll be placed a nd compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer. All fill, if not specified otherwise elsewhere in this report, should be compacted to at least 90 percent of the laboratory dry density in accordance with the ASTM Standard D1557 test method. The upper 12 inches of subgrade below pavem ent areas should be compacted to 95 percent relative compaction.

2.6.8 Expansive Soil

The near surface soils have a “Very Low” expans ive potential. Mitigation for expansiv e soil is not considered necessary.

2.6.9 Pipeline Backfill

Any soft and/or unsuitable material encount ered at the pipe invert should be removed and replaced with an adequate bedding material. Th e pipe s ubgrade should be leve l, firm, uniform, free of loose materials and properly graded to provide unifor m bearing and support to the entire se ction of the pi pe placed on beddi ng material. Protruding oversize particles larger than tw o (2) inches in the largest dimension, if any, should be removed from the trench bottom and replac ed with compacted materials. During the digging of depressions for proper sealing of the pipe joints, the pipe should rest on a prepared bottom for as near its fu ll length as is practicable. The bedding zone is defined as that portion of the pipe tr ench from four inches below the pipe invert to one foot above the top of pipe, in acco rdance with Section 306-1.2.1 of the Latest Edition of the *Standard Specifications for Public Works Construction* (SSPWC).

The following specifications are recommended to provide a basis for quality control during the placement of trench backfill.

Trench excavations to receive backfill shall be free of trash, debris or other unsatisfactory materials at the time of backfill placement. Excavated on-site soils free of oversize particles, defined as larger than one (1) inch in maximum dimension in the upper 12 inches of subgrade soils and larger than three (3) inches in the largest dimension in the trench backfill below, and deleterious matter after proper processing may be used to backfill the trench zone. Imported trench backfill, if used, should be approved by the project soils consultant prior to delivery at the site. No more than 30 percent of the backfill volume should be larger than ¾ inch in the largest dimension.

Trench backfill shall be compacted to 90 percent of the laboratory maximum dry density as per ASTM Standard D1557 test method. At least the upper twelve (12) inches of trench underlying pavements should be compacted to at least 95 percent of the laboratory maximum dry density.

Trench backfill shall be compacted by mechanical methods, such as sheepsfoot, vibrating or pneumatic rollers, or mechanical tampers, to achieve the density specified herein. The backfill materials shall be brought to within two (2) percent of optimum moisture content and then placed in horizontal layers. The thickness of uncompacted layers should not exceed eight (8) inches. Each layer shall be evenly spread, moistened or dried as necessary, and then tamped or rolled until the specified density has been achieved.

The contractor shall select the equipment and processes to be used to achieve the specified density without damage to adjacent ground and completed work. The field density of the compacted soils shall be measured by the ASTM Standard D1556 or ASTM Standard D2922 test methods or equivalent. Observation and field tests should be performed by Converse during construction to confirm that the required degree of compaction has been obtained. Where compaction is less than that specified, additional compactive effort shall be made with adjustment of the moisture content as necessary, until the specified compaction is obtained. It should be the responsibility of the contractor to maintain safe conditions during cut and/or fill operations. Trench backfill shall not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the project's geotechnical consultant indicate that the moisture content and density of the fill are as previously specified.

Imported soils, if any, used as compacted trench backfill should be predominantly granular and meet the following criteria:

- Expansion Index less than 20
- Free of all deleterious materials
- Contain no particles larger than 3 inches in the largest dimension
- Contain less than 30 percent by weight retained on ¾-inch sieve
- Contain at least 15 percent fines (passing #200 sieve)
- Have a Plasticity Index of 10 or less

Any import fill should be tested and approved by the geotechnical representative prior to delivery to the site.

2.6.10 Temporary Excavations

Based on the materials encountered in the exploratory borings, sloped temporary excavations may be constructed according to the slope ratios presented in the following table:

Table No. 3, Slope Ratios for Temporary Excavation

Maximum Depth of Cut (feet)	Maximum Slope Ratio* (horizontal: vertical)
0 – 4	vertical
4 – 8	1:1
>8	1.5:1

*Slope ratio assumed to be uniform from top to toe of slope.

Any loose utility trench backfill or other fill encountered in excavations will be less stable than the native soils. Temporary cuts encountering loose fill or loose dry sand should be constructed at a flatter gradient than presented in the table above. Surfaces exposed in slope excavations should be kept moist but not saturated to minimize raveling and sloughing during construction. Adequate provisions should be made to protect the slopes from erosion during periods of rainfall. Surcharge loads, including construction, should not be placed within five (5) feet of the unsupported excavation edge.

All applicable requirements of the California Construction and General Industry Safety Orders, the Occupational Safety and Health Act of 1987 and current amendments, and the Construction Safety Act should be met. The soils exposed in cuts should be

observed during exc avation by the project's geotechnical consultant. If potentially unstable soil conditions are enc ountered, modifications of slope ratios for temporary cuts may be required.

3.0 SITE NO. 2A – ROADWAY REPAIR SITE

3.1 Site Description

Site No. 2A is located at about 1,000 feet s outheast of Site No. 1, just south of the Behner Intake. It is our understanding that the existing asphalt paved roadway (Arroyo Seco Canyon Road/Gabrieleno Trail) was er oded for approxim ate 145 feet in length along the westerly shoulder during 2009-2010 storms and subsequent canyon floods. K-rails are currently in place along the western edge of the roadway. The northern segment of road erosion scarp is about 4 to 5 feet in vertical height and about 90 feet in length along roadway. The scarp exposed older alluvial soil consisting of brown silty sand with cobbles and boulders. The southern segment of road erosion scarp is about 1 foot in height and about 55 feet in length. The southern scarp exposed soil layer about 6 inches in height underlain by very hard, massive grantic rock.

The site is situated at about 1192 feet MSL. The site coor dinates are: North latitude: 34.2075 degrees and West longi tude: 118.1681 degrees. The project site is depicted on Drawing No. 2b, *Site No. 2A, Boring Location Map*.

3.2 Scope of Work

The scope of our pres ent study includes site reconnaissance, subsurface exploration, soil sampling, laboratory testing, engineering anal ysis, and preparat ion of this report. Details of the tasks are addressed in the following sections:

3.2.1 Project Setup and Site Reconnaissance

A Converse geologist conducted a site reconnaissance on June 20, 2013. The purpose of the reconnaissance was to evalua te site conditions with respect to the lo cation of th e borings and drill rig accessibility. The Underground Services Alert (USA) was notified on June 28, 2013 within 14 calendar days prior to field exploration.

3.2.2 Subsurface Exploration

One boring (BH-3) was drilled to 5 feet below existing r oadway ground surface on July 9, 2013. The borings were drilled with a limited access drill rig equip ped with 12-inc h diameter bucket augers for soil sampling. The boring was visually logg ed

and sampled at regular depth intervals and at changes in subsurface soils. The boring was backfilled and compacted with soil cuttings and patched with asphalt after completion of drilling. The boring encountered refusal at shallow depths due to very hard grantic bedrock. The locations of borings are shown on the attached *Drawing No. 2b, Site No. 2A, Boring Location Map*.

California Modified Sampler (Ring samples), and bulk soil samples were obtained for laboratory testing. The bore holes were backfilled and compacted with soil cuttings after the completion of field testing.

3.2.3 Laboratory Testing

Representative samples of the site soils were tested in the laboratory to aid in the classification and to evaluate relevant engineering properties. The tests performed included:

- *In situ* moisture contents and dry densities (ASTM Standard D2216)
- Grain-Size Analysis (ASTM D422)
- Soil corrosivity tests (Caltrans 643, 422, 417 and 532)

The detailed description of the laboratory test methods and test results are presented in Appendix B, *Laboratory Testing Program*.

3.2.4 Analyses and Report

Data obtained from the exploratory fieldwork and laboratory-testing program were analyzed and evaluated with respect to the proposed development. Recommendations for retaining walls, foundations, earthwork, and pavement structural section are provided.

3.3 Subsurface Conditions

3.3.1 Subsurface Soil Profile of Project Site

Based on our field observations, older alluvial soil (Map symbol: Qoa) and grantic bedrock (Map symbol: gr) were exposed on the erosion scarps underneath the roadway. Based on our exploratory soil boring (BH-3), the explored location is underlain by about 3-foot thick sandy soils over by grantic bedrock. The upper 1 foot of bedrock was highly weathered. The bedrock below the weather zone is massive and very hard. The detailed descriptions of the borings are presented in Appendix A, Field Exploration.

3.3.2 Groundwater

Groundwater was not encountered in our exploratory borings to a maximum depth of 3.5 feet. In accordance with the Seismic Hazard Zone Report for the Pasadena Quadrangle (CDMG, 1998), the historic highest groundwater level contours are not defined at this location. However, the roadway is adjacent to existing stream channel, seasonal high groundwater is anticipated to be shallow.

3.3.3 Subsurface Variations

Based on results of the subsurface exploration and our experience, some variations in the continuity and nature of subsurface conditions within the project site should be anticipated. Because of the uncertainties involved in the nature and geologic characteristics of the earth material at the site, care should be exercised in interpolating or extrapolating subsurface conditions between or beyond the boring locations. If during construction, subsurface conditions differ significantly from those presented in this report, this office should be notified immediately so that recommendations can be modified, if necessary.

3.4 Faulting and Geologic Hazards

Geologic hazards are defined as geologically related conditions that may present a potential danger to life and property. Typical geologic hazards in Southern California include earthquake ground shaking, fault surface rupture, landslides, and liquefaction.

3.4.1 Fault Surface Rupture and Active Faults

The project site is not located within a currently designated State of California Earthquake Fault Zone (formerly Alquist-Priolo Special Studies Zones) for surface fault rupture. Based on Drawing No. 3, Regional Geologic Map (Dibblee, 1989), the trace of Tujunga Fault is located at approximate 1,000 feet south of the project site.

3.4.2 Liquefaction

Liquefaction is the sudden decrease in the strength of cohesionless soils due to dynamic or cyclic shaking. Saturated soils behave temporarily as a viscous fluid (liquefaction) and, consequently, lose their capacity to support the structures founded on them. The potential for liquefaction decreases with increasing clay and gravel content, but increases as the ground acceleration and duration of shaking increase. Liquefaction potential has been found to be the greatest where the groundwater level and loose sands occur within 50 feet of the ground surface. The site is not located

within a mapped Seismic Hazard Zone for liquefaction (CDMG, 1998) as shown in Drawing No. 4, *Seismic Hazard Zones Map*.

Based on the results of our subsurface exploration, the site has shallow grantic bedrock, it is our professional opinion that the site is not susceptible to liquefaction and seismically-induced settlement to be negligible.

3.4.3 Landslides

The Grantic bedrock slope east of the site is located within a Seismic Hazard Zone for required investigation for earthquake-induced landsliding (CDMG, 1999). Based on our field observations of bedrock slope, it is our opinion the slope is stable at its current condition. However, small rock fall hazard should be expected due to steepness of the slope.

3.4.4 Flood Zone

Based on the information provided by Carollo Engineers, the roadway repair site is located within a 5-year floodplain. The roadway is located along the Arroyo Seco Canyon floodplain and is subject to potential flooding following periods of heavy rainfall. The retaining wall should be designed considering the inundation and scour by flood events. Flood protection measures are recommended for new structures. Channel armor may be necessary to protect the retaining wall. Maintenance of roadway will be required after flood events.

3.5 Seismic Analysis

3.5.1 CBC Seismic Design Parameters

Seismic parameters based on the 2010 California Building Code are calculated using the United States Geological Survey computer program *Seismic Hazards Curves, Response Parameters and Design Parameters, Version 5.1.0a.* The seismic parameters are presented below.

Table No. 4, 2010 CBC Seismic Parameters For Site No. 2A

Seismic Parameters	
Site Class	C
Mapped Short period (0.2-sec) Spectral Response Acceleration, S_S	2.636g
Mapped 1-second Spectral Response Acceleration, S_1	0.973g
Site Coefficient (from Table 1613.5.3(1)), F_a	1.0
Site Coefficient (from Table 1613.5.3(2)), F_v	1.3
MCE 0.2-sec period Spectral Response Acceleration, S_{MS}	2.636g
MCE 1-second period Spectral Response Acceleration, S_{M1}	1.265g
Design Spectral Response Acceleration for short period, S_{DS}	1.757g
Design Spectral Response Acceleration for 1-second period, S_{D1}	0.843g
Seismic Design Category	D

3.5.2 Deaggregated Seismic Source Parameters

Based on our analyses utilizing the USGS 2008 NSHM P PSHA Interactive Deaggregation website, the mean and modal ear thquake magnitudes for a return ti me of 2475 years are calculated to be 6.89 and 7.02, respectively. The earthquake magnitude of 7.02 should be considered for seismic analyses at the project site.

3.6 Conclusions and Recommendations

3.6.1 Retaining Wall Recommendations

We recommend a training wall along the west shoulder of the roadway be constructed to support and restore the existing roadway. T he training wail is expected to be from 3 to 6 feet in height and should be designed for an active pressure in terms of equivalen t fluid pressure of 90 pcf, considering both earth and hydrostatic pr essure behind the wall.

Walls subjected to surcharge loads located wit hin a dis tance equal to the height of the wall should be designed for an additional unifo rm lateral pressure equal to one-third or one-half the anticipated surcharge load fo r unrestrained or restrained walls, respectively. These values are applic able for backfill placed between the wall stem and an imaginary plane rising 45 degrees from below the edge (heel) of the wall footings.

Retaining wall should be supp orted by ca st-in-drilled-hole (CIDH) piles embedded at least 8 feet into older alluvial soils (nort hern segment) or at least 3 feet into grantic bedrock (southern segment). CIDH piles s hould be at least 18 inches in diameter with 8 feet center-to-center spacing. Pile bearing capacities c an be calculated using allowable

skin friction of 400 psf and 800 psf for older alluvium and competent grantic bedrock, respectively. Uplift capacity can be taken as one-half of the downward pile capacity.

A coefficient of friction of 0.4 can be assumed for concrete in contact with firm older alluvium and bedrock. An allowable passive earth pressure in terms of equivalent fluid pressure of 300 pcf and 500 pcf up to a maximum of 4,000 psf can be used for firm older alluvial soils and bedrock, respectively. If pile spacing is greater than 3 times pile diameter, the passive pressure can be doubled.

For any backfills, excavated site soils, free of deleterious materials and rock particles larger than three (3) inches in the largest dimension, are suitable for placement as compacted fill. Any proposed import fill should be evaluated and approved by Converse prior to import to the site. Import fill material should have an expansion index less than 20. Prior to compaction, fill materials should be thoroughly mixed and moisture conditioned within two (2) percent above the optimum moisture content. Fill soils shall be evenly spread in maximum 8-inch lifts, watered or dried as necessary, mixed and compacted to at least the density specified below. The fill shall be placed and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer. All fill, if not specified otherwise elsewhere, should be compacted to at least 90 percent of the laboratory dry density in accordance with the ASTM Standard D1557 test method.

3.6.2 Flexible Pavement Recommendations

The flexible pavement structural section design recommendations were performed in accordance with the method contained in the *CALTRANS Highway Design Manual*, Chapter 630 without the factor of safety. No specific traffic study was performed to determine the Traffic Index (TI) for the proposed project. The recommended flexible pavement structural sections for various TI conditions are presented in the following table:

Table No. 5, Flexible Pavement Structural Sections

Design Subgrade R-value	Design TI	PAVEMENT STRUCTURAL SECTIONS		FULL AC STRUCTURAL SECTION
		AC (inches)	AB (inches)	AC (inches)
50*	4	2	2	3
	5	3	2	4
	6	3	4	5

* maximum allowable R-value for design

Actual traffic index and traffic load should be determined by either Civil Engineer or Traffic Engineer. The above pavement sections are recommended as a guideline for basic usage of the indicated TI values, and may not be sufficient for actual traffic loading.

Base material shall conform to requirements for a Class 2 Crushed Aggregate Base (CAB) or equivalent (such as crushed miscellaneous base - CMB) and should be placed in accordance with the requirements of the Standard Specifications for Public Works Construction (SSPWC, Latest Edition). Asphaltic materials should conform to Section 203-1, "*Paving Asphalt*," and should be placed in accordance with Section 302-5, "*Asphalt Concrete Pavement*," of the SSPWC.

3.6.3 Earthwork

The earthwork anticipated for the roadway improvement includes CIDH pile excavations and subgrade preparation. To prepare the subgrade underneath the pavement, we recommend scarify the subgrade at least 6 inches, moisture conditioned as needed to near optimum moisture content, and compacted to 90 percent relative compaction for slab support. Deeper removal will be needed if soft soil conditions expose at the excavation bottom.

All engineered fill should be placed on competent, scarified and compacted bottom as evaluated by the geotechnical engineer and in accordance with the recommendations presented in this section. Excavated site soils, free of deleterious materials and rock particles larger than three (3) inches in the largest dimension, should be suitable for placement as compacted fill. Any proposed import fill should be evaluated and approved by Converse prior to import to the site. Import fill material should have an expansion index less than 20.

The onsite materials will contain large amount of gravels, cobbles, boulders and very hard grantic bedrock. Based on our field exploration, the earth materials at the site may be excavated with conventional heavy-duty earth moving and trenching equipment in general. Difficult drilling and excavation conditions shall be also anticipated and other suitable equipment and methods should be used.

Prior to compaction, fill materials should be thoroughly mixed and moisture conditioned within two (2) percent above the optimum moisture content. Fill soils shall be evenly spread in maximum 8-inch lifts, watered or dried as necessary, mixed and compacted to at least the density specified below. The fill shall be placed and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer. All fill, if not specified otherwise elsewhere in this report, should be compacted to at least 90 percent of the laboratory dry density in accordance with the ASTM Standard D1557 test method.

4.0 SITE NO. 2C – 2nd CANDIDATE SITE FOR PUBLIC RESTROOM

4.1 Site Description

Site No. 2C is located at a relative flat area on the east side of Gabrieleno Trail just north of the JPL parking area south of a junction of two stream channels. The preliminarily planned restroom building is located on the northern portion of the site, and the onsite wastewater treatment system (OWTS) is located on the southern portion. The site is about 3 feet higher than the existing road and the surface conditions consist of bushes and some mature trees. An approximate 120 feet high ascending grantic bedrock slope to a building pad is located about 60 feet east of boring BH-5. The slope is steeper than 1H:1V.

The site is situated at about 1162 feet MSL. The site coordinates are: North latitude: 34.2102 degrees and West longitude: 118.1713 degrees. The project site is depicted on Drawing No. 2c, *Site No. 2C, Boring Location Map*.

4.2 Scope of Work

The scope of our present study includes site reconnaissance, subsurface exploration, soil sampling, laboratory testing, engineering analysis, and preparation of this report. Details of the tasks are addressed in the following sections:

4.2.1 Project Setup and Site Reconnaissance

A Converse geologist conducted a site reconnaissance on June 20, 2013. The purpose of the reconnaissance was to evaluate site conditions with respect to the location of the borings and drill rig accessibility. The Underground Services Alert (USA) was notified on June 28, 2013 within 14 calendar days prior to field exploration.

4.2.2 Subsurface Exploration and Percolation Testing

Three (3) borings, including two borings (BH-4 and BH-4A) within the planned restroom area and one boring (BH-5) within the planned wastewater treatment system (leach lines) area, were drilled a maximum 3.5 feet below existing ground surface on July 10, 2013. The borings were drilled with a limited access drill rig equipped with 12-inch and 24-inch diameter bucket augers for soil sampling. Each boring was visually logged and sampled at changes in subsurface soils. The borings were backfilled with soil cuttings after completion of testing. All three borings encountered refusals at shallow depths due to very hard grantic bedrock. The boring BH-4A was an additional attempt after

refusal at BH-4. The locations of borings are shown on the attached Drawing No. 2c, Site No. 2C, Boring Location Map.

California Modified Sampler (Ring samples), and bulk soil samples were obtained for laboratory testing. The bore holes were backfilled and compacted with soil cuttings after the completion of field testing.

Boring BH-5 was utilized for percolation tests prior to backfill. Percolation test procedures and test results are further discussed in Section 4.6.1, Preliminary OWTS Feasibility Evaluation. The raw data of percolation testing is presented in Appendix C, *Percolation Testing Data*.

4.2.3 Laboratory Testing

Representative samples of the site soils were tested in the laboratory to aid in the classification and to evaluate relevant engineering properties. The tests performed included:

- *In situ* moisture contents and dry densities (ASTM Standard D2216)
- Grain-Size Analysis (ASTM D422)
- Soil corrosivity tests (Caltrans 643, 422, 417 and 532)
- R-value

The detailed description of the laboratory test methods and test results are presented in Appendix B, *Laboratory Testing Program*.

4.2.4 Analyses and Report

Data obtained from the exploratory fieldwork and laboratory-testing program were analyzed and evaluated with respect to the proposed development. Feasibility evaluation of OWTS are provided.

4.3 Subsurface Conditions

4.3.1 Subsurface Soil Profile of Project Site

Based on our exploratory soil borings (BH-4, BH-4A and BH-5) at the site, the site is underlain by thin sandy soils over very hard grantic bedrock (Map symbol: gr). The bedrock was encountered at about 6 inches to 2.5 feet below the ground surface. The detailed descriptions of the borings are presented in Appendix A, Field Exploration.

Although the bedrock is considered as an excellent material to support the building foundation, however, it is impermeable and not suitable for the planned leach field.

4.3.2 Groundwater

Groundwater was not encountered in our exploratory borings to a maximum depth of 2.5 feet. In accordance with the Seismic Hazard Zone Report for the Pasadena Quadrangle (CDMG, 1998), the historic highest groundwater level is reportedly at depth of approximately 20 feet at the site.

4.3.3 Subsurface Variations

Based on results of the subsurface exploration and our experience, some variations in the continuity and nature of subsurface conditions within the project site should be anticipated. Because of the uncertainties involved in the nature and geologic characteristics of the earth material at the site, care should be exercised in interpolating or extrapolating subsurface conditions between or beyond the boring locations. If during construction, subsurface conditions differ significantly from those presented in this report, this office should be notified immediately so that recommendations can be modified, if necessary.

4.4 Faulting and Geologic Hazards

Geologic hazards are defined as geologically related conditions that may present a potential danger to life and property. Typical geologic hazards in Southern California include earthquake ground shaking, fault surface rupture, landslides, and liquefaction.

4.4.1 Fault Surface Rupture and Active Faults

The project site is not located within a currently designated State of California Earthquake Fault Zone (formerly Alquist-Priolo Special Studies Zones) for surface fault rupture. Based on Drawing No. 3, Regional Geologic Map (Dibblee, 1989), the trace of Tujunga Fault is located at approximate 80 feet south of the project site.

4.4.2 Liquefaction

Liquefaction is the sudden decrease in the strength of cohesionless soils due to dynamic or cyclic shaking. Saturated soils behave temporarily as a viscous fluid (liquefaction) and, consequently, lose their capacity to support the structures founded on them. The potential for liquefaction decreases with increasing clay and gravel content, but increases as the ground acceleration and duration of shaking increase. Liquefaction potential has been found to be the greatest where the groundwater level

and loose sands occur within 50 feet of the ground surface. The site is not located within a mapped Seismic Hazard Zone for liquefaction (CDMG, 1998) as shown in Drawing No. 4, *Seismic Hazard Zones Map*.

Based on the results of our subsurface exploration, the site has shallow Grantic bedrock, it is our professional opinion that the site is not susceptible to liquefaction and seismically-induced settlement to be negligible.

4.4.3 Landslides

The grantic bedrock slope east of the site is located within a Seismic Hazard Zone for required investigation for earthquake-induced landsliding (CDMG, 1999). Based on our field observations of bedrock slope, it is our opinion the slope is stable at its current condition. However, small rock fall hazard should be expected due to steepness of the slope.

4.4.4 Flood Zone

The proposed restroom site is located in the Arroyo Seco Canyon near the confluence to two tributary drainage canyons. The site is subject to potential flooding following major storm events and/or wildfires.

4.5 Seismic Analysis

4.5.1 CBC Seismic Design Parameters

Seismic parameters based on the 2010 California Building Code are calculated using the United States Geological Survey computer program *Seismic Hazards Curves, Response Parameters and Design Parameters, Version 5.1.0a.* The seismic parameters are presented below.

Table No. 6, 2010 CBC Seismic Parameters For Site No. 2C

Seismic Parameters	
Site Class	B
Mapped Short period (0.2-sec) Spectral Response Acceleration, S_S	2.656g
Mapped 1-second Spectral Response Acceleration, S_1	0.979g
Site Coefficient (from Table 1613.5.3(1)), F_a	1.0
Site Coefficient (from Table 1613.5.3(2)), F_v	1.0
MCE 0.2-sec period Spectral Response Acceleration, S_{MS}	2.656g
MCE 1-second period Spectral Response Acceleration, S_{M1}	0.979g

Design Spectral Response Acceleration for short period, S_{DS}	1.771g
Design Spectral Response Acceleration for 1-second period, S_{D1}	0.953g
Seismic Design Category	D

4.5.2 Deaggregated Seismic Source Parameters

Based on our analyses utilizing the USGS 2008 NSHM P PSHA Interactive Deaggregation website, the mean and modal ear thquake magnitudes for a return ti me of 2475 years are calculated to be 6.89 and 7.02, respectively. The earthquake magnitude of 7.02 should be considered for seismic analyses at the project site.

4.6 Conclusions and Recommendations

4.6.1 Preliminary OWTS Feasibility Evaluation

The boring BH-5 was utilized to perform percolation t ests on July 10 and 1 1, 2013 to evaluate the feasibility of onsite wastewater treatment system. Water was a dded to the bore hole until the water level was at the ground surface on July 10, 2013 and allowed to pre-soak for one day. Based on our obs ervations on July 11, 2013, water still remained in the borehole after the one-day pre-soak. In accordance with the LA County guidelines, **Site No. 2C is not feasible for the construction of onsite wastewater treatment system.** The site is underlain by shallow, hard bedrock with littl e permeability.

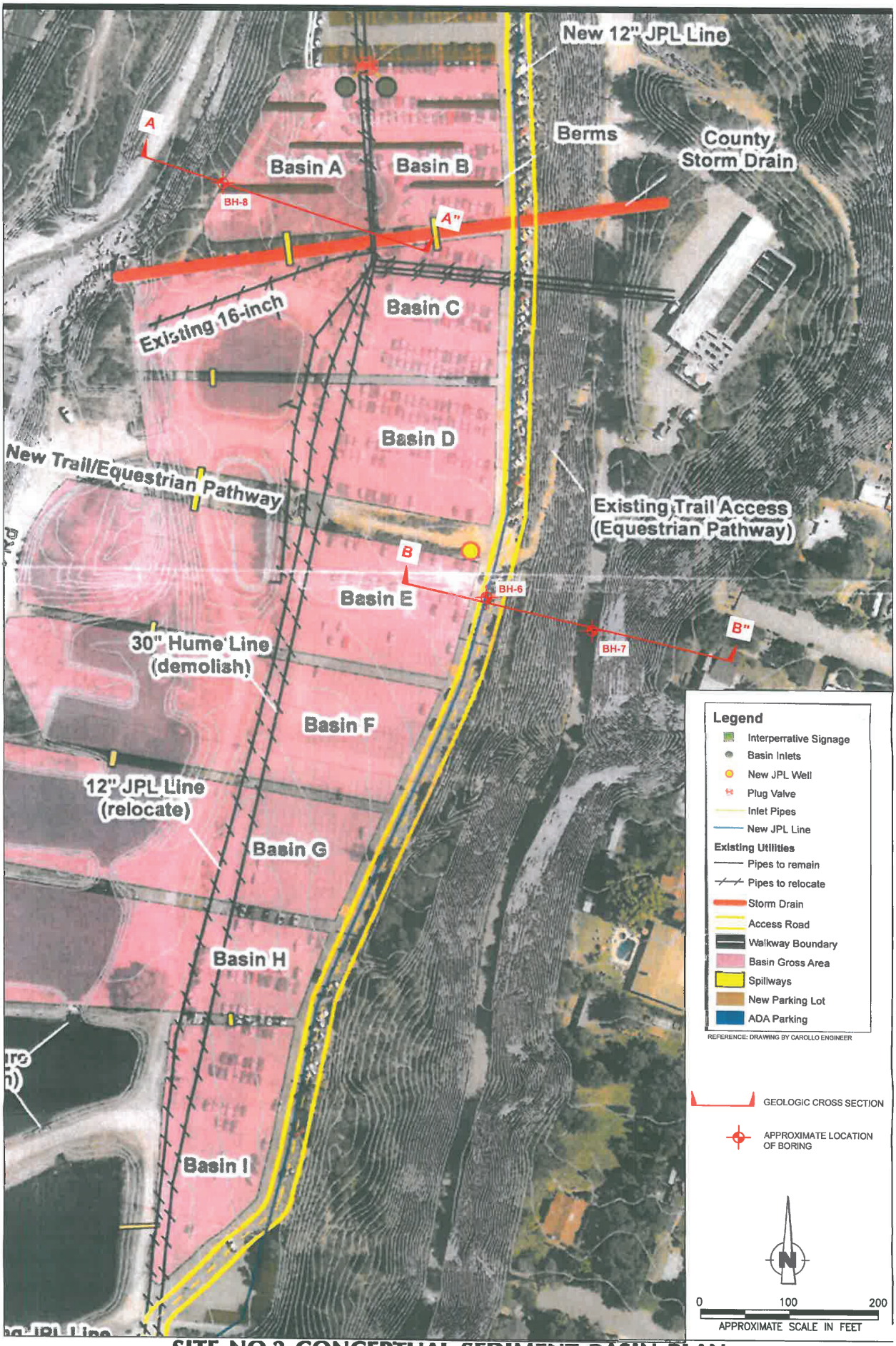
Since this site is not suitable for the public restroom, further geotechnical recommendation is not provided.

5.0 SITE NO. 3 – STORMWATER SEDIMENT BASIN SITE

5.1 Site Description

Site No. 3 is located at the southernmost part of the proj ect, including the existing JPL parking area and existing sediment basins. The surface conditions consis t of asphalt concrete pavement and unpaved ground.

It is understood that the southern portion of the existing JPL parking area will be demolished for the future sediment basin ex pansion. The construction of basins will consist of excav ating approximate 1 foot below the existing grade and constructing about 2-foot-high berms around th e basins. Although not fina lized, the conceptual plan provided by Carollo is illustrated on Drawing No. 5, *Site No. 3, Conceptual Sediment Basin Plan* for reference.



SITE NO.3 CONCEPTUAL SEDIMENT BASIN PLAN

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.
13-31-199-01

Drawing No.
5

5.2 Scope of Work

The scope of our present study includes site reconnaissance, subsurface exploration, soil sampling, laboratory testing, engineering analysis, and preparation of this report. Details of the tasks are addressed in the following sections:

5.2.1 Project Setup and Site Reconnaissance

A Converse geologist conducted a site reconnaissance on June 20, 2013. The purpose of the reconnaissance was to evaluate site conditions with respect to the location of the borings and drill rig accessibility. The Underground Services Alert (USA) was notified on June 28, 2013 within 14 calendar days prior to field exploration.

5.2.2 Subsurface Exploration and Percolation Testing

A total of nine (9) borings were drilled, including 3 borings (BH-6 through BH-8) to a maximum depth of 21 feet near the slopes, 3 borings (BH-9 through BH-11) to about 5 feet within the existing paved parking lot, and 3 borings (BH-12 though BH-14) to about 5 feet within the existing sediment basins. The locations of borings are shown on the attached Drawing No. 2d, *Site No. 3, Boring Location Map.*

The borings were drilled with a truck-mounted drill rig equipped with 8-inch diameter hollow-stem auger and a 4-inch diameter hand auger for soil sampling and/or percolation testing. Each boring will be visually logged and sampled at regular depth intervals and at changes in subsurface soils. The borings will be backfilled with soil cuttings and patched with asphalt where needed.

During our drilling at Boring BH-7 location, the driller hit a 16-inch water main pipe on July 12, 2013. Prior to using drill rig, the driller attempted to hand auger the upper 5 feet below ground surface (bgs). However, the hand augering encountered refusal due to big cobbles at about 3 feet bgs. The driller started to use drill rig to drill the boring, and then hit the water main at about 4 to 5 feet bgs.

This incident created a cavity on the existing roadway and erosion scarps on both sides of roadway. Based on our visual observations, the cavity was about maximum 15 feet in width and 10 feet in depth. The erosion scarp on the east side of roadway created a near vertical ascending slope up to approximate 20 feet in height. This slope exposed terrance deposits consisting of silty sand with cobbles and boulders. Some cobbles and boulders were exposed on the slope that may cause potential rock fall hazard.

Converse revisited the site on July 23, 2013. Based on our observations, the cavity on the road had been backfilled with slurry to about 80% of road width and the road was accessible to the recreational traffic.

5.2.3 Laboratory Testing

Representative samples of the site soils were tested in the laboratory to aid in the classification and to evaluate relevant engineering properties. The tests performed included:

- *In situ* moisture contents and dry densities (ASTM Standard D2216)
- Grain-Size Analysis (ASTM D422)
- Maximum dry density and optimum-moisture content relationship (ASTM Standard D1557)
- Direct shear (ASTM Standard D3080)
- Consolidation (ASTM Standard D2435)
- Soil corrosivity tests (Caltrans 643, 422, 417 and 532)

The detailed description of the laboratory test methods and test results are presented in Appendix B, *Laboratory Testing Program*.

5.2.4 Analyses and Report

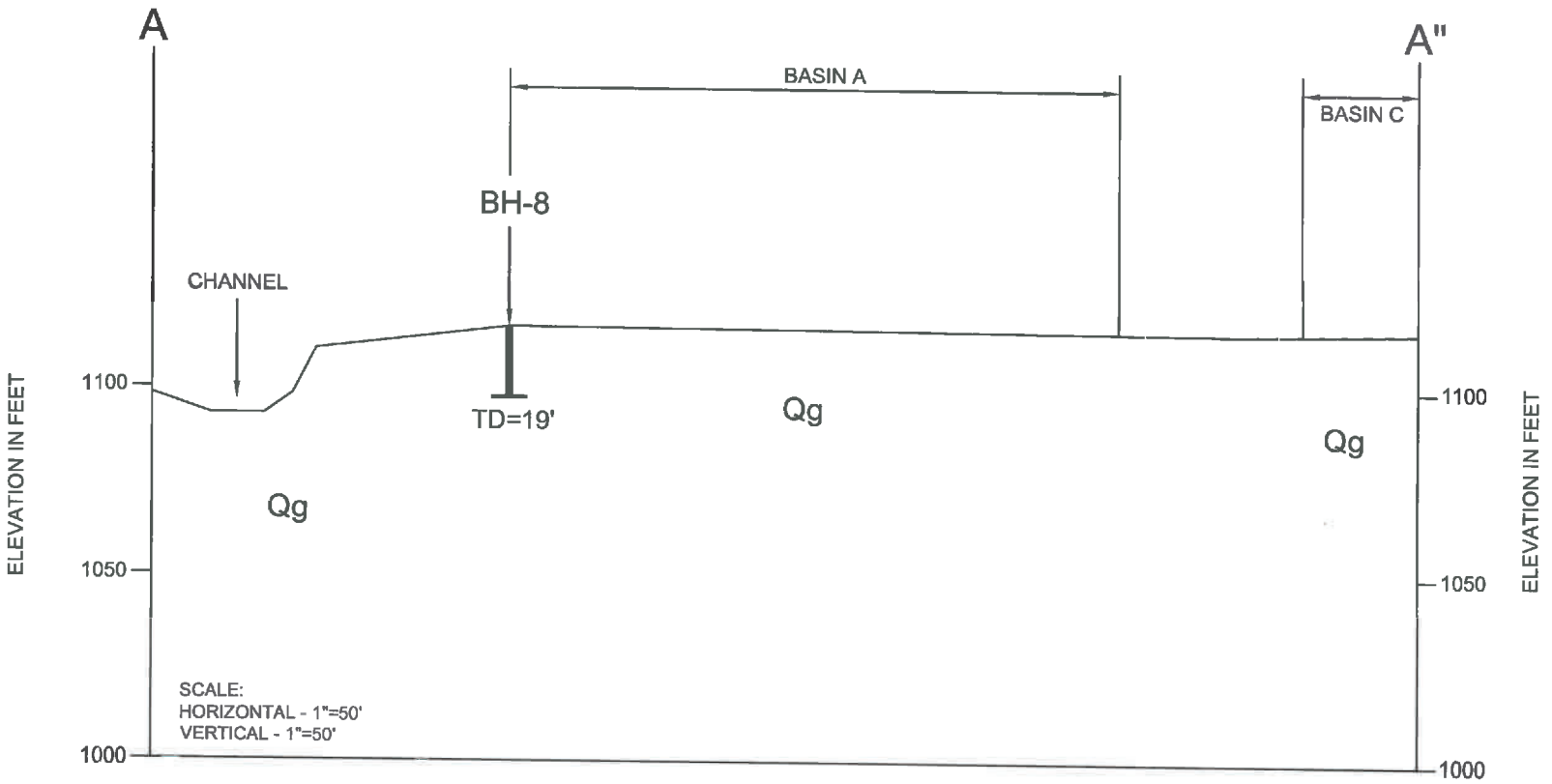
Percolation test results and slope stability were analyzed and evaluated with respect to the proposed development. Preliminary earthwork recommendations are presented.

5.3 Subsurface Conditions

5.3.1 Subsurface Soil Profile of Project Site

Based on our exploratory soil borings, stream deposits (Map symbol: Qg) and terrace deposits (Map symbol: Qof) both consisting of primarily light brown silty sand with numerous cobbles and boulders were encountered to a maximum explored depth of 21 feet below existing ground surface (bgs). The stream deposits and terrace deposits are both moderately dense to very dense. The detailed descriptions of the borings are presented in Appendix A, Field Exploration.

Drawing No. 6a and 6b are prepared to illustrate the geologic cross sections of A-A' and B-B' for slope stability analyses.



EXPLANATION

Qg - STREAM DEPOSIT

TD - TOTAL DEPTH

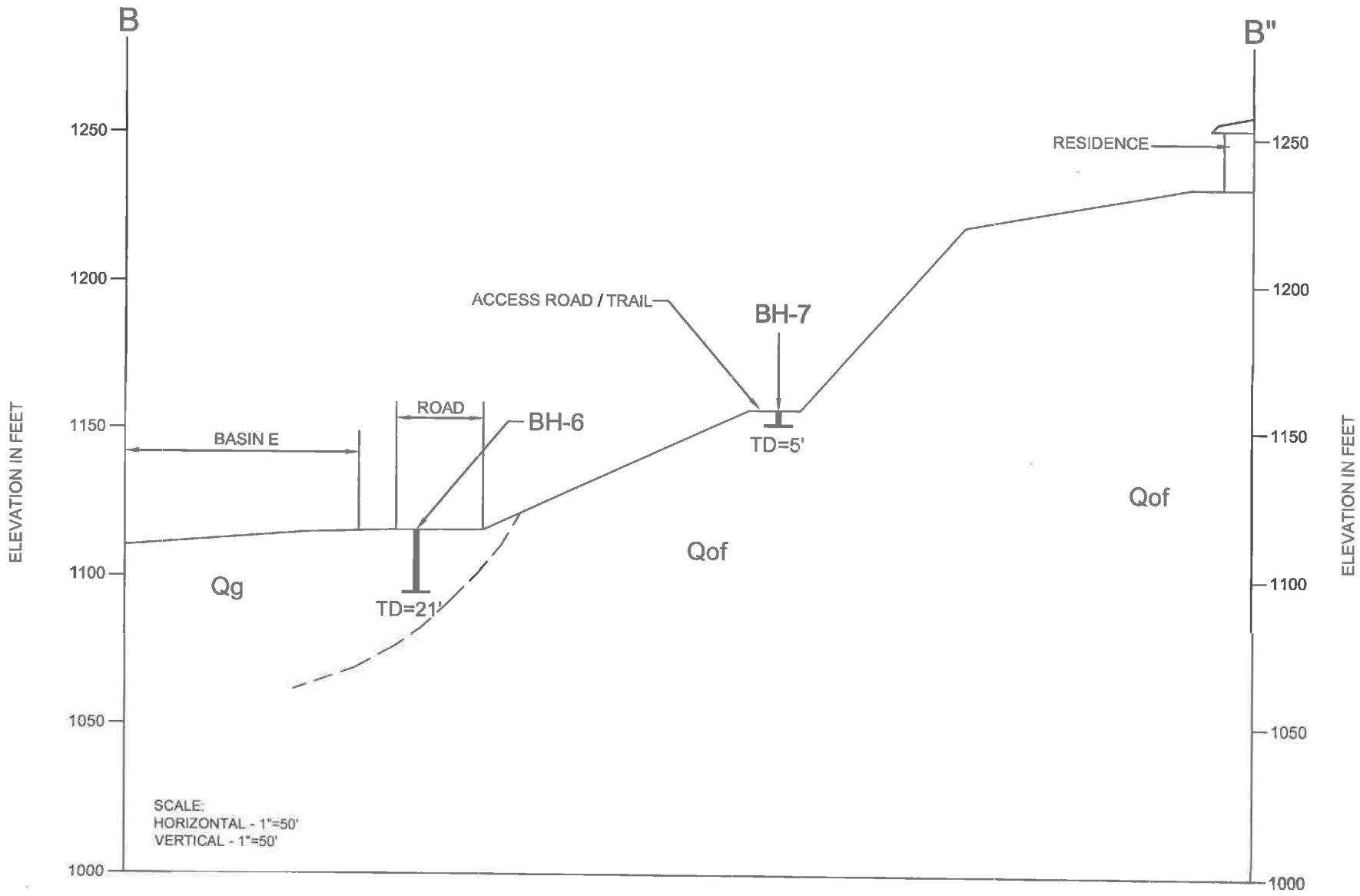
GEOLOGIC CROSS SECTION A-A"

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. 6a



EXPLANATION

Qg - STREAM DEPOSIT

TD - TOTAL DEPTH

GEOLOGIC CROSS SECTION B-B"

Converse Consultants

ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. 6b

5.3.2 Groundwater

Groundwater was not encountered in our exploratory borings to a maximum depth of 21 feet. In accordance with the Seismic Hazard Zone Report for the Pasadena Quadrangle (CDMG, 1998), the historic highest groundwater level is reportedly at depths of approximately 20 feet.

5.3.3 Subsurface Variations

Based on results of the subsurface exploration and our experience, some variations in the continuity and nature of subsurface conditions within the project site should be anticipated. Because of the uncertainties involved in the nature and geologic characteristics of the earth material at the site, care should be exercised in interpolating or extrapolating subsurface conditions between or beyond the boring locations. If during construction, subsurface conditions differ significantly from those presented in this report, this office should be notified immediately so that recommendations can be modified, if necessary.

5.4 Percolation Testing Results

The borings BH-9 through BH-14 were utilized to perform percolation tests on July 11 and 12 to evaluate the percolation rates for the design of future sediment basins. Tests were performed using the falling head test method in accordance with Los Angeles County "Low Impact Development Best Management Practice Guideline for Design, Investigation, and Reporting"

The bored hole was cased using a two-inch diameter perforated PVC casing surrounded with filter gravel pack. Water was added to the bore hole until the water level was at the ground surface and allowed to pre-soak for at least 2 hours. After pre-soak, water was added to the bore hole until the water level was at the ground surface. The water level was measured to the nearest 1/100-foot and recorded every 10-minute interval. The results of the percolation tests are tabulated below and in Appendix C, Percolation Testing Data.

Table No. 7, Percolation Test Results at Site No. 3

Boring No.	Location	Depth of Test Hole* (feet)	Lowest Percolation Rate (inches/hour)	Average Percolation Rate (inches/hour)
BH-9	JPL Parking	5.0	6.58	7.87
BH-10	JPL Parking	5.0	11.52	15.90

BH-11	JPL Parking	5.0	4.50	6.65
BH-12	Sludge Basin 2	5.0	4.70	24.09
BH-13	Basin 8	3.0	27.51	58.65
BH-14	Basin 13	5.0	16.96	28.07

*approximate

The upper 5 feet of soils within Site No. 3 have high to very high percolation rates. Converse has reviewed a literature entitled "Seepage, Drainage and Flow Nets" by Cedregren (1989) to verify the percolation results and provide our opinions to the high percolation rates. The followings are some reasons to explain the high percolation rates.

- Young stream deposits from the river channel naturally have higher permeability than other alluvial soils. These sediments are generally loose and unconsolidated.
- Percolation test holes did not have fine sediments.
- Clean water was used for percolation tests.
- The soils surrounding the test holes (especially near surface soil) may be disturbed or loosened during drilling.
- The higher percolation rates near surface increased the average rates.

The soils encountered in the JPL parking lot and existing sediment basins are "Stream Deposits" from the Arroyo Seco Canyon, consisting of primarily gravelly sands with cobbles and boulders, which are excellent permeable materials. The typical permeability rates of gravelly sands range from 2.8 to 280 ft/day, however, the percent of fine sediments accumulated in soil will reduce the permeability down to 0.2 to 3 ft/day according to Cedergren (1989). Our test results are within the typical percolation rate range.

It is our opinion that the percolation rates presented on our table demonstrate the good percolation capacity of the onsite soils without considering fine sediment clogging. For planning or design purposes, it is recommended consider the lowest percolation rates among the tests because the percolation test holes are located at only a few scattered points over a fairly large area. Fine sediment clogging should be also considered into the design and maintenance plan for the stormwater spreading and recharge of the basins.

5.5 Slope Stability Analysis

Geologic cross sections A-A' and B-B' were analyzed for gross static slope stability by using a computer program SLOPE/W which utilizes various limiting equilibrium methods, including the ordinary slice, Bishop's, Jabu's, and Spencer's method.

To evaluate the influence of the future sediment basin expansion, groundwater level is assumed to be (1) at 20 feet below the ground surface, and (2) groundwater at ground surface, to simulate dry and saturated soil conditions underneath the sediment basins, respectively. The detailed analyses results are presented in Appendix D, Slope Stability Analyses. The summary of slope stability results are presented in the following table:

Table No. 8, Summary of Slope Factor of Safety

Cross Section	Groundwater Depth (feet)	Minimum Factor of Safety (Static)	Plate No.
A – A'	20	1.496	S-A1
	0	1.292	S-A2
B – B'	20	1.487	S-B1
	0	1.487	S-B2

As shown in the table above, the slope stability near the existing stream channel (Cross Section A-A') has a factor of safety greater than 1.496 at current condition. When the proposed new sediment basin with groundwater at surface is assumed, the factor of safety reduces to 1.292. The factors of safety in both cases remain above 1.0, which indicates this slope does not expose immediate instability. In general practices, most structures constructed on slopes require a minimum factor of safety of 1.5, and temporary grading requires a minimum factor of safety of 1.25. The proposed new Sediment Basin A is located in the area having 1.5 factor of safety, and the slope near the stream channel has factor of safety greater than 1.25 which meet the minimum requirements. It should be advised that this slope will be eroded by the stream from time to time, and the slope stability will be also changed by the slope profile.

The slope stability of the easterly slope (Cross Section B-B') has a factor of safety of 1.487 at current condition. When the proposed new sediment basin with groundwater at surface is assumed, the factor of safety remains the same, which suggests the saturation of subsurface soil will not impact the current slope stability.

5.6 Earthwork Recommendations

5.6.1 Earthwork and Site Grading

To construct the planned sediment basins, the anticipated earthwork and site grading includes excavations of basins and constructing berms. All berms should be constructed with a slope gradient less than 2H:1V.

All engineered fill should be placed on competent, scarified and compacted bottom as evaluated by the geotechnical engineer and in accordance with the recommendations presented in this section. Excavated site soils, free of deleterious materials and rock particles larger than three (3") inches in the largest dimension, should be suitable for placement as compacted fill. Any proposed import fill should be evaluated and approved by Converse prior to import to the site. Import fill material should have an expansion index less than 20.

The onsite materials will contain large amount of gravels, cobbles and boulders. Based on our field exploration, the earth materials at the site may be excavated with conventional heavy-duty earth moving and trenching equipment in general. Difficult drilling and excavation conditions should be also anticipated and other suitable equipment and methods should be used.

Prior to compaction, fill materials should be thoroughly mixed and moisture conditioned within two (2) percent above the optimum moisture content. Fill soils shall be evenly spread in maximum 8-inch lifts, watered or dried as necessary, mixed and compacted to at least the density specified below. The fill shall be placed and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer. All fill, if not specified otherwise elsewhere in this report, should be compacted to at least 90 percent of the laboratory dry density in accordance with the ASTM Standard D1557 test method. The upper 12 inches of subgrade below pavement areas should be compacted to 95 percent relative compaction.

5.6.2 Expansive Soil

The near surface soils have a "Very Low" expansive potential. Mitigation for expansive soil is not considered necessary.

5.6.3 Pipeline Backfill

Any soft and/or unsuitable material encountered at the pipe invert should be removed and replaced with an adequate bedding material. The pipe subgrade should be level, firm, uniform, free of loose materials and properly graded to provide uniform bearing

and support to the entire section of the pipe placed on bedding material. Protruding oversize particles larger than two (2) inches in the largest dimension, if any, should be removed from the trench bottom and replaced with compacted materials. During the digging of depressions for proper sealing of the pipe joints, the pipe should rest on a prepared bottom for as near its full length as is practicable. The bedding zone is defined as that portion of the pipe trench from four inches below the pipe invert to one foot above the top of pipe, in accordance with Section 306-1.2.1 of the Latest Edition of the *Standard Specifications for Public Works Construction* (SSPWC).

The following specifications are recommended to provide a basis for quality control during the placement of trench backfill.

Trench excavations to receive backfill shall be free of trash, debris or other unsatisfactory materials at the time of backfill placement. Excavated on-site soils free of oversize particles, defined as larger than one (1) inch in maximum dimension in the upper 12 inches of subgrade soils and larger than three (3) inches in the largest dimension in the trench backfill below, and deleterious matter after proper processing may be used to backfill the trench zone. Imported trench backfill, if used, should be approved by the project soils consultant prior to delivery at the site. No more than 30 percent of the backfill volume should be larger than ¾ inch in the largest dimension.

Trench backfill shall be compacted to 90 percent of the laboratory maximum dry density as per ASTM Standard D1557 test method. At least the upper twelve (12) inches of trench underlying pavements should be compacted to at least 95 percent of the laboratory maximum dry density.

Trench backfill shall be compacted by mechanical methods, such as sheepsfoot, vibrating or pneumatic rollers, or mechanical tampers, to achieve the density specified herein. The backfill materials shall be brought to within two (2) percent of optimum moisture content and then placed in horizontal layers if the expansion index is less than or equal to 30. Should the expansion index be greater than 30, backfill materials shall be brought to approximately 2 percent above optimum moisture content. The thickness of uncompacted layers should not exceed eight (8) inches. Each layer shall be evenly spread, moistened or dried as necessary, and then tamped or rolled until the specified density has been achieved.

The contractor shall select the equipment and processes to be used to achieve the specified density without damage to adjacent ground and completed work. The field density of the compacted soils shall be measured by the ASTM Standard D1556 or ASTM Standard D2922 test methods or equivalent. Observation and field tests should be performed by Converse during construction to confirm that the required degree of

compaction has been obtained. Where compaction is less than that specified, additional compactive effort shall be made with adjustment of the moisture content as necessary, until the specified compaction is obtained. It should be the responsibility of the contractor to maintain safe conditions during cut and/or fill operations. Trench backfill shall not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the project's geotechnical consultant indicate that the moisture content and density of the fill are as previously specified.

Imported soils, if any, used as compacted trench backfill should be predominantly granular and meet the following criteria:

- Expansion Index less than 20
- Free of all deleterious materials
- Contain no particles larger than 3 inches in the largest dimension
- Contain less than 30 percent by weight retained on ¾-inch sieve
- Contain at least 15 percent fines (passing #200 sieve)
- Have a Plasticity Index of 10 or less

Any import fill should be tested and approved by the geotechnical representative prior to delivery to the site.

5.6.4 Temporary Excavations

Based on the materials encountered in the exploratory borings, sloped temporary excavations may be constructed according to the slope ratios presented in the following table:

Table No. 9, Slope Ratios for Temporary Excavation at Site No. 3

Maximum Depth of Cut (feet)	Maximum Slope Ratio* (horizontal: vertical)
0 – 4	vertical
4 – 8	1:1
>8	1.5:1

*Slope ratio assumed to be uniform from top to toe of slope.

Any loose utility trench backfill or other fill encountered in excavations will be less stable than the native soils. Temporary cuts encountering loose fill or loose dry sand should be constructed at a flatter gradient than presented in the table above. Surfaces exposed in slope excavations should be kept moist but not saturated to minimize raveling and sloughing during construction. Adequate provisions should be made to protect the slopes from erosion during periods of rainfall. Surcharge loads, including construction, should not be placed within five (5) feet of the unsupported excavation edge.

All applicable requirements of the California Construction and General Industry Safety Orders, the Occupational Safety and Health Act of 1987 and current amendments, and the Construction Safety Act should be met. The soils exposed in cuts should be observed during excavation by the project's geotechnical consultant. If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required.

6.0 SLOPE REPAIR RECOMMENDATIONS

The erosion scarps caused by the broken water pipe incident on both sides of the existing roadway (Arroyo Seco Canyon Road) will require repairs to support the roadway.

For the erosion scarp below the roadway, we recommend soldier piles with wood lagging be used as the retaining system to support the roadway. The soldier piles should be embedded at least 8 feet below the lowest adjacent grade. The actual embedment depth should be determined by the design engineer. The pile capacity can be calculated using allowable skin friction of 350 psf. An allowable passive resistance in the terms of equivalent fluid pressure of 300 pcf can be used for lateral design. Passive resistance can be doubled if pile spacing is greater than 3 time diameter. The retaining wall should have proper subdrain or weepholes. Loose soils and debris washed down to the parking lot fence should be removed and cleared. Portions of the fence may have to be repaired and/or replaced.

For the erosion scarp on the ascending slope east of the roadway, we recommend a buttress system be constructed to increase the slope stability and reduce rock fall hazard. Gabions constructed to a 1H:1V slope ratio to a minimum height of 8 feet can be used as the buttress system, any oversized rocks with potential rock fall hazard should be removed from the slope face.

7.0 GEOTECHNICAL SERVICES DURING CONSTRUCTION

This report has been partially prepared to aid in the foundation plans and specifications, and to assist the architect, civil and structural engineers in the design of the proposed structures. It is recommended that this office be provided an opportunity to review final design drawings and specifications to verify that the recommendations of this report have been properly implemented.

Recommendations presented herein are based upon the assumption that adequate earthwork monitoring will be provided by the geotechnical engineer. Footing excavations should be observed by the geotechnical engineer prior to placement of steel and concrete so that footings are founded on satisfactory materials and excavations are free of loose and disturbed materials. Trench backfill should be placed and compacted with observation and field density testing provided by this office.

During construction, the geotechnical engineer and/or their authorized representatives should be present at the site to provide a source of advice to the client regarding the geotechnical aspects of the project and to observe and test the earthwork performed. Their presence should not be construed as an acceptance of responsibility for the performance of the completed work, since it is the sole responsibility of the contractor performing the work to ensure that it complies with all applicable plans, specifications, ordinances, etc.

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

8.0 CLOSURE

The findings and recommendations of this report were prepared in accordance with generally accepted professional engineering and engineering geologic principles and practice. We make no other warranty, either expressed or implied. Our conclusions and recommendations are based on the results of the field and laboratory studies, combined with an interpolation and extrapolation of soil conditions between and beyond boring locations. If conditions encountered during construction appear to be different from those shown by the borings, this office should be notified.

Design recommendations given in this report are based on the assumption that the earthwork and site grading recommendations contained in this report are implemented.

Additional consultation may be prudent to interpret Converse's findings for contractors, or to possibly refine these recommendations based upon the review of the final site grading and actual site conditions encountered during construction. If the scope of the project changes, if project completion is to be delayed, or if the report is to be used for another purpose, this office should be consulted.

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APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

Field exploration included a site reconnaissance and subsurface exploration program. During the site reconnaissance, the surface conditions were noted, and the approximate locations of the boring were determined. The exploratory borings were approximately located using existing boundary and other features as a guide and should be considered accurate only to the degree implied by the method used. The various field study methods performed are discussed below.

Exploratory Borings

Fourteen (14) exploratory borings (BH-1 through BH-14) were drilled within the project sites from July 8 to July 12, 2013. The borings were advanced using a limited access rig with 12-inch and 24-inch diameter bucket augers, and truck mounted 8-inch diameter hollow stem auger drill rig to depths ranging from 2.5 to 21 feet below the existing ground surface (bgs). Every boring was visually logged by a Converse engineer and sampled at regular intervals and at changes in subsurface soils.

California Modified Sampler (Ring samples), Standard Penetration Test samples, and bulk soil samples were obtained for laboratory testing. Standard Penetration Tests (SPTs) were performed in selected borings at selected intervals using a standard (1.4 inches inside diameter and 2.0 inches outside diameter) split-barrel sampler. The bore holes were backfilled and compacted with soil cuttings by reverse spinning of the auger following the completion of drilling and patched with asphalt.

Borings BH-2, BH-5, and BH-9 through BH-14 were utilized for percolation tests prior to backfill. Percolation test results are presented in Appendix C, *Percolation Testing Data*.

It should be noted that the exact depths at which material changes occur cannot always be established accurately. Changes in material conditions that occur between driven samples are indicated in the logs at the top of the next drive sample. A key to soil symbols and terms is presented as Drawing No. A-1, *Soil Classification Chart*. The log of the exploratory boring is presented in Drawing Nos. A-2 through A-15, *Log of Borings*.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINEC
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

BORING LOG SYMBOLS

SAMPLE TYPE

- STANDARD PENETRATION TEST — Split barrel sampler in accordance with ASTM D-1586-84 Standard Test Method
- DRIVE SAMPLE 2.42" I.D. sampler.
- DRIVE SAMPLE No recovery
- BULK SAMPLE
- GROUNDWATER WHILE DRILLING
- GROUNDWATER AFTER DRILLING

LABORATORY TESTING ABBREVIATIONS

TEST TYPE (Results shown in Appendix B)

CLASSIFICATION

Plasticity	pi
Grain Size Analysis	ma
Passing No. 200 Sieve	wa
Sand Equivalent	se
Expansion Index	ei
Compaction Curve	max
Hydrometer	h

STRENGTH

Pocket Penetrometer	p
Direct Shear	ds
Direct Shear (single point)	ds*
Unconfined Compression	uc
Triaxial Compression	tx
Vane Shear	vs
Consolidation	c
Collapse Test	col
Resistance (R) Value	r
Chemical Analysis	ca
Electrical Resistivity	er

UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS

Converse Consultants

Project Name: ARROYO SECO CANYON PROJECT, PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. A-1

Log of Boring No. BH-1

Dates Drilled: 7/9/2013 Logged by: MDR Checked By: SCL

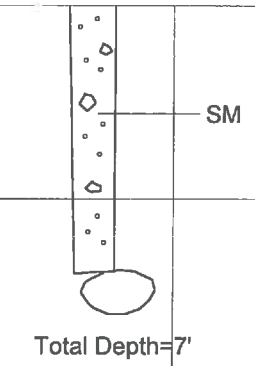
Equipment: 12" AUGER BUCKET Driving Weight and Drop: 866 lb Kelly Bar / 30"

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FOOT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		STREAM DEPOSIT (Qg): **GRAVELLY SAND WITH SILT (SP-SM):** fine to medium-grained, some cobbles up to 12" in maximum dimension, light brown.						ca,er, max,ma
		-fine to coarse-grained, some gravels up to 3" in maximum dimension, light brown, cobbbles, boulders.			24	4	115	ds
5					32	12	117	c
		End of boring at 7 feet due to refusal of boulder. Groundwater not encountered during drilling. Borehole backfilled with soil cuttings on 7-9-13.						

SKETCH

SCALE: 1"=5' (H=V)



Converse Consultants

Project Name: ARROYO SECO CANYON PROJECT PASADENA, CALIFORNIA

Project No.: 13-31-199-01

Drawing No.: A-2

Log of Boring No. BH-2

Dates Drilled: 7/8/2013 Logged by: MDR Checked By: SCL

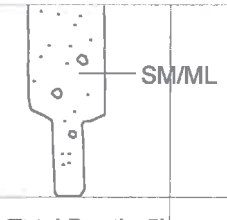
Equipment: 12" & 24" AUGER BUCKET Driving Weight and Drop: 866 lb Kelly Bar / 30"

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FOOT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		OLDER ALLUVIUM (Qoa): **SILTY SAND TO SANDY SILT (SM/ML):** fine to coarse-grained, some gravels up to 3" in maximum dimension, brown. -at 3' encountered cobbles, changed to 12" diameter drill bit, difficult drilling with rocks.						ma
5		End of boring at 5 feet due to refusal of cobbles Groundwater not encountered during drilling. Borehole utilized for percolation testing Borehole backfilled with soil cuttings after completion of percolation testing on 7-9-13.						

SKETCH

SCALE: 1"=5' (H=V)



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Converse Consultants

Project Name: ARROYO SECO CANYON PROJECT PASADENA, CALIFORNIA

Project No.: 13-31-199-01

Drawing No.: A-3a

Log of Boring No. BH-2A

Dates Drilled: 7/9/2013 Logged by: MDR Checked By: SCL

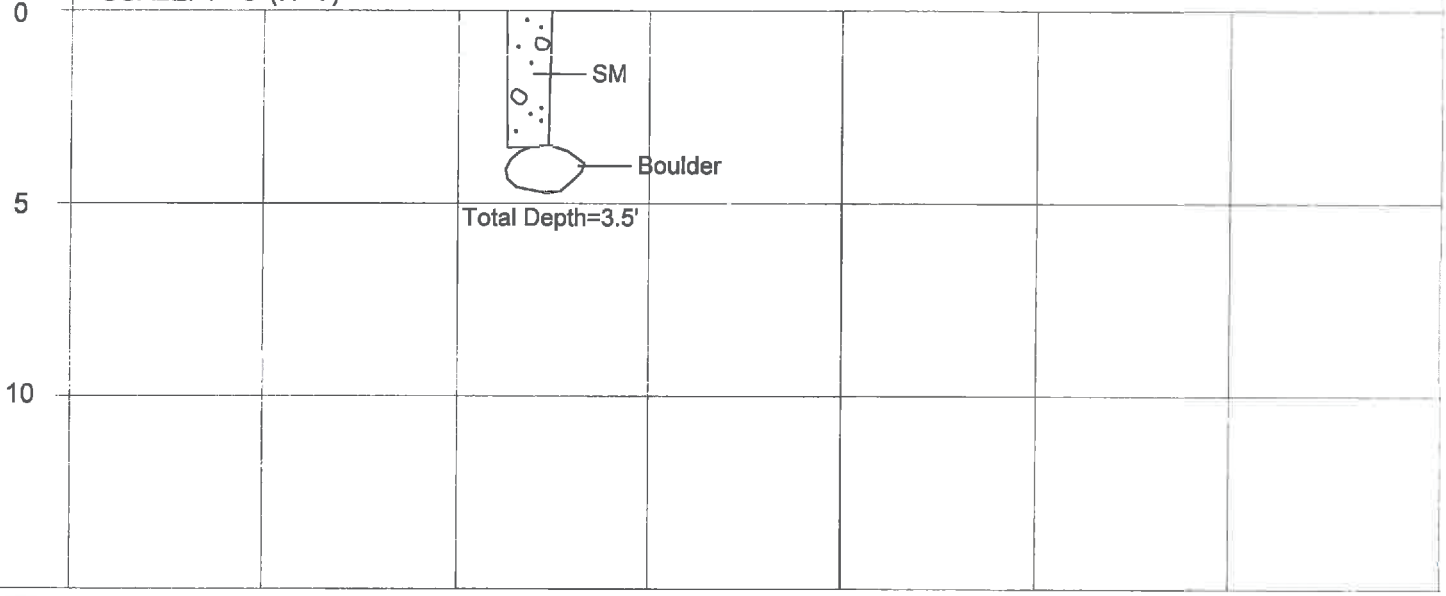
Equipment: 12" AUGER BUCKET Driving Weight and Drop: 866 lb Kelly Bar / 30"

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FOOT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		OLDER ALLUVIUM (Qoa): **SILTY SAND(SM):** fine to coarse-grained, little gravels up to 3" in maximum dimension, few cobbles up to 2' in maximum dimension, brown.						
		End of boring at 3.5 feet due to refusal of bedrock Groundwater not encountered during drilling. Borehole utilized for percolation testing Borehole backfilled with soil cuttings after completion of drilling on 7-8-13.						

SKETCH

SCALE: 1"=5' (H=V)



Converse Consultants

Project Name: ARROYO SECO CANYON PROJECT PASADENA, CALIFORNIA

Project No.: 13-31-199-01

Drawing No.: A-3b

Log of Boring No. BH-3

Dates Drilled: 7/9/13 Logged by: MDR Checked By: SCL

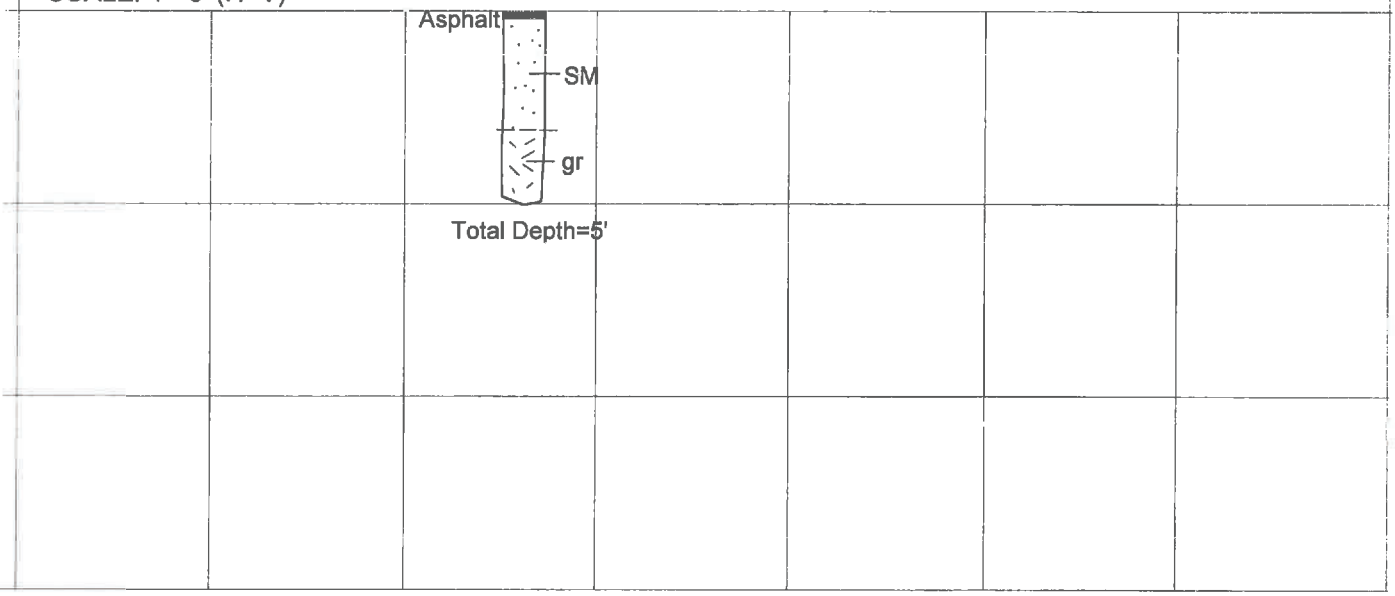
Equipment: 12" AUGER BUCKET Driving Weight and Drop: 866 lb Kelly Bar / 30"

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FOOT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		3" ASPHALT WITH NO BASE						ca,er,r ma
		SILTY SAND(SM): fine-grained, gravels up to 2" in maximum dimension, brown.						
		GRANTIC BEDROCK (gr): weathered at upper 1 ft, very hard, gray, drilling refusal, hard, intact.			15	15	117	ds
5					50(2")			
		End of boring at 5 feet due to refusal of cobbles Groundwater not encountered during drilling. Borehole utilized for percolation testing Borehole backfilled with soil cuttings after completion of drilling on 7-9-13.						

SKETCH

SCALE: 1"=5' (H=V)



Converse Consultants

Project Name: ARROYO SECO CANYON PROJECT, PASADENA, CALIFORNIA

Project No.: 13-31-199-01

Drawing No.: A-4

Log of Boring No. BH-4A

Dates Drilled: 7/10/2013 Logged by: MDR Checked By: SCL

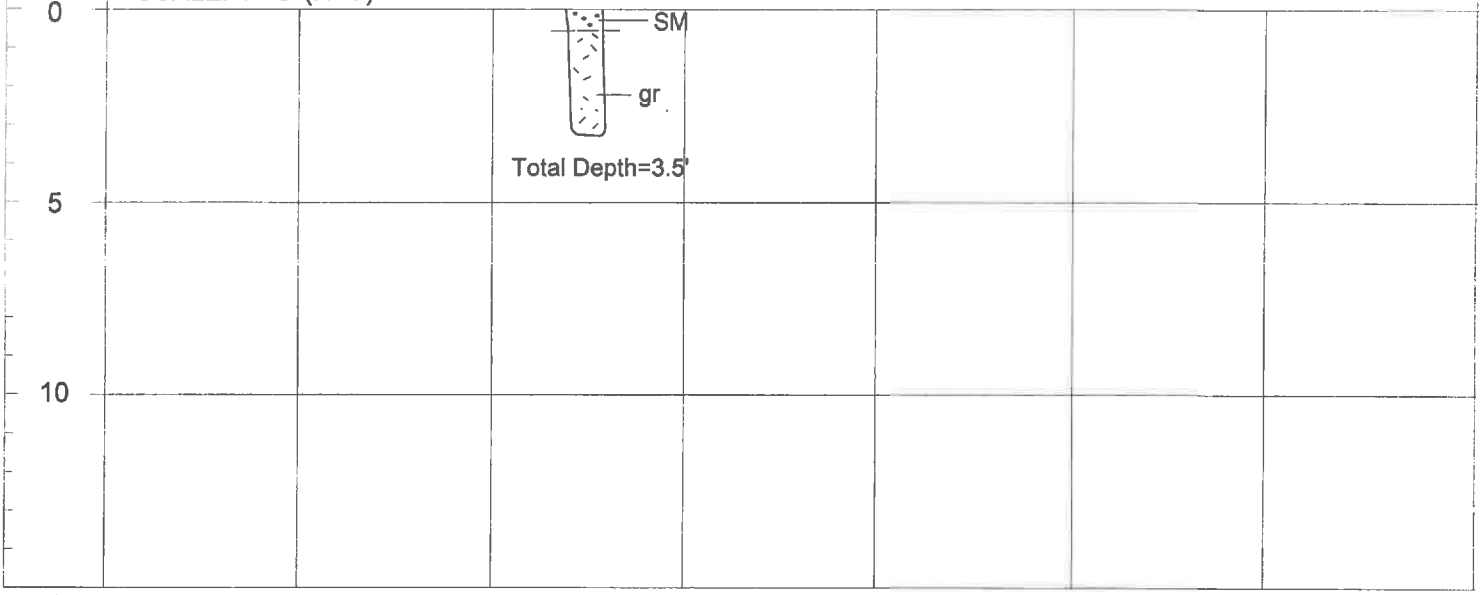
Equipment: 12" AUGER BUCKET Driving Weight and Drop: 866 lb Kelly Bar / 30"

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FOOT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		SILTY SAND(SM): medium to coarse-grained, some gravels up to 3" in maximum dimension, light brown.						
		GRANTIC BEDROCK (gr): medium weathered at upper 1 ft, moderately to very hard, gray.						
		End of boring at 3.5 feet due to refusal from bedrock. Groundwater not encountered during drilling. Borehole backfilled with soil cuttings on 7-10-13.						

SKETCH

SCALE: 1"=5' (H=V)



Converse Consultants

Project Name: ARROYO SECO CANYON PROJECT, PASADENA, CALIFORNIA

Project No.: 13-31-199-01

Drawing No.: A-5

Log of Boring No. BH-4

Dates Drilled: 7/10/2013 Logged by: MDR Checked By: SCL

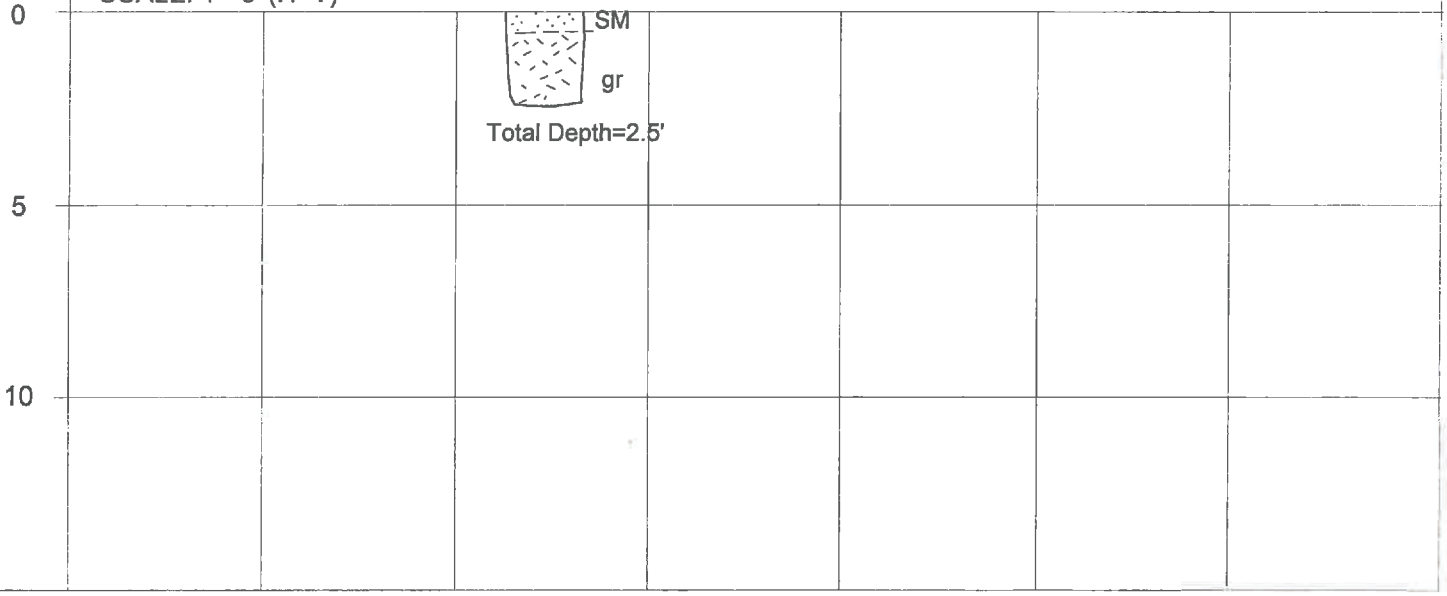
Equipment: 24" AUGER BUCKET Driving Weight and Drop: 866 lb Kelly Bar / 30"

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FOOT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		SILTY SAND(SM): medium to coarse-grained, some gravels up to 3" in maximum dimension, few cobbles up to 8" in maximum dimension, light brown.						
		GRANTIC BEDROCK (gr): medium weathered at upper 1 ft, moderately hard to very hard, gray.						
		End of boring at 2.5 feet due to refusal from bedrock. Groundwater not encountered during drilling. Borehole backfilled with soil cuttings on 7-10-13.						

SKETCH

SCALE: 1"=5' (H=V)



Converse Consultants

Project Name: ARROYO SECO CANYON PROJECT, PASADENA, CALIFORNIA

Project No.: 13-31-199-01

Drawing No.: A-5a

Log of Boring No. BH-5

Dates Drilled: 7/10/2013 Logged by: MDR Checked By: SCL

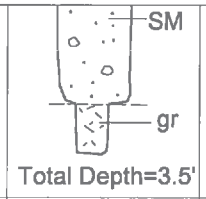
Equipment: 12" & 24" AUGER BUCKET Driving Weight and Drop: 866 lb Kelly Bar / 30"

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FOOT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		GRAVELLY SAND WITH SILT(SP-SM): fine to coarse-grained, some gravels up to 3" in maximum dimension, little cobbles up to 8" in maximum dimension, light brown/gray brown.						ca,er, ma
		GRANTIC BEDROCK (gr): very hard, moderately fractured, slightly weathered, gray.						
		End of boring at 5 feet due to refusal of bedrock Groundwater not encountered during drilling. Borehole utilized for percolation testing Borehole backfilled with soil cuttings after completion of percolation testing on 7-11-13.						

SKETCH

SCALE: 1"=5' (H=V)



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Converse Consultants

Project Name: **ARROYO SECO CANYON PROJECT PASADENA, CALIFORNIA**

Project No.: **13-31-199-01**

Drawing No.: **A-6**

Log of Boring No. BH-6

Dates Drilled: 7/11/2013 Logged by: JR Checked By: SCL

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		4.5" ASPHALT OVER 7" BASE						ma
		STREAM DEPOSIT (Qg): **SILTY SAND (SM):** fine-grained, some gravels up to 2" in maximum dimension, brown.			7/11/12	3	117	
5		-some gravels up to 2" in maximum dimension, less silt, yellow brown			13/27/26	1	119	
		-fine-grained, trace gravel up to 3" in maximum dimension, orange brown			16/15/15	9	100	ds
10					18/28/50(5")	1	129	
		-cobble layer, possible boulders						
15		**SAND WITH SILT (SP-SM):** fine-grained, some gravels up to 2" in maximum dimension.			50(6")			dist.
20		-cobble layer, possible boulders			50(3")			dist.
		End of boring at 21 feet due to refusal of cobbles. Groundwater not encountered during drilling. Borehole backfilled with soil cuttings and patchd with asphalt on 7-11-13.						

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. A-7

Log of Boring No. BH-7

Dates Drilled: 7/12/2013 Logged by: JR Checked By: SCL

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop:

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		4" ASPHALT WITH NO BASE						
		FILL (Af): **GRAVELLY SAND WITH SILT(SP-SM):** fine to coarse-grained, some gravels up to 3" in maximum dimension, gray brown.						
5		End of boring at 5 feet due to encounter of water main pipe. The road erosion and excavation created by the broken pipe and repair were backfilled with cement slurry.						

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. A-8

Log of Boring No. BH-8

Dates Drilled: 7/12/2013 Logged by: JR Checked By: SCL

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		FILL (Af): **SILTY SAND (SM):** fine-grained, some gravels up to 3" in maximum dimension, light brown.						
		STREAM DEPOSIT (Qg): **GRAVELLY SAND (SP):** fine to coarse-grained, gravels up to 3" in maximum dimension, light brown.	■		16/35/50(4")	2	139	
5		-cobble layer, possible boulders	■		25/50(5")	1	145	
10		**SAND WITH SILT (SP-SM):** fine to coarse-grained, gravels up to 2" in maximum dimension.	■		26/34/50(3")	15	107	ds
15		-cobble layer, possible boulders	■		50(5")	2	117	
		End of boring at 19 feet due to refusal of cobbles. Groundwater not encountered during drilling. Borehole backfilled with soil cuttings on 7-12-13.						

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. A-9

Log of Boring No. BH-9

Dates Drilled: 7/11/2013 Logged by: JR Checked By: SCL

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		5" ASPHALT OVER 8" BASE						
		STREAM DEPOSIT (Qg): **SAND WITH SILT (SP-SM):** fine to coarse-grained, some gravels up to 3" in maximum dimension, gray brown.						
5		**GRAVELLY SAND (SP):** fine-grained, light yellow brown.			27/43/50(4")	2	124	
		End of boring at 6.5 feet. Groundwater not encountered during drilling Borehole utilized for percolation testing. Borehole backfilled with soil cuttings and patched with asphalt after completion of percolation test on 7-11-13.						

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. A-10

Log of Boring No. BH-10

Dates Drilled: 7/11/2013 Logged by: JR Checked By: SCL

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
		4" ASPHALT WITH NO BASE						ma
		STREAM DEPOSIT (Qg): **GRAVELLY SAND WITH SILT(SP-SM):** fine to coarse-grained, some gravels up to 3" in maximum dimension, gray brown.			9/23/21	2	137	
5		-little gravels up to 3" in maximum dimension, few silt			12/15/17	4	100	
		End of boring at 6.5 feet. Groundwater not encountered during drilling. Borehole utilized for percolation testing. Borehole backfilled with soil cuttings and patched with asphalt after completion of percolation test on 7-11-13.						

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.
13-31-199-01

Drawing No.
A-11

Log of Boring No. BH-11

Dates Drilled: 7/11/2013 Logged by: JR Checked By: SCL

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		4.5" ASPHALT WITH NO BASE						ma
		STREAM DEPOSIT (Qg): **SILTY SAND (SM):** fine-grained, some gravels up to 2.5" in maximum dimension, olive brown.						
5		**SAND WITH SILT (SP-SM):** fine to medium-grained, brown.			23/47/50(5")	2	142	
		End of boring at 6.5 feet. Groundwater not encountered during drilling. Borehole utilized for percolation testing. Borehole backfilled wth soil cuttings and patched with asphalt after completion of percolation test on 7-11-13.						

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. A-12

Log of Boring No. BH-12

Dates Drilled: 7/12/2013 Logged by: JR Checked By: SCL

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES DRIVE	SAMPLES BULK	BLOWS/FT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		STREAM DEPOSIT (Qg): **SAND WITH SILT (SP-SM):** fine to coarse-grained, gravels up to 3" in maximum dimension, light brown.						ma
5					46/50(3")	1	138	
		End of boring at 5.75 feet. Groundwater not encountered during drilling. Borehole utilized for percolation testing. Borehole backfilled wth soil cuttings after completion of percolation test on 7-12-13.						

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. A-13

Log of Boring No. BH-13

Dates Drilled: 7/12/2013 Logged by: JR Checked By: SCL

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		STREAM DEPOSIT (Qg): **GRAVELLY SAND WITH SILT(SP-SM):** fine to coarse-grained, gravels up to 3" in maximum dimension, cobbles up to 12" in maximum dimension.						ma
		End of boring at 3 feet due to refusal of cobbles. Groundwater not encountered during drillig. Borehole utilized for percolation testing. Borehole backfilled wth soil cuttings after completion of percolation test on 7-12-13.						

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. A-14

Log of Boring No. BH-14

Dates Drilled: 7/12/2013 Logged by: JR Checked By: SCL

Equipment: 8" HOLLOW STEM AUGER Driving Weight and Drop: 140 lbs / 30 in

Ground Surface Elevation (ft): N/A Depth to Water (ft): NOT ENCOUNTERED

Depth (ft)	Graphic Log	SUMMARY OF SUBSURFACE CONDITIONS This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	SAMPLES: DRIVE	SAMPLES: BULK	BLOWS/FT	MOISTURE (%)	DRY UNIT WT. (pcf)	OTHER
		STREAM DEPOSIT (Qg): **SILTY SAND (SM):** coarse-grained, gravels and cobbles up to 10" in maximum dimension, light gray brown.						ma
5		**GRAVELLY SAND WITH SILT(SP-SM):** fine to coarse-grained, light brown.			22/30/50(6")			
		End of boring at 6.5 feet. Groundwater not encountered during drilling. Borehole utilized for percolation testing. Borehole backfilled wth soil cuttings after completion of percolation test on 7-12-13.						

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. A-15

APPENDIX B

LABORATORY TESTING PROGRAM

APPENDIX B

LABORATORY TESTING PROGRAM

Tests were conducted in our laboratory on representative soil samples for the purpose of classification and evaluation of their relevant physical characteristics and engineering properties. The amount and selection of tests were based on the geotechnical requirements of the project. Test results are presented herein and on the Logs of Borings in Appendix A, *Field Exploration*. The following is a summary of the laboratory tests conducted for this project.

Moisture Content and Dry Density

Results of moisture content and dry density tests, performed on relatively undisturbed ring samples were used to aid in the classification of the soils and to provide quantitative measure of the *in situ* dry density. Data obtained from this test provides qualitative information on strength and compressibility characteristics of site soils. For test results, see the Logs of Borings in Appendix A, *Field Exploration*.

Grain-Size Analysis

To assist in classification of soils, mechanical grain-size analyses were performed on nine (9) selected samples. Testing was performed in general accordance with the ASTM Standard C136 test method. Grain-size curve is shown in Drawing No. B-1a and B-1b, *Grain Size Distribution Results*.

Maximum Density Test

One (1) representative bulk sample was tested in the laboratory to determine the maximum dry density and optimum moisture content. The tests were conducted in accordance with the ASTM Standard D1557 laboratory procedure. The test results are presented in Drawing No. B-2, *Moisture-Density Relationship Results*.

Direct Shear

Direct shear tests were performed on four (4) relatively undisturbed in-situ samples. For each test, three brass sampler rings were placed, one at a time, directly into the test apparatus and subjected to a range of normal loads appropriate for the anticipated conditions. The sample was then sheared at a constant strain rate of 0.01 inch/minute. Shear deformation was recorded until a maximum of about 0.25-inch shear displacement was achieved. Ultimate strength was selected from the shear-stress deformation data and plotted to determine the shear strength parameters. For test data,

including sample density and moisture c ontent, see Drawing No. B-3a through B-3d, *Direct Shear Test Results.*

Table No. B-1, Direct Shear Test Results

Boring No.	Depth (feet)	Soil Classification	Ultimate Strength Parameters	
			Friction Angle (degrees)	Cohesion (psf)
BH-1	3	Gravelly Sand with Silt (SP-SM)	33	200
BH-3	3	Weathered Grantic Bedrock (gr)	34	400
BH-6	7	Silty Sand (SM)	33	250
BH-8	10	Sand with Silt (SP-SM)	33	200

Consolidation

Consolidation tests were perfo rmed on one (1) relatively undisturbed in-situ sample. Data obtained from this test procedure was used to evaluate the settlement characteristics of the foundation soils under load. Preparation for this test involved trimming the sample and placing the one-i nch high brass ring into the test apparatus, which contained porous stones, both top and bottom, to accommodate drainage during testing. Normal axial loads were applied to one end of t he sample through the porous stones, and the resul ting deflections were recorded at various time periods. T he load was increa sed after the sample reached a reasona ble state equilibrium. Normal l oads were applied at a constant load-increment ratio, successive loads being ge nerally twice the precedi ng load. The sample was tested at field and submerged conditions. The test results, including sample density and moisture content, are presented in Drawing No. B- 4, *Consolidation Test Results*.

Soil Corrosivity

Three (3) representative soil samples wer e tested to evaluate minimum electrical resistivity, pH, and chemical conten t, including soluble sulfate and chloride concentrations. The purpose of these tests is to determine the corrosion potential of site soils when placed in contact with comm on construction materials. These tests were performed by Environmental Geotechnology Laborat ory, Inc. (EGL), located in Arcadia, California. The test results received from EGL are included in the following table:

Table No. B-2, Corrosivity Test Results

Boring No.	Sample Depth (feet)	pH (Caltrans 643)	Soluble Chlorides (Caltrans 422) ppm	Soluble Sulfate (Caltrans 417) (%)	Saturated Resistivity (Caltrans 643) Ohm-cm
BH-1	0 – 3	7.15	85	0.01	22,000
BH-3	0 – 3	8.15	75	0.002	23,000
BH-5	0 – 2.5	6.01	75	0.001	23,000

R-value

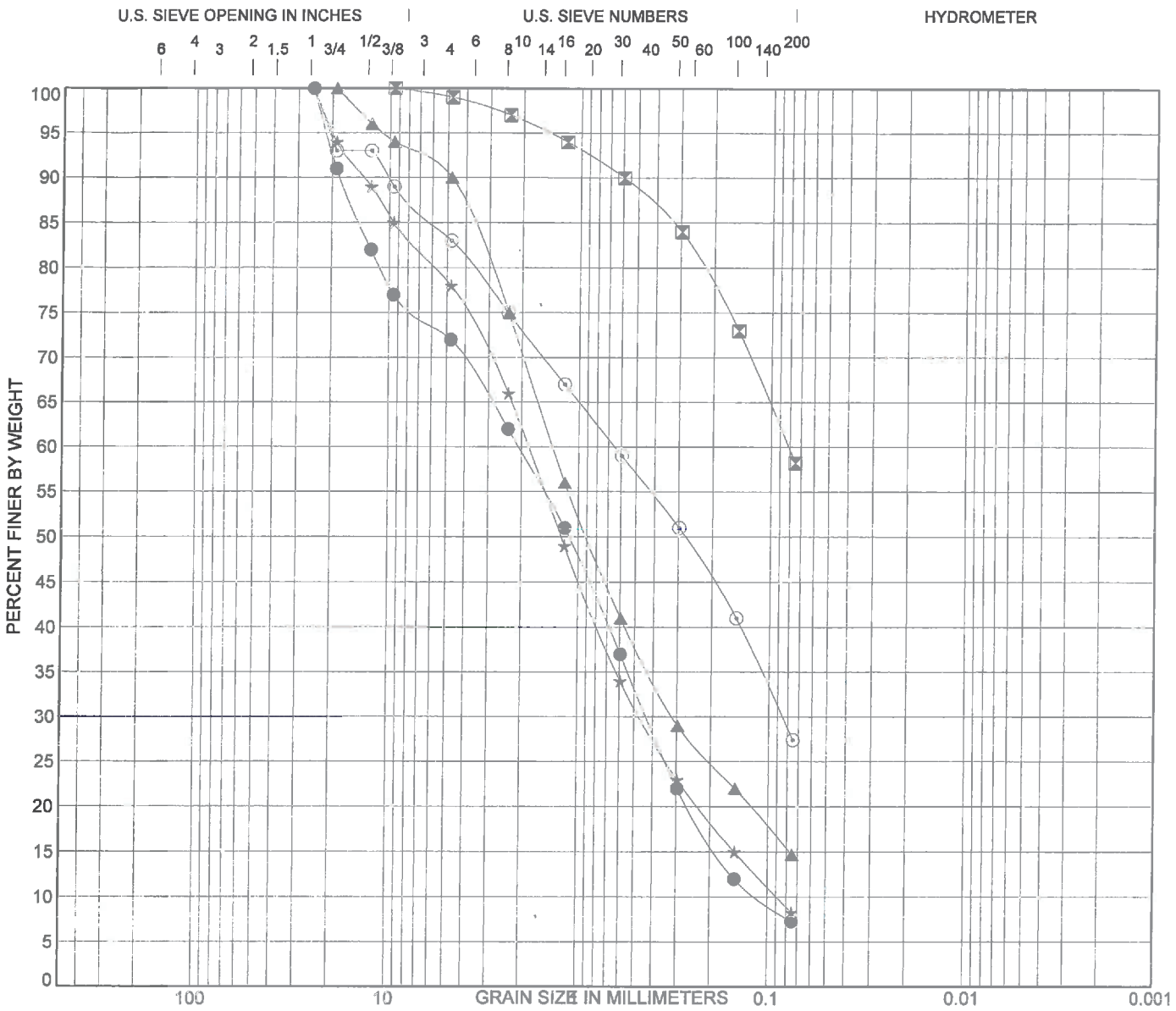
One (1) representative bulk soil sample was tested for resistance value (R-value) in accordance with ASTM D2844 Standard. This test is designed to provide a relative measure of soil strength for use in pavement design. The test results are shown in the following table:

Table No. B-3, R-value Test Result

Boring No.	Depth, (feet)	Soil Classification	Measured R-value
BH-3	0 – 3	Weathered Grantic Bedrock (gr)	74

Sample Storage

Soil samples presently stored in our laboratory will be discarded 30 days after the date of this report, unless this office receives a specific request to retain the samples for a longer period.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring No.	Depth (ft)	Description	LL	PL	PI	Cc	Cu
● BH-1	0-3	GRAVELLY SAND WITH SILT (SP-SM)				0.80	18.70
⊠ BH-2	0-5	SANDY SILT WITH SILTY SAND (SM/ML)					
▲ BH-3	0-3	SILTY SAND (SM)					
★ BH-5	0-2.5	GRAVELLY SAND WITH SILT (SP-SM)				1.29	20.70
⊙ BH-6	0-5	SILTY SAND (SM)					

Boring No.	Depth (ft)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● BH-1	0-3	25	2.081	0.43	0.111	28.0	64.7	7.3	
⊠ BH-2	0-5	9.5	0.082			1.0	40.8	58.2	
▲ BH-3	0-3	19	1.365	0.315		10.0	75.3	14.7	
★ BH-5	0-2.5	25	1.848	0.462	0.089	22.0	69.7	8.3	
⊙ BH-6	0-5	25	0.649	0.086		17.0	55.6	27.4	

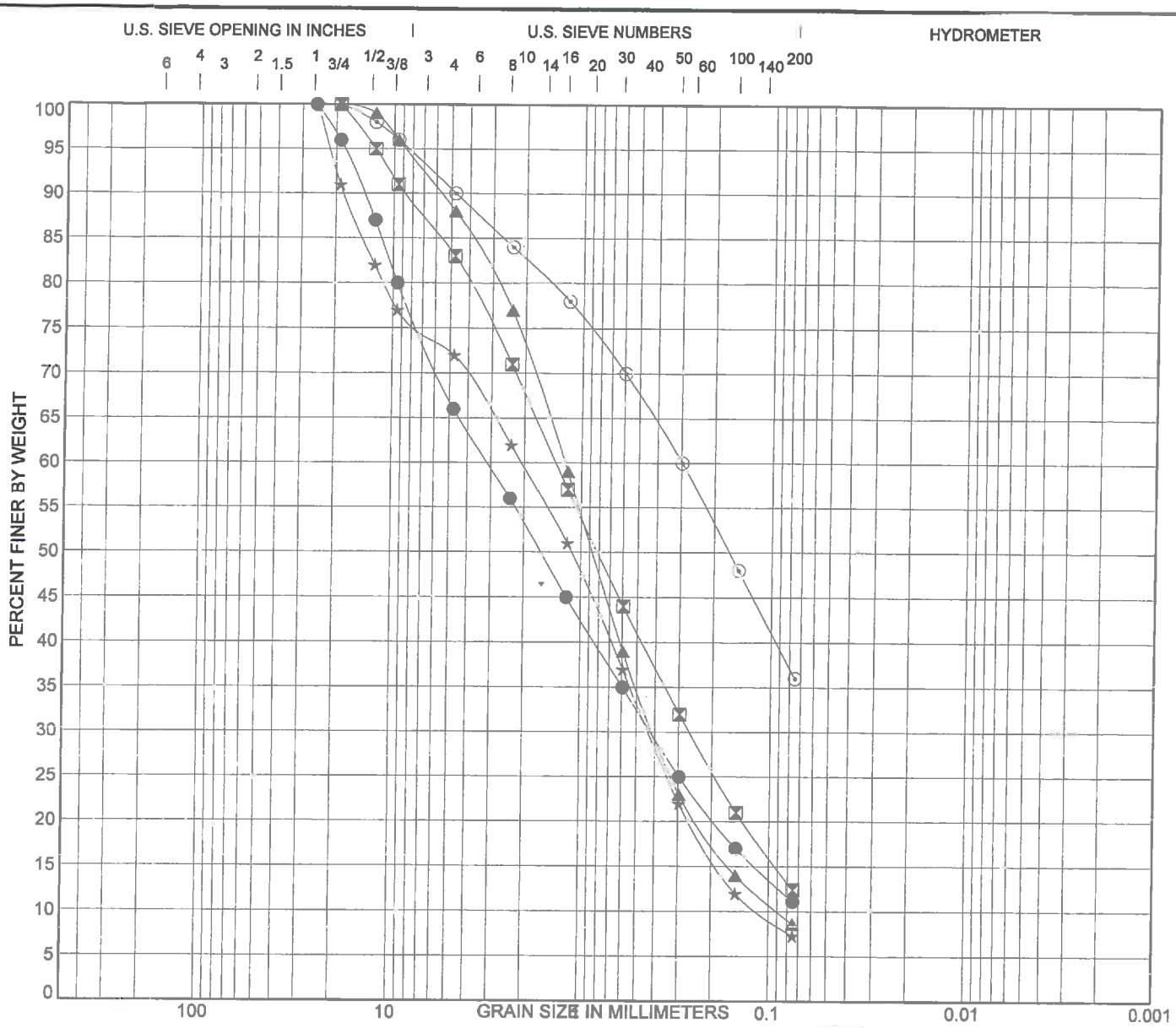
GRAIN SIZE DISTRIBUTION RESULTS

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.
13-31-199-01

Drawing No.
B-1a



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring No.	Depth (ft)	Description	LL	PL	PI	Cc	Cu
●	BH-10	0-5	GRAVELLY SAND WITH SILT (SP-SM)				0.85	47.55
⊠	BH-11	0-5	SILTY SAND (SM)				0.81	22.11
▲	BH-12	0-5	SAND WITH SILT (SP-SM)				1.47	13.69
★	BH-13	0-3	GRAVELLY SAND WITH SILT (SP-SM)				0.80	18.70
⊙	BH-14	0-5	SILTY SAND (SM)					

	Boring No.	Depth (ft)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	BH-10	0-5	25.4	3.138	0.42		34.0	54.9	11.1	
⊠	BH-11	0-5	19	1.369	0.262		17.0	70.6	12.4	
▲	BH-12	0-5	19	1.226	0.403	0.09	12.0	79.4	8.6	
★	BH-13	0-3	25	2.081	0.43	0.111	28.0	64.7	7.3	
⊙	BH-14	0-5	19	0.297			10.0	54.0	36.0	

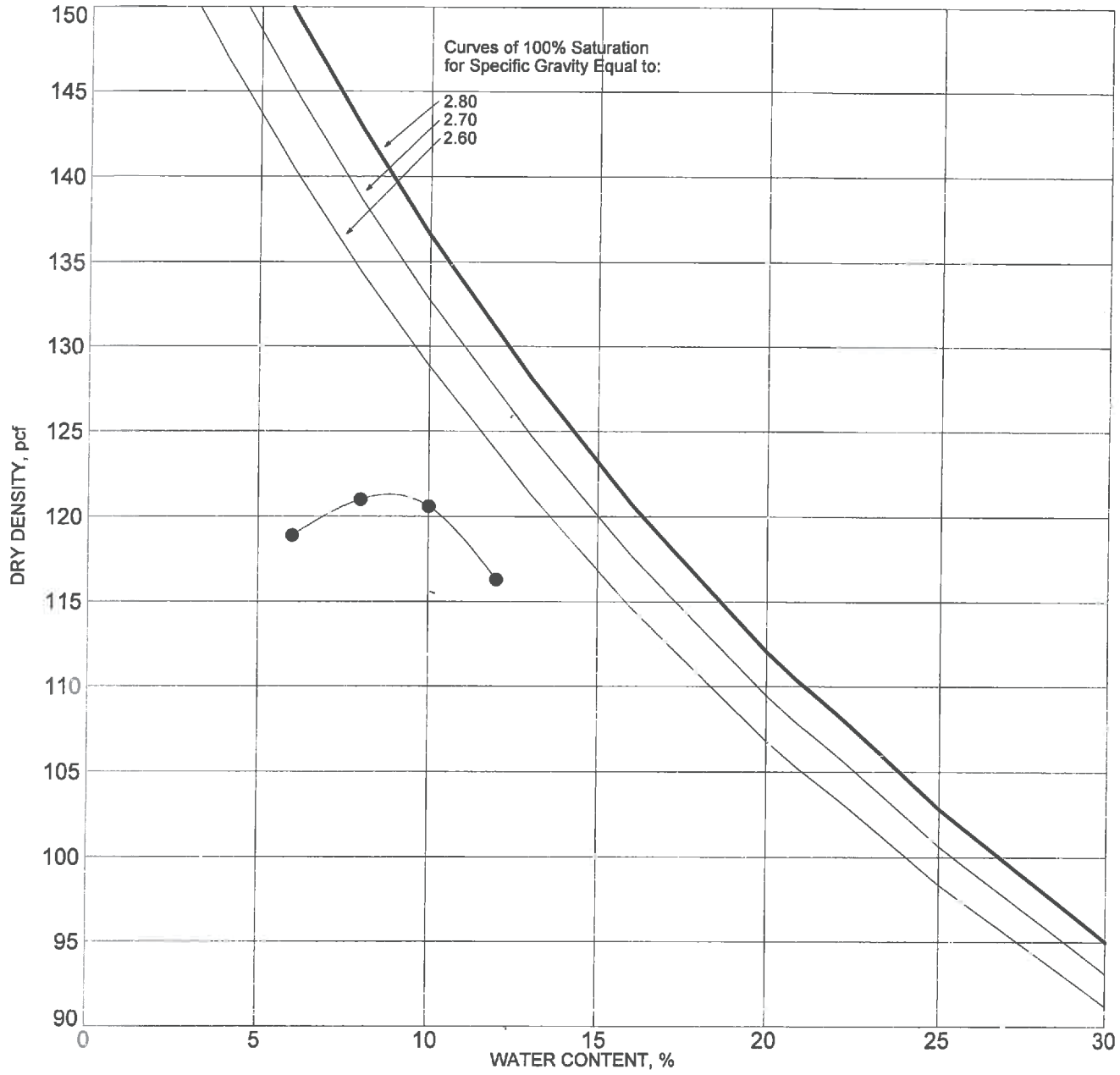
GRAIN SIZE DISTRIBUTION RESULTS

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.
13-31-199-01

Drawing No.
B-1b



SYMBOL	BORING NO.	DEPTH (ft)	DESCRIPTION	ASTM TEST METHOD	OPTIMUM WATER, %	MAXIMUM DRY DENSITY, pcf
●	BH-1	0-3	GRAVELLY SAND WITH SILT (SP-SM)	D1557 Method B	9.2	121.5

NOTE:

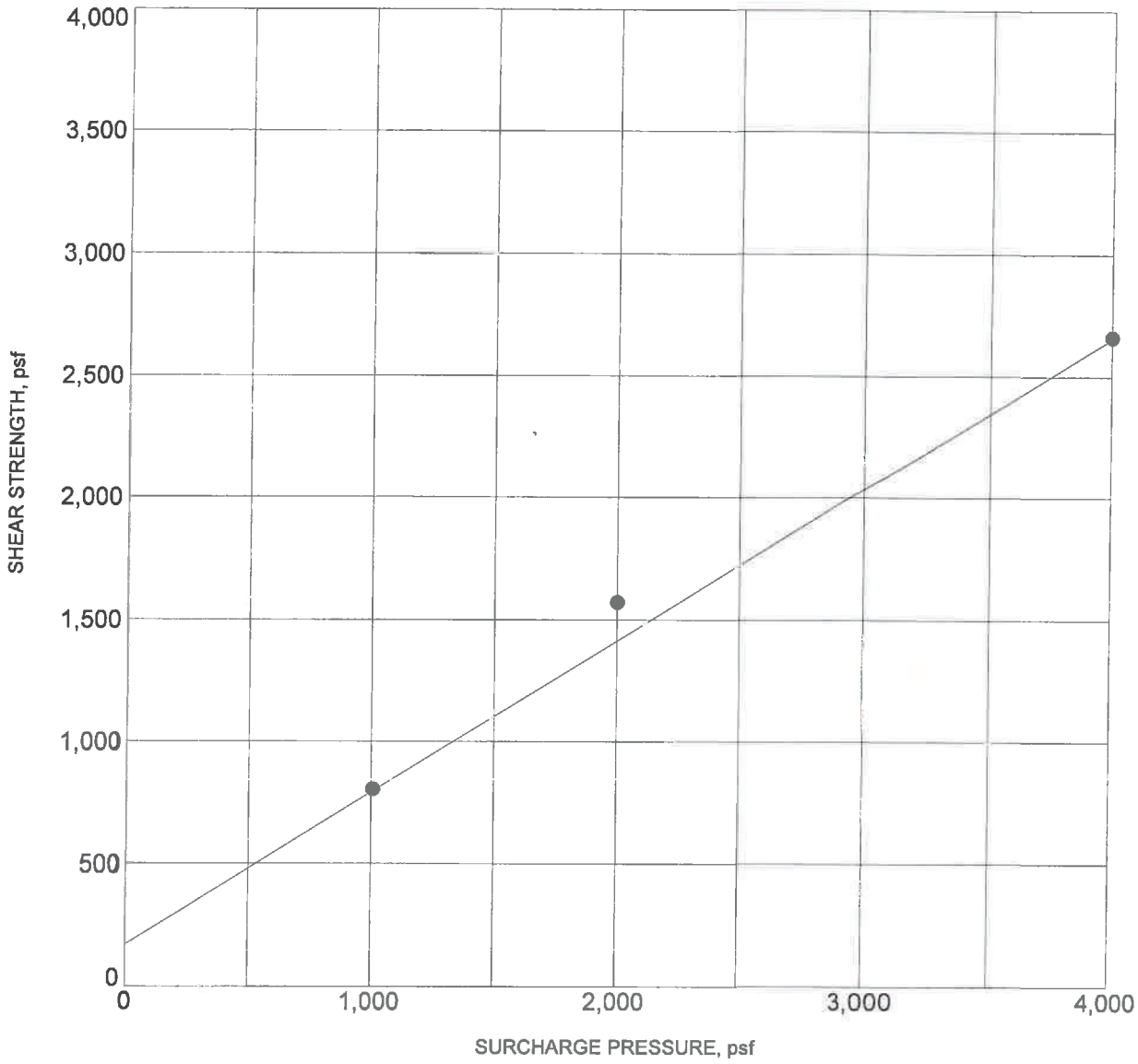
MOISTURE-DENSITY RELATIONSHIP RESULTS

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.
13-31-199-01

Drawing No.
B-2



BORING NO.	:	BH-1	DEPTH (ft)	:	3
DESCRIPTION	:	GRAVELLY SAND WITH SILT (SP-SM)			
COHESION (psf)	:	200	FRICTION ANGLE (degrees)		33
MOISTURE CONTENT (%)	:	4	DRY DENSITY (pcf)	:	115

NOTE: Ultimate Strength.

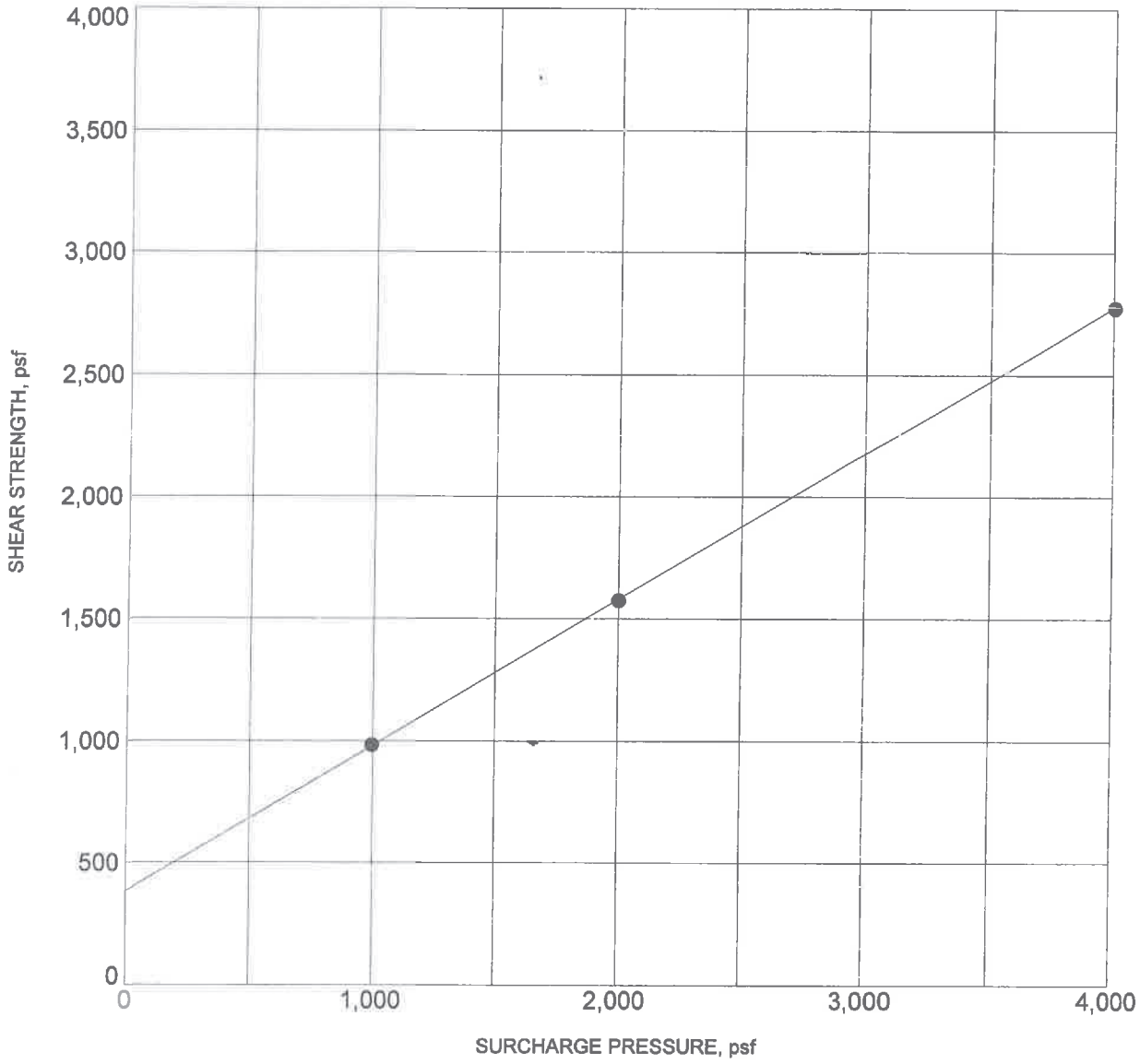
DIRECT SHEAR TEST RESULTS

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. 13-31-199-01

Drawing No. B-3a



BORING NO.	:	**BH-3**	DEPTH (ft)	:	**3**
DESCRIPTION	:	**WEATHERED BEDROCK (gr)**			
COHESION (psf)	:	**400**	FRICTION ANGLE (degrees)		**34**
MOISTURE CONTENT (%)	:	**15.4**	DRY DENSITY (pcf)	:	**117**

NOTE: Ultimate Strength.

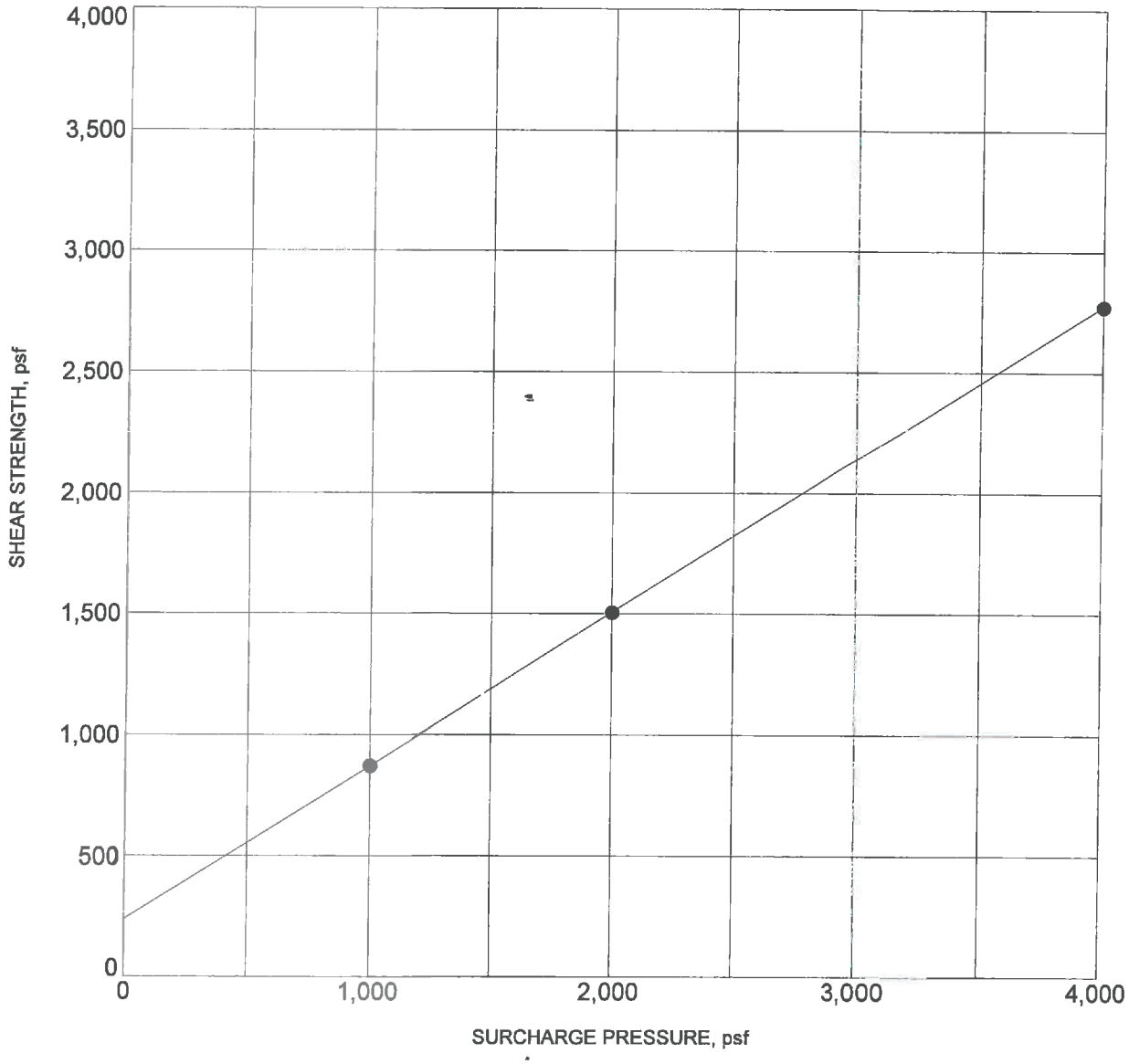
DIRECT SHEAR TEST RESULTS

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.
13-31-199-01

Drawing No.
B-3b



BORING NO.	:	**BH-6**	DEPTH (ft)	:	**7**
DESCRIPTION	:	**SILTY SAND (SM)**			
COHESION (psf)	:	**250**	FRICTION ANGLE (degrees)		**33**
MOISTURE CONTENT (%)	:	**9.4**	DRY DENSITY (pcf)	:	**100.2**

NOTE: Ultimate Strength.

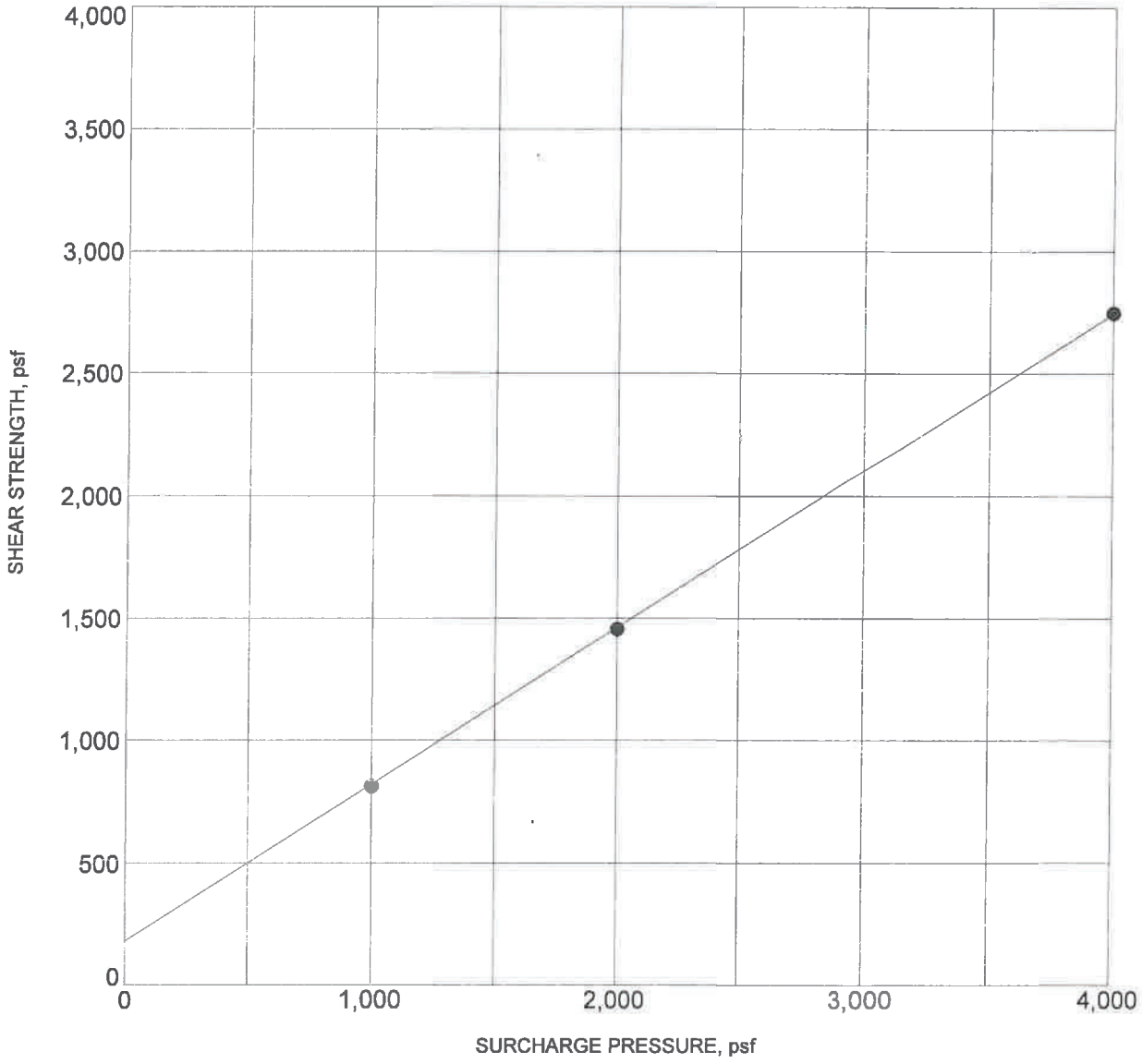
DIRECT SHEAR TEST RESULTS

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.
13-31-199-01

Drawing No.
B-3c



BORING NO.	:	**BH-8**	DEPTH (ft)	:	**10**
DESCRIPTION	:	**SAND WITH SILT (SP-SM)**			
COHESION (psf)	:	**200**	FRICTION ANGLE (degrees)		**33**
MOISTURE CONTENT (%)	:	**15.3**	DRY DENSITY (pcf)	:	**107.4**

NOTE: Ultimate Strength.

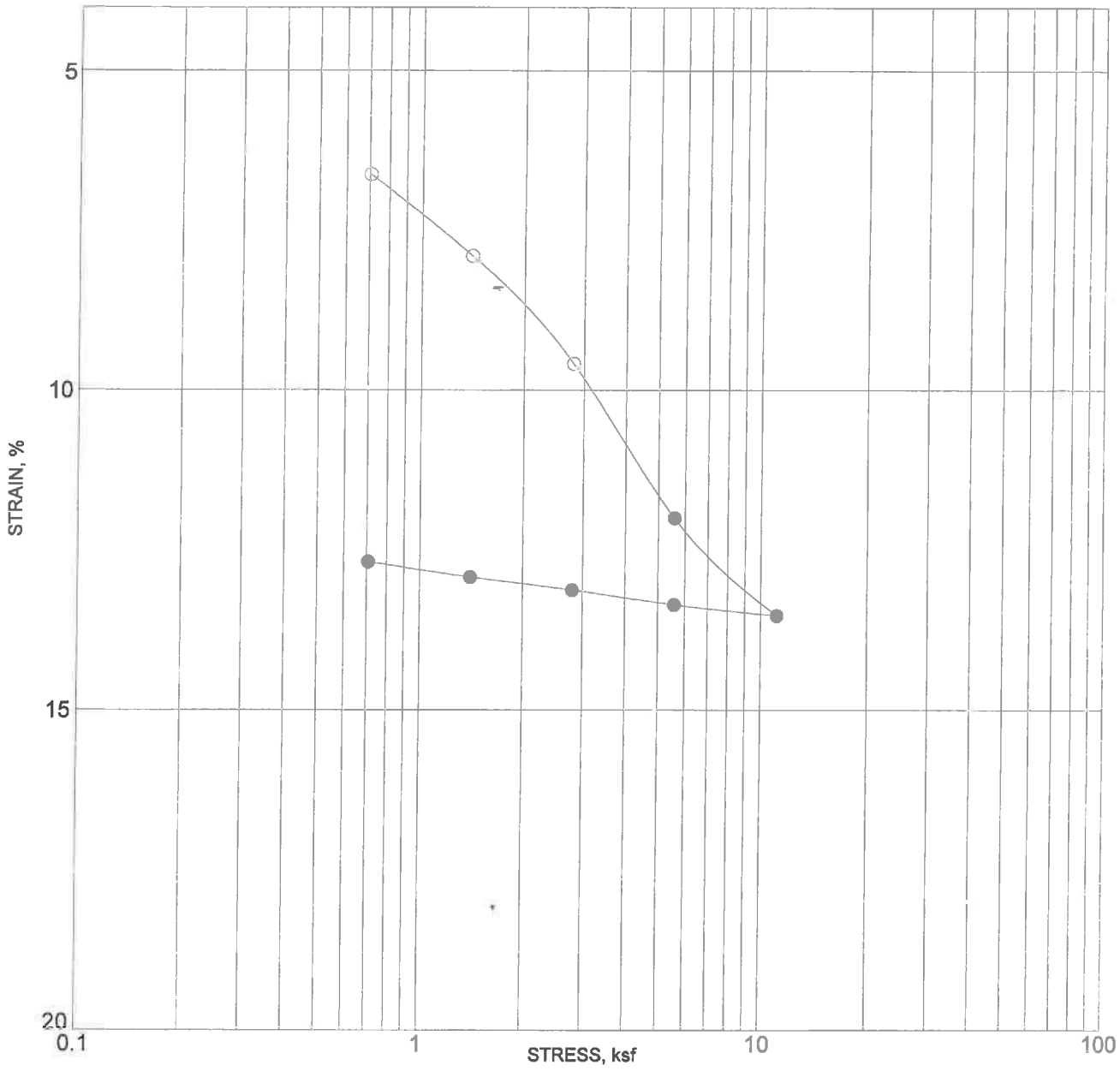
DIRECT SHEAR TEST RESULTS

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No.
13-31-199-01

Drawing No.
B-3d



BORING NO. :	**BH-1**	DEPTH (ft) :	**5**
DESCRIPTION :	**SILTY SAND (SM)**		

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	**11.8**	**116.8**		
FINAL	**18.1**	**116.8**		

NOTE: SOLID CIRCLES INDICATE READINGS AFTER ADDITION OF WATER

CONSOLIDATION TEST RESULTS

Converse Consultants

Project Name
ARROYO SECO CANYON PROJECT
PASADENA, CALIFORNIA

Project No. **13-31-199-01**

Drawing No. **B-4**

APPENDIX C

PERCOLATION TESTING DATA

Percolation Testing

Job Name: Arroyo Seco Canyon Project
Job No.: 13-31-199-01
Location: Site No. 1 - Leach field area
Test Date: July 9, 2013

Test Boring No. **BH-2**
Depth of Boring (d_b): 5.0 feet
Diameter of Boring (D): 1.00 foot
Test Performer: MDR

Time of Testing			Water Level Measurement at The Bottom 12 inches		Notes
Initial Time T_i	Final Time T_f	Time Interval ΔT (minutes)	Initial depth to water d_1 (inches)	Final depth to water d_2 (inches)	
Presoak 7/8/2013 10:05 AM	7/9/2013 11:00 AM	24 hours	0.00	12.00	Acceptable for leach field
Percolation Test					
11:40:00 AM	11:45:00 AM	5.00	0.00	1.00	
11:45:00 AM	11:52:00 AM	7.00	1.00	2.00	
11:52:00 AM	11:57:00 AM	5.00	2.00	3.00	
11:57:00 AM	12:05:00 PM	8.00	3.00	4.00	
12:05:00 PM	12:15:00 PM	10.00	4.00	5.00	
12:15:00 PM	12:25:00 PM	10.00	5.00	6.00	
12:37:00 PM	12:42:00 PM	5.00	0.00	1.00	
12:42:00 PM	12:49:00 PM	7.00	1.00	2.00	
12:49:00 PM	12:55:00 PM	6.00	2.00	3.00	
12:55:00 PM	1:02:00 PM	7.00	3.00	4.00	
1:02:00 PM	1:09:00 PM	7.00	4.00	5.00	
1:09:00 PM	1:20:00 PM	11.00	5.00	6.00	
1:44:00 PM	1:52:00 PM	8.00	0.00	1.00	
1:52:00 PM	1:59:00 PM	7.00	1.00	2.00	
1:59:00 PM	2:06:00 PM	7.00	2.00	3.00	
2:06:00 PM	2:13:00 PM	7.00	3.00	4.00	
2:13:00 PM	2:21:00 PM	8.00	4.00	5.00	
2:21:00 PM	2:31:00 PM	10.00	5.00	6.00	

Reference: Los Angeles County (2012). A Professional Guide to Requirements and Procedures for Onsite Wasterwater Treatment Systems (OWTS), dated January 1, 2012.

Percolation Testing

Job Name: Arroyo Seco Canyon Project
Job No.: 13-31-199-01
Location: Site No. 2C - Leach field area
Test Date: July 11, 2013

Test Boring No. **BH-5**
Depth of Boring (d_b): 3.5 feet
Diameter of Boring (D): 1.00 foot
Test Performer: MDR

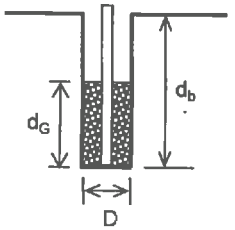
Time of Testing			Water Level Measurement at The Bottom 12 inches		Notes
Initial Time T_i	Final Time T_f	Time Interval ΔT (minutes)	Initial depth to water d_1 (inches)	Final depth to water d_2 (inches)	
Presoak 7/10/2013 10:35 AM	7/11/2013 10:40 AM	24 hours	0.00	6.00	Not acceptable for leach field
Percolation Test					
10:47:00 AM	11:24:00 AM	37.00	0.00	1.00	Percolation rate too slow
11:24:00 AM	12:45:00 PM	81.00	1.00	2.00	Not acceptable for leach field

Reference: Los Angeles County (2012). A Professional Guide to Requirements and Procedures for Onsite Wasterwater Treatment Systems (OWTS), dated January 1, 2012.

Percolation Testing

Job Name: Arroyo Seco Canyon Project
Job No.: 13-31-199-01
Location: Site No. 3 - JPL Parking Lot
Test Date: July 11, 2013

Test Boring No. BH-9
Depth of Boring (d_b): 5.0 feet
Diameter of Boring (D): 0.67 feet
Test Performer: MDR



Time of Testing			Water Level Measurement		Water Level Calculations				Percolation Rate Calculations		
Initial Time	Final Time	Time Interval	Initial depth to water	Final depth to water	Initial Height of water column	Final Height of water column	Drop in Height	Average height of water column	Pre-adjusted Percolation Rate	Reduction Factor	Adjusted Percolation Rate
T_i	T_f	ΔT	d_1	d_2	d_i	d_f	$\Delta d = d_i - d_f$	L_{ave}	$k_i = \Delta d / \Delta T$	R_f	$k = k_i / R_f$
		(hr)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(inch/hr)		(inch/hr)
Presoak											
9:28 AM	11:28 AM	2.00	0.00	5.00							
Percolation Test											
11:35:00 AM	11:45:00 AM	0.17	0.00	1.92	5.00	3.08	1.92	4.04	138.24	13.1	10.59
11:45:00 AM	11:55:00 AM	0.17	1.92	2.92	3.08	2.08	1.00	2.58	72.00	8.7	8.27
11:55:00 AM	12:05:00 PM	0.17	2.92	3.50	2.08	1.50	0.58	1.79	41.76	6.3	6.58
12:09:00 PM	12:19:00 PM	0.17	0.00	1.63	5.00	3.37	1.63	4.19	117.36	13.5	8.70
12:19:00 PM	12:29:00 PM	0.17	1.63	2.58	3.37	2.42	0.95	2.90	68.40	9.6	7.09
12:29:00 PM	12:39:00 PM	0.17	2.58	3.42	2.42	1.58	0.84	2.00	60.48	7.0	8.68
12:41:00 PM	12:51:00 PM	0.17	0.00	1.50	5.00	3.50	1.50	4.25	108.00	13.7	7.89
12:51:00 PM	1:01:00 PM	0.17	1.50	2.46	3.50	2.54	0.96	3.02	69.12	10.0	6.90
1:01:00 PM	1:11:00 PM	0.17	2.46	3.21	2.54	1.79	0.75	2.17	54.00	7.5	7.24
1:14:00 PM	1:24:00 PM	0.17	0.00	1.58	5.00	3.42	1.58	4.21	113.76	13.6	8.38
1:24:00 PM	1:34:00 PM	0.17	1.58	2.58	3.42	2.42	1.00	2.92	72.00	9.7	7.41
1:34:00 PM	1:44:00 PM	0.17	2.58	3.25	2.42	1.75	0.67	2.09	48.24	7.2	6.68

Note: Reduction Factor, $R_f = (2*d_i - \Delta d)/D + 1$

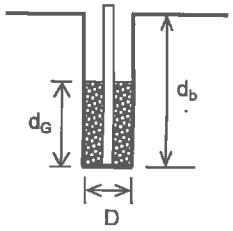
Lowest Perlcolaton Rate = **6.58** **inch/hr**
Average Percolation Rate = **7.87** **inch/hr**

Reference: Los Angeles County (2011). Adminstrative Manual - Low Impact Development Best Management Practice Guideline for Design, Investigation, and Reporting, 01/03/11.

Percolation Testing

Job Name: Arroyo Seco Canyon Project
Job No.: 13-31-199-01
Location: Site No. 3 - JPL Parking Lot
Test Date: July 11, 2013

Test Boring No. **BH-10**
Depth of Boring (d_b): 5.0 feet
Diameter of Boring (D): 0.67 feet
Test Performer: JR



Time of Testing			Water Level Measurement		Water Level Calculations				Percolation Rate Calculations		
Initial Time	Final Time	Time Interval	Initial depth to water	Final depth to water	Initial Height of water column	Final Height of water column	Drop in Height	Average height of water column	Pre-adjusted Percolation Rate	Reduction Factor	Adjusted Percolation Rate
T_i	T_f	ΔT	d_1	d_2	d_i	d_f	$\Delta d = d_i - d_f$	L_{ave}	$k_i = \Delta d / \Delta T$	R_f	$k = k_i / R_f$
		(hr)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(inch/hr)		(inch/hr)
Presoak											
8:59 AM	11:00 AM	2.00	0.00	5.00							
Percolation Test											
11:11:00 AM	11:21:00 AM	0.17	0.00	2.60	5.00	2.40	2.60	3.70	187.20	12.0	15.54
11:21:00 AM	11:31:00 AM	0.17	2.60	3.69	2.40	1.31	1.09	1.86	78.48	6.5	12.00
11:31:00 AM	11:41:00 AM	0.17	3.69	4.67	1.31	0.33	0.98	0.82	70.56	3.4	20.47
11:42:00 AM	11:52:00 AM	0.17	0.00	2.47	5.00	2.53	2.47	3.77	177.84	12.2	14.53
11:52:00 AM	12:02:00 PM	0.17	2.47	3.59	2.53	1.41	1.12	1.97	80.64	6.9	11.72
12:02:00 PM	12:12:00 PM	0.17	3.59	4.65	1.41	0.35	1.06	0.88	76.32	3.6	21.04
12:13:00 PM	12:23:00 PM	0.17	0.00	2.58	5.00	2.42	2.58	3.71	185.76	12.1	15.38
12:23:00 PM	12:33:00 PM	0.17	2.58	3.65	2.42	1.35	1.07	1.89	77.04	6.6	11.63
12:33:00 PM	12:43:00 PM	0.17	3.65	4.70	1.35	0.30	1.05	0.83	75.60	3.5	21.83
12:44:00 PM	12:54:00 PM	0.17	0.00	2.43	5.00	2.57	2.43	3.79	174.96	12.3	14.23
12:54:00 PM	1:04:00 PM	0.17	2.43	3.55	2.57	1.45	1.12	2.01	80.64	7.0	11.52
1:04:00 PM	1:14:00 PM	0.17	3.55	4.63	1.45	0.37	1.08	0.91	77.76	3.7	20.92

Note: Reduction Factor, $R_f = (2*d_i - \Delta d)/D + 1$

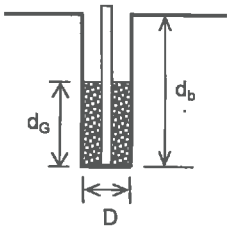
Lowest Perlcolaton Rate = 11.52 inch/hr
Average Percolation Rate = 15.90 inch/hr

Reference: Los Angeles County (2011). Adminstrative Manual - Low Impact Development Best Management Practice Guideline for Design, Investigation, and Reporting, 01/03/11.

Percolation Testing

Job Name: Arroyo Seco Canyon Project
Job No.: 13-31-199-01
Location: Site No. 3 - JPL Parking Lot
Test Date: July 11, 2013

Test Boring No. **BH-11**
Depth of Boring (d_b): 5.0 feet
Diameter of Boring (D): 0.67 feet
Test Performer: JR



Time of Testing			Water Level Measurement		Water Level Calculations				Percolation Rate Calculations		
Initial Time	Final Time	Time Interval	Initial depth to water	Final depth to water	Initial Height of water column	Final Height of water column	Drop in Height	Average height of water column	Pre-adjusted Percolation Rate	Reduction Factor	Adjusted Percolation Rate
T_i	T_f	ΔT	d_1	d_2	d_i	d_f	$\Delta d = d_i - d_f$	L_{ave}	$k_i = \Delta d / \Delta T$	R_f	$k = k_i / R_f$
		(hr)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(inch/hr)		(inch/hr)
Presoak											
8:00 AM	10:00 AM	2.00	0.00	5.00							
Percolation Test											
10:36:00 AM	10:46:00 AM	0.17	0.00	1.89	5.00	3.11	1.89	4.06	136.08	13.1	10.38
10:46:00 AM	10:56:00 AM	0.17	1.89	2.60	3.11	2.40	0.71	2.76	51.12	9.2	5.54
10:56:00 AM	11:06:00 AM	0.17	2.60	3.10	2.40	1.90	0.50	2.15	36.00	7.4	4.85
11:17:00 AM	11:27:00 AM	0.17	0.00	1.75	5.00	3.25	1.75	4.13	126.00	13.3	9.46
11:27:00 AM	11:37:00 AM	0.17	1.75	2.51	3.25	2.49	0.76	2.87	54.72	9.6	5.72
11:37:00 AM	11:47:00 AM	0.17	2.51	3.00	2.49	2.00	0.49	2.25	35.28	7.7	4.58
11:48:00 AM	11:58:00 AM	0.17	0.00	1.80	5.00	3.20	1.80	4.10	129.60	13.2	9.79
11:58:00 AM	12:08:00 PM	0.17	1.80	2.52	3.20	2.48	0.72	2.84	51.84	9.5	5.47
12:08:00 PM	12:18:00 PM	0.17	2.52	3.00	2.48	2.00	0.48	2.24	34.56	7.7	4.50
12:19:00 PM	12:29:00 PM	0.17	0.00	1.75	5.00	3.25	1.75	4.13	126.00	13.3	9.46
12:29:00 PM	12:39:00 PM	0.17	1.75	2.47	3.25	2.53	0.72	2.89	51.84	9.6	5.38
12:39:00 PM	12:49:00 PM	0.17	2.47	2.97	2.53	2.03	0.50	2.28	36.00	7.8	4.61

Note: Reduction Factor, $R_f = (2*d_i - \Delta d)/D + 1$

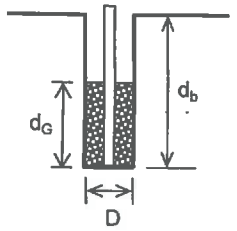
Lowest Perlcolaton Rate = 4.50 inch/hr
Average Percolation Rate = 6.65 inch/hr

Reference: Los Angeles County (2011). Adminstrative Manual - Low Impact Development Best Management Practice Guideline for Design, Investigation, and Reporting, 01/03/11.

Percolation Testing

Job Name: Arroyo Seco Canyon Project
Job No.: 13-31-199-01
Location: Site No. 3 - Sludge Basin 2
Test Date: July 12, 2013

Test Boring No. BH-12
Depth of Boring (d_b): 5.0 feet
Diameter of Boring (D): 0.67 feet
Test Performer: MDR



Time of Testing			Water Level Measurement		Water Level Calculations				Percolation Rate Calculations		
Initial Time	Final Time	Time Interval	Initial depth to water	Final depth to water	Initial Height of water column	Final Height of water column	Drop in Height	Average height of water column	Pre-adjusted Percolation Rate	Reduction Factor	Adjusted Percolation Rate
T_i	T_f	ΔT	d_1	d_2	d_i	d_f	$\Delta d = d_i - d_f$	L_{ave}	$k_i = \Delta d / \Delta T$	R_f	$k = k_i / R_f$
		(hr)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(inch/hr)		(inch/hr)
Presoak											
10:20 AM	3:20 PM	5.00	0.00	5.00							
Percolation Test											
3:46:00 AM	3:51:00 AM	0.08	0.00	3.25	5.00	1.75	3.25	3.38	468.00	11.1	42.26
3:51:00 AM	3:56:00 AM	0.08	3.25	3.54	1.75	1.46	0.29	1.61	41.76	5.8	7.21
4:02:00 PM	4:07:00 PM	0.08	0.00	3.29	5.00	1.71	3.29	3.36	473.76	11.0	43.01
4:07:00 PM	4:12:00 PM	0.08	3.29	3.48	1.71	1.52	0.19	1.62	27.36	5.8	4.70
4:15:00 PM	4:20:00 PM	0.08	0.00	3.25	5.00	1.75	3.25	3.38	468.00	11.1	42.26
4:20:00 PM	4:25:00 PM	0.08	3.25	3.48	1.75	1.52	0.23	1.64	33.12	5.9	5.63
4:28:00 AM	4:33:00 AM	0.08	0.00	3.25	5.00	1.75	3.25	3.38	468.00	11.1	42.26
4:33:00 AM	4:38:00 AM	0.08	3.25	3.47	1.75	1.53	0.22	1.64	31.68	5.9	5.37

Note: Reduction Factor, $R_f = (2*d_i - \Delta d)/D + 1$

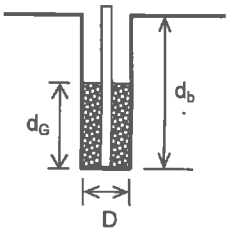
Lowest Perlcolaton Rate = **4.70** **inch/hr**
Average Percolation Rate = **24.09** **inch/hr**

Reference: Los Angeles County (2011). Adminstrative Manual - Low Impact Development Best Management Practice Guideline for Design, Investigation, and Reporting, 01/03/11.

Percolation Testing

Job Name: Arroyo Seco Canyon Project
Job No.: 13-31-199-01
Location: Site No. 3 - Basin 8
Test Date: July 12, 2013

Test Boring No. BH-13
Depth of Boring (d_b): 2.8 feet
Diameter of Boring (D): 0.67 feet
Test Performer: MDR



Time of Testing			Water Level Measurement		Water Level Calculations				Percolation Rate Calculations		
Initial Time	Final Time	Time Interval	Initial depth to water	Final depth to water	Initial Height of water column	Final Height of water column	Drop in Height	Average height of water column	Pre-adjusted Percolation Rate	Reduction Factor	Adjusted Percolation Rate
T_i	T_f	ΔT	d_1	d_2	d_i	d_f	$\Delta d = d_i - d_f$	L_{ave}	$k_i = \Delta d / \Delta T$	R_f	$k = k_i / R_f$
		(hr)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(inch/hr)		(inch/hr)
Presoak											
7:30 AM	9:00 AM	1.50	0.00	2.80							
Percolation Test											
9:01:00 AM	9:04:00 AM	0.05	0.00	2.29	2.80	0.51	2.29	1.66	549.60	5.9	92.52
9:04:00 AM	9:06:00 AM	0.03	2.29	2.50	0.51	0.30	0.21	0.41	75.60	2.2	34.22
9:06:00 AM	9:08:00 AM	0.03	2.50	2.63	0.30	0.17	0.13	0.24	46.80	1.7	27.51
9:21:00 AM	9:24:00 AM	0.05	0.00	2.25	2.80	0.55	2.25	1.68	540.00	6.0	90.00
9:24:00 AM	9:26:00 AM	0.03	2.25	2.46	0.55	0.34	0.21	0.45	75.60	2.3	32.47
9:33:00 AM	9:36:00 AM	0.05	0.00	2.21	2.80	0.59	2.21	1.70	530.40	6.1	87.53
9:36:00 AM	9:38:00 AM	0.03	2.21	2.46	0.59	0.34	0.25	0.47	90.00	2.4	37.69
9:52:00 AM	9:55:00 AM	0.05	0.00	2.20	2.80	0.60	2.20	1.70	528.00	6.1	86.92
9:55:00 AM	9:57:00 AM	0.03	2.20	2.46	0.60	0.34	0.26	0.47	93.60	2.4	38.95

Note: Reduction Factor, $R_f = (2*d_i - \Delta d)/D + 1$

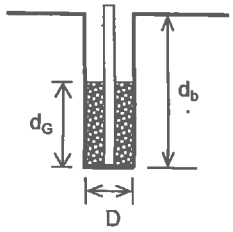
Lowest Percolaton Rate = **27.51** **inch/hr**
Average Percolation Rate = **58.65** **inch/hr**

Reference: Los Angeles County (2011). Adminstrative Manual - Low Impact Development Best Management Practice Guideline for Design, Investigation, and Reporting, 01/03/11.

Percolation Testing

Job Name: Arroyo Seco Canyon Project
Job No.: 13-31-199-01
Location: Site No. 3 - Basin 13
Test Date: July 12, 2013

Test Boring No. **BH-14**
Depth of Boring (d_b): 5.0 feet
Diameter of Boring (D): 0.67 feet
Test Performer: MDR



Time of Testing			Water Level Measurement		Water Level Calculations				Percolation Rate Calculations		
Initial Time	Final Time	Time Interval	Initial depth to water	Final depth to water	Initial Height of water column	Final Height of water column	Drop in Height	Average height of water column	Pre-adjusted Percolation Rate	Reduction Factor	Adjusted Percolation Rate
T_i	T_f	ΔT	d_1	d_2	d_i	d_f	$\Delta d = d_i - d_f$	L_{ave}	$k_i = \Delta d / \Delta T$	R_f	$k = k_i / R_f$
		(hr)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(inch/hr)		(inch/hr)
Presoak											
8:00 AM	10:30 AM	2.50	0.00	5.00							
Percolation Test											
10:34:00 AM	10:39:00 AM	0.08	0.00	3.08	5.00	1.92	3.08	3.46	443.52	11.3	39.15
10:39:00 AM	10:44:00 AM	0.08	3.08	3.79	1.92	1.21	0.71	1.57	102.24	5.7	18.03
10:55:00 AM	11:00:00 AM	0.08	0.00	3.04	5.00	1.96	3.04	3.48	437.76	11.4	38.44
11:00:00 AM	11:05:00 AM	0.08	3.04	3.79	1.96	1.21	0.75	1.59	108.00	5.7	18.84
11:22:00 AM	11:27:00 AM	0.08	0.00	3.04	5.00	1.96	3.04	3.48	437.76	11.4	38.44
11:27:00 AM	11:32:00 AM	0.08	3.04	3.75	1.96	1.25	0.71	1.61	102.24	5.8	17.65
3:10:00 PM	3:15:00 PM	0.08	0.00	2.96	5.00	2.04	2.96	3.52	426.24	11.5	37.04
3:15:00 PM	3:20:00 PM	0.08	2.96	3.67	2.04	1.33	0.71	1.69	102.24	6.0	16.96

Note: Reduction Factor, $R_f = (2*d_i - \Delta d)/D + 1$

Lowest Perlcolaton Rate = **16.96** **inch/hr**
Average Percolation Rate = **28.07** **inch/hr**

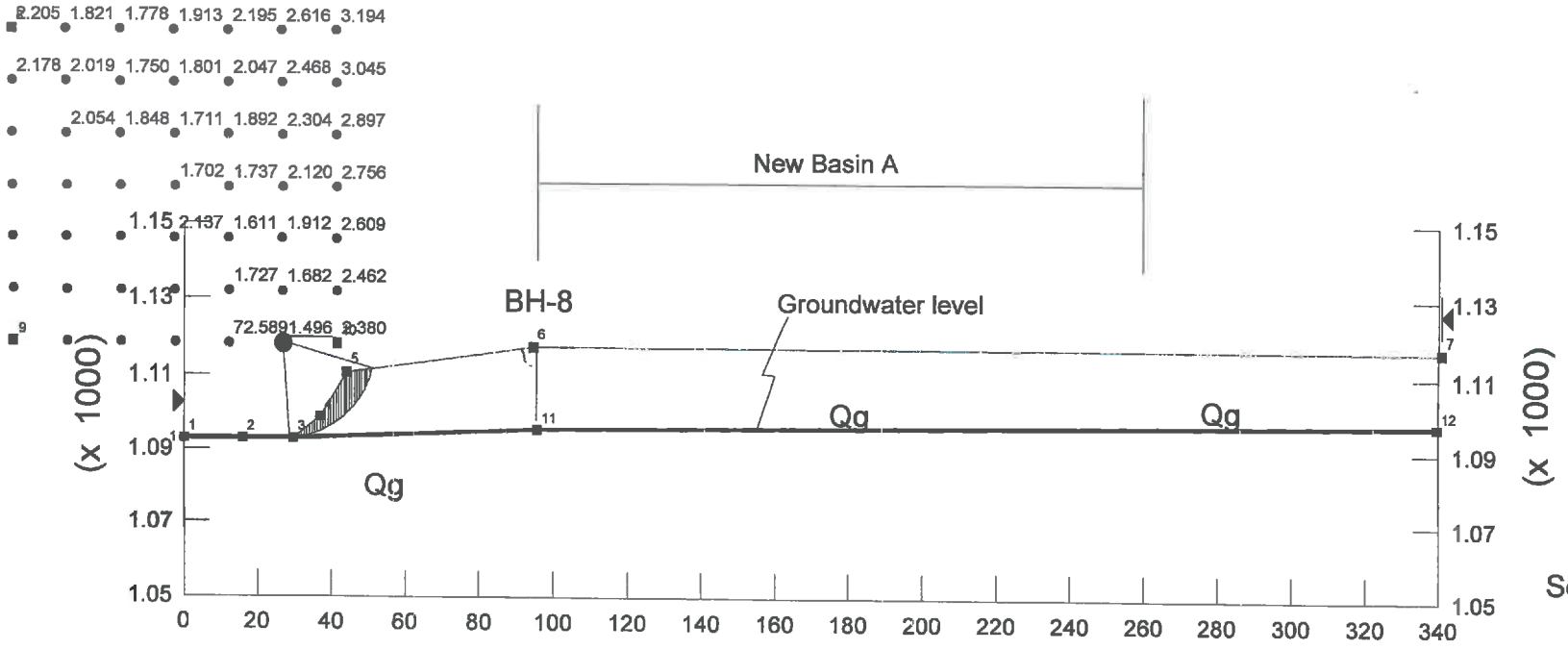
Reference: Los Angeles County (2011). Adminstrative Manual - Low Impact Development Best Management Practice Guideline for Design, Investigation, and Reporting, 01/03/11.

APPENDIX D

SLOPE STABILITY ANALYSES

Description: Gross Slope Stability Analysis - Geologic Cross Section A-A'
Comments: 13-31-199-01 - Arroyo Seco Canyon Project
File Name: 13-31-199-01_a1.slp
Last Saved Date: 8/20/2013
Analysis Method: Spencer
Direction of Slip Movement: Right to Left
Slip Surface Option: Grid and Radius

Case 1: Groundwater level at 20' below grade
Soil Shear Strength
Qg
unit weight = 125 pcf
cohession= 200 psf
friction= 33 degrees

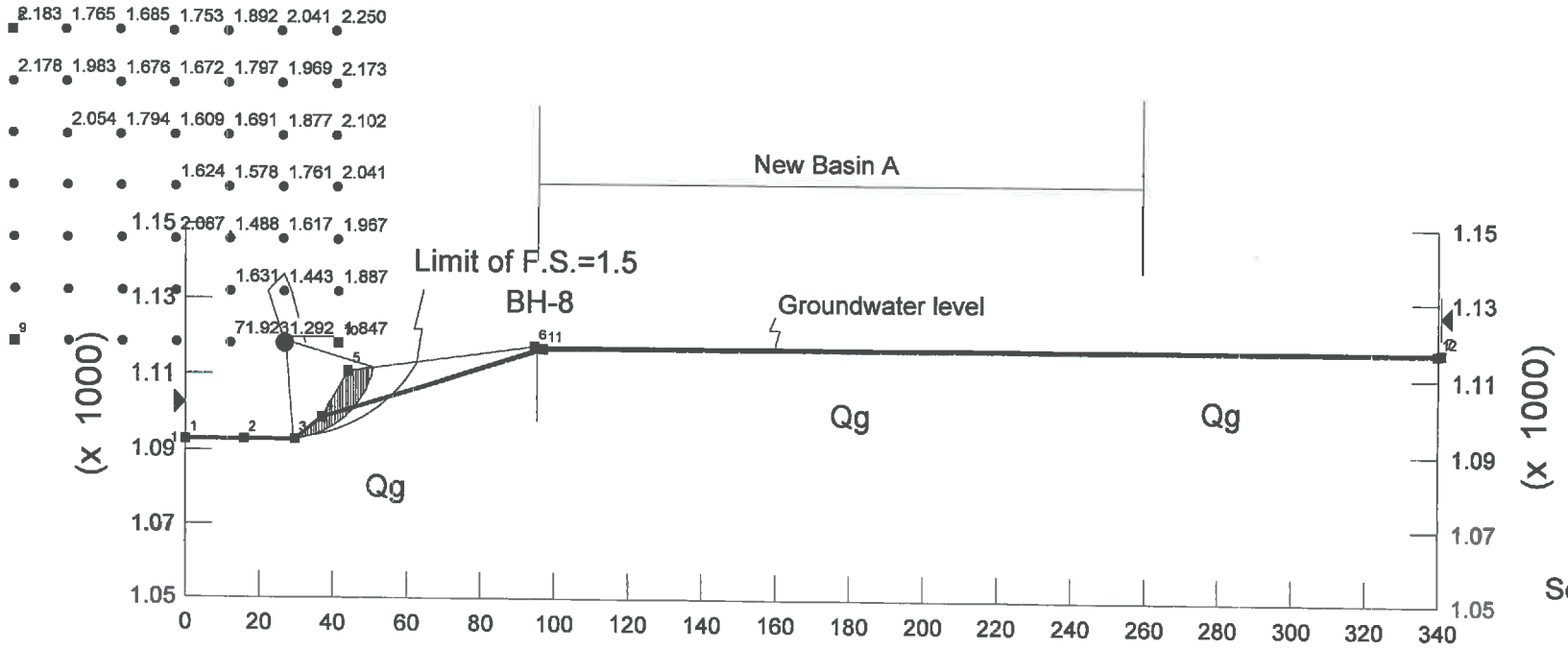


Scale: 1"=50'

Plate S-A1

Description: Gross Slope Stability Analysis - Geologic Cross Section A-A
Comments: 13-31-199-01 - Arroyo Seco Canyon Project
File Name: 13-31-199-01_a2.slp
Last Saved Date: 8/20/2013
Analysis Method: Spencer
Direction of Slip Movement: Right to Left
Slip Surface Option: Grid and Radius

Case 2: Groundwater level at 0' below parking lot grade
Soil Shear Strength
Qg
unit weight = 125 pcf
cohession= 200 psf
friction= 33 degrees



Scale: 1"=50'

Plate S-A2

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 Gross Slope Stability Analysis - Geologic Cross Section A-A'
 13-31-199-01 - Arroyo Seco Canyon Project
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 TIMESTAMP 8:23:45 AM
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 SOIL           1
     1 +1.2500e+002 +2.0000e+002 +3.3000e+001 +0.0000e+000 +0.0000e+000
+0.0000e+000   1  0
       +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000    0    0
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+0.0000e+000
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+0.0000e+000
 Stream Deposit (Qg)
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 AFUNCTION      0
 POINT         12
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     2 +1.6000e+001 +1.0930e+003
     3 +2.9690e+001 +1.0930e+003
     4 +3.6981e+001 +1.0988e+003
     5 +4.4165e+001 +1.1107e+003
     6 +9.4743e+001 +1.1169e+003
     7 +3.4068e+002 +1.1166e+003
     8 -4.7258e+001 +1.2022e+003
     9 -4.6392e+001 +1.1180e+003
    10 +4.1597e+001 +1.1177e+003
    11 +9.5587e+001 +1.0955e+003
    12 +3.3965e+002 +1.0972e+003
 LINE           1
     1     7
     1
     2
     3
     4
     5
     6
     7
TENSION
    0 +6.2400e+001 +0.0000e+000 +0.0000e+000     0
GRID
    9    10     8     6     6 0 +0.0000e+000 0 +0.0000e+000
RADIUS
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AXIS
    0
LIMIT
```

```
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 SLIP            0
 BLOCK
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     0      0      0      0      0 +4.5000e+001 +4.5000e+001 0  0
 PORU            1
     1 +0.0000e+000      0 +0.0000e+000
 PBBAR           1
     1 +0.0000e+000      0 +0.0000e+000
 PIEZ            1 +0.0000e+000      0
     1      5      1
     1
     2
     3
    11
    12
 PCON            0
 POGH            0
 POGP            0
 POGR            0
 PORA            1
     1 +0.0000e+000
 LOAD            0
 ANCHOR          0
 PBOUNDARY       0
 SEISMIC
 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
 INTEGRATION


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 FT
 MATLCOLOR       1
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 Gross Slope Stability Analysis - Geologic Cross Section A-A'
 13-31-199-01 - Arroyo Seco Canyon Project
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 SOIL           1
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       +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
+0.0000e+000
 Stream Deposit (Qg)
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 AFUNCTION      0
 POINT         12
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     2 +1.6000e+001 +1.0930e+003
     3 +2.9690e+001 +1.0930e+003
     4 +3.6981e+001 +1.0988e+003
     5 +4.4165e+001 +1.1107e+003
     6 +9.4743e+001 +1.1169e+003
     7 +3.4068e+002 +1.1166e+003
     8 -4.7258e+001 +1.2022e+003
     9 -4.6392e+001 +1.1180e+003
    10 +4.1597e+001 +1.1177e+003
    11 +9.6972e+001 +1.1164e+003
    12 +3.3975e+002 +1.1163e+003
 LINE           1
     1     7
     1
     2
     3
     4
     5
     6
     7
 TENSION
     0 +6.2400e+001 +0.0000e+000 +0.0000e+000     0
 GRID
     9    10     8     6     6 0 +0.0000e+000 0 +0.0000e+000
 RADIUS
     3     3     3     3     0     3     3
 AXIS
     0
 LIMIT
```

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BLOCK
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    0     0     0     0     0 +4.5000e+001 +4.5000e+001 0 0
PORU            1
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PBBAR           1
    1 +0.0000e+000     0 +0.0000e+000
PIEZ            1 +0.0000e+000     0
    1     6     1
    1
    2
    3
    4
   11
   12
PCON            0
POGH            0
POGP            0
POGR            0
PORA            1
    1 +0.0000e+000
LOAD            0
ANCHOR          0
PBOUNDARY       0
SEISMIC
+0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
INTEGRATION


  -1


  -1
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FT
MATLCOLOR       1
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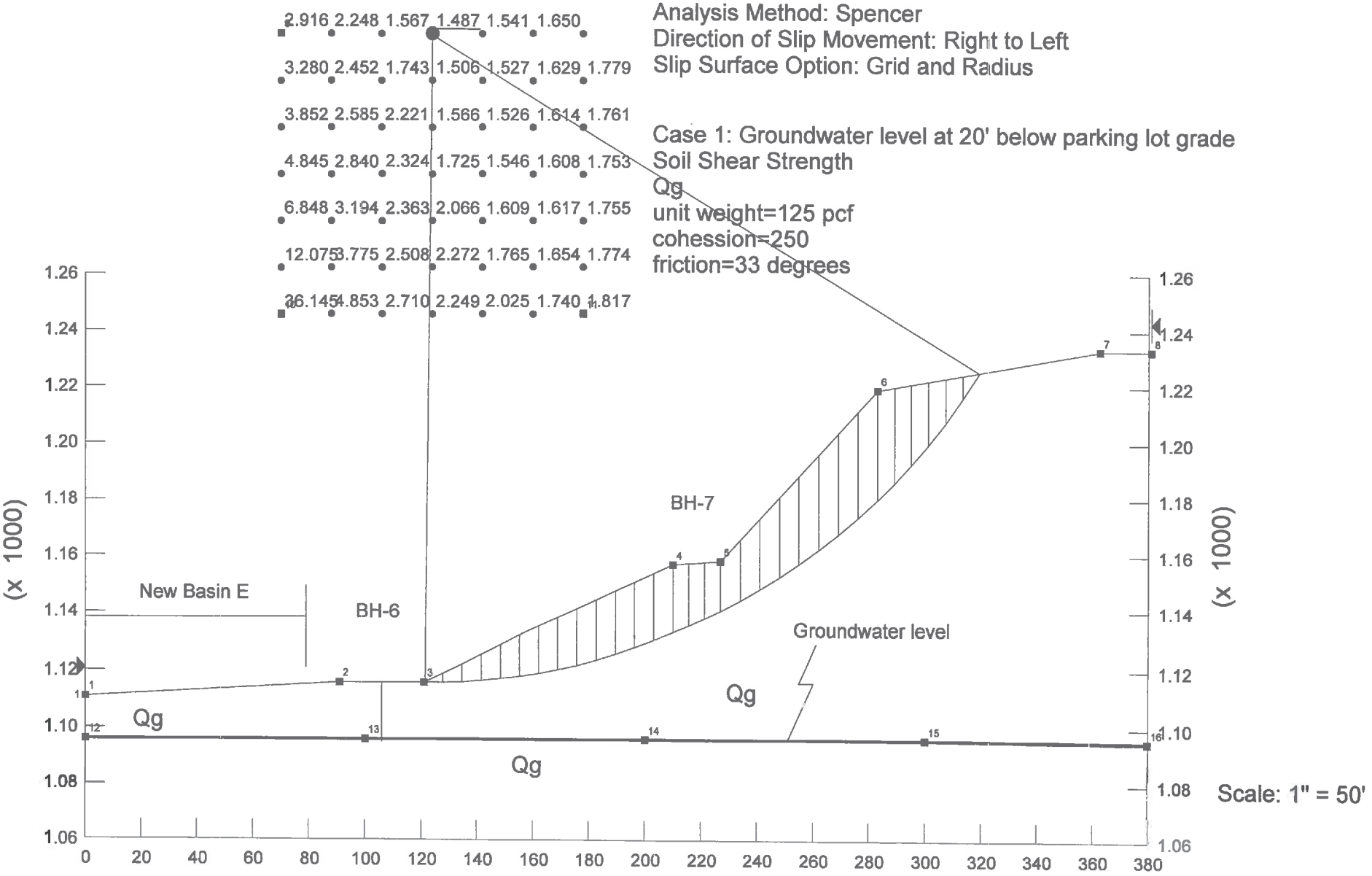
Description: Gross Slope Stability Analysis - Geologic Cross Section B-B'
Comments: 13-31-199-01 Arroyo Seco Canyon Project
File Name: 13-31-199-01_b1.slp
Last Saved Date: 8/20/2013
Analysis Method: Spencer
Direction of Slip Movement: Right to Left
Slip Surface Option: Grid and Radius

Case 1: Groundwater level at 20' below parking lot grade
Soil Shear Strength
Qg
unit weight=125 pcf
cohession=250
friction=33 degrees

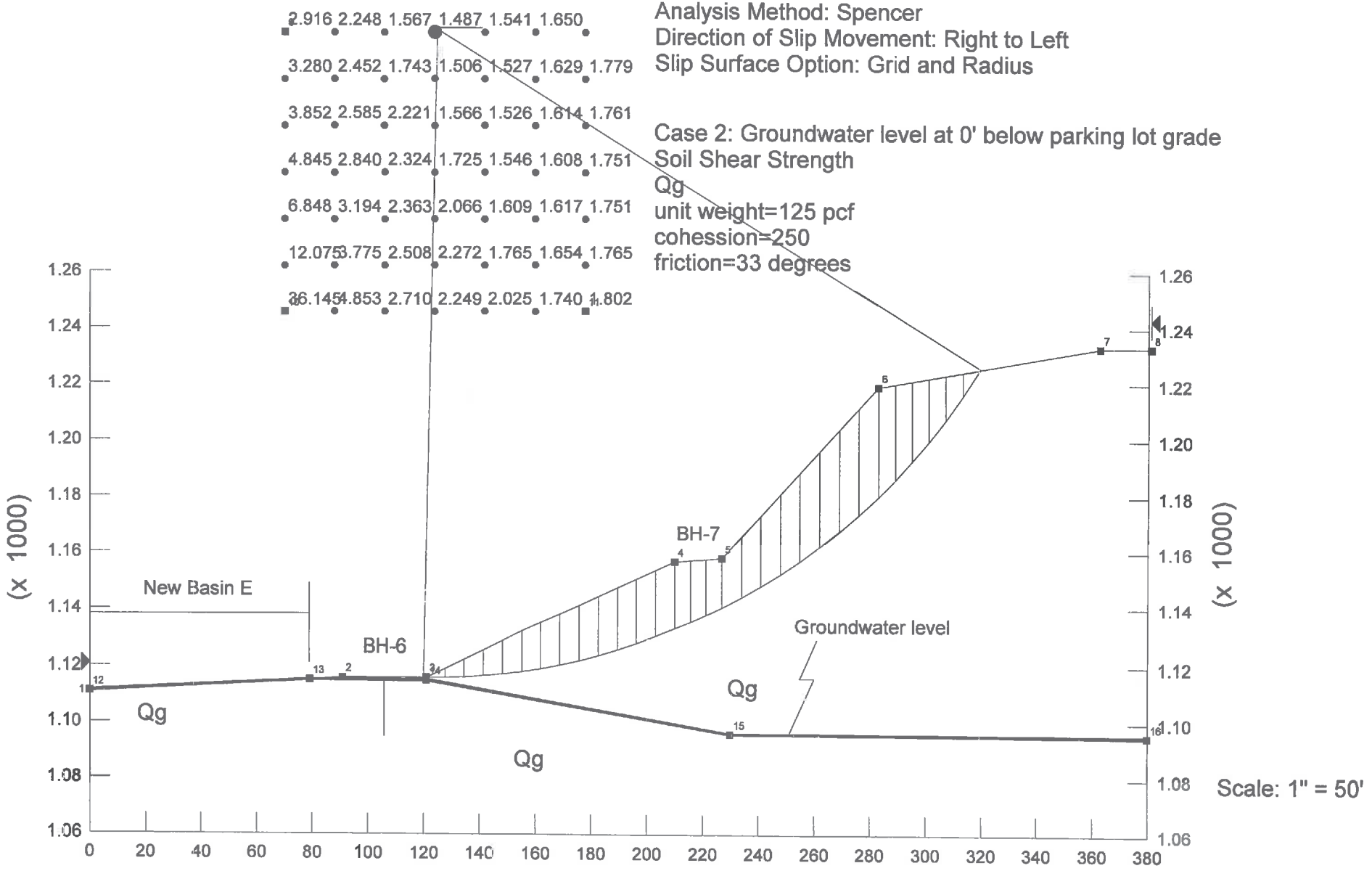


Scale: 1" = 50'

Plate S-B1

Description: Gross Slope Stability Analysis - Geologic Cross Section B-B'
Comments: 13-31-199-01 Arroyo Seco Canyon Project
File Name: 13-31-199-01_b2.slp
Last Saved Date: 8/20/2013
Analysis Method: Spencer
Direction of Slip Movement: Right to Left
Slip Surface Option: Grid and Radius

Case 2: Groundwater level at 0' below parking lot grade
Soil Shear Strength
Qg
unit weight=125 pcf
cohession=250
friction=33 degrees



Scale: 1" = 50'

Plate S-B2

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 13-31-199-01 Arroyo Seco Canyon Project
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     1
 LAMBDA
 +0.0000e+000 +9.9900e+002 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
 SOIL           1
     1 +1.2500e+002 +2.5000e+002 +3.4000e+001 +0.0000e+000 +0.0000e+000
+0.0000e+000   1  0
       +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000    0    0
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+0.0000e+000
       +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
+0.0000e+000
 Stream Deposit
 SFUNCTION      0
 AFUNCTION      0
 POINT         16
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     3 +1.2100e+002 +1.1160e+003
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     5 +2.2700e+002 +1.1580e+003
     6 +2.8300e+002 +1.2190e+003
     7 +3.6266e+002 +1.2331e+003
     8 +3.8088e+002 +1.2331e+003
     9 +7.0000e+001 +1.3450e+003
    10 +7.0024e+001 +1.2455e+003
    11 +1.7800e+002 +1.2460e+003
    12 +0.0000e+000 +1.0960e+003
    13 +1.0000e+002 +1.0960e+003
    14 +2.0000e+002 +1.0960e+003
    15 +3.0000e+002 +1.0960e+003
    16 +3.7981e+002 +1.0953e+003
LINE           1
     1     8
     1
     2
     3
     4
     5
     6
     7
     8
TENSION
     0 +6.2400e+001 +0.0000e+000 +0.0000e+000     0
GRID
    10    11     9     6     6 0 +0.0000e+000 0 +0.0000e+000
```

```
RADIUS
    3     3     3     3     0     3     3
AXIS
    0
LIMIT
0 +0.0000e+000 +3.8088e+002
SLIP            0
BLOCK
    0     0     0     0     0 +1.3500e+002 +1.3500e+002 0  0
    0     0     0     0     0 +4.5000e+001 +4.5000e+001 0  0
PORU            1
    1 +0.0000e+000     0 +0.0000e+000
PBBAR           1
    1 +0.0000e+000     0 +0.0000e+000
PIEZ            1 +0.0000e+000     0
    1     5     1
   12
   13
   14
   15
   16
PCON            0
POGH            0
POGP            0
POGR            0
PORA            1
    1 +0.0000e+000
LOAD            0
ANCHOR          0
PBOUNDARY       0
SEISMIC
+0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
INTEGRATION


  -1


  -1
ENGINEERING
FT
MATLCOLOR       1
    1   255   255   128
```

```
 FILEINFO
 SLOPEW 5.04
 TITLE
 Gross Slope Stability Analysis - Geologic Cross Section B-B'
 13-31-199-01 Arroyo Seco Canyon Project
 DATESTAMP 8/20/2013
 TIMESTAMP 9:13:59 AM
 ANALYSIS
     2     2     1 +6.2400e+001     1     0     0
 CONVERGE
    30 +1.0000e-002  1000 +0.0000e+000 0 0 0
 SIDE
     1
 LAMBDA
 +0.0000e+000 +9.9900e+002 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
 SOIL           1
     1 +1.2500e+002 +2.5000e+002 +3.4000e+001 +0.0000e+000 +0.0000e+000
+0.0000e+000   1  0
       +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000    0    0
       +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
+0.0000e+000
       +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
+0.0000e+000
 Stream Deposit
 SFUNCTION      0
 AFUNCTION      0
 POINT         16
     1 +0.0000e+000 +1.1111e+003
     2 +9.1000e+001 +1.1160e+003
     3 +1.2100e+002 +1.1160e+003
     4 +2.1004e+002 +1.1568e+003
     5 +2.2700e+002 +1.1580e+003
     6 +2.8300e+002 +1.2190e+003
     7 +3.6266e+002 +1.2331e+003
     8 +3.8088e+002 +1.2331e+003
     9 +7.0000e+001 +1.3450e+003
    10 +7.0024e+001 +1.2455e+003
    11 +1.7800e+002 +1.2460e+003
    12 -1.6248e-001 +1.1110e+003
    13 +7.9046e+001 +1.1151e+003
    14 +1.2100e+002 +1.1150e+003
    15 +2.3000e+002 +1.0960e+003
    16 +3.7981e+002 +1.0953e+003
 LINE           1
     1     8
     1
     2
     3
     4
     5
     6
     7
     8
 TENSION
     0 +6.2400e+001 +0.0000e+000 +0.0000e+000     0
 GRID
    10    11     9     6     6 0 +0.0000e+000 0 +0.0000e+000
```

```
RADIUS
    3     3     3     3     0     3     3
AXIS
    0
LIMIT
0 +0.0000e+000 +3.8088e+002
SLIP            0
BLOCK
    0     0     0     0     0 +1.3500e+002 +1.3500e+002 0  0
    0     0     0     0     0 +4.5000e+001 +4.5000e+001 0  0
PORU            1
    1 +0.0000e+000     0 +0.0000e+000
PBBAR           1
    1 +0.0000e+000     0 +0.0000e+000
PIEZ            1 +0.0000e+000     0
    1     5     1
   12
   13
   14
   15
   16
PCON            0
POGH            0
POGP            0
POGR            0
PORA            1
    1 +0.0000e+000
LOAD            0
ANCHOR          0
PBOUNDARY       0
SEISMIC
+0.0000e+000 +0.0000e+000 +0.0000e+000 +0.0000e+000
INTEGRATION


  -1


  -1
ENGINEERING
FT
MATLCOLOR       1
    1   255   255   128
```