jodencrantz@tri-s.com

From: jodencrantz@tri-s.com
Sent: Tuesday, July 2, 2024 12:39 PM
To: 'Landaverde, Carlos@Waterboards'
Cc: 'Joan Davidson'; 'Susana.Arredondo@waterboards.ca.gov'; 'Dave.Kereazis@dtsc.ca.gov'; 'jrinella@pw.lacounty.gov'; 'jodencrantz@tri-s.com'
Subject: RE: 2325 Crenshaw Blvd., Torrance Request for Information and Documented Environmental Concerns
Attachments: 2325 Crenshaw Soil Reports 1988 Building and Safety - 027191G.pdf; DTSC Comment Letter-Torrance Del Amo Project_Final_ADA.pdf; pdf 806 of 889 of Phase I Report 2022 Torrance Del Amo Project.pdf

Importance: High

Dear Mr. Landaverde:

Thank you for your email this morning. I appreciate your interest in obtaining addition information regarding subsurface contamination (potentially hazardous) at the subject site that may be impacting the waters of the State of California. As a licensed Professional Civil Engineer in the State of California, safeguarding life, health, property, and public welfare is my primary concern. I have responded to your request for documents in parts 1) and 2) below.

1) Please find attached a 104-page document that constitutes the 1988 Grading Permit for 2325 Crenshaw Blvd, Torrance and all the supporting documents.

Pdf Range 73-101 is the November 16, 1987 LeRoy Crandall Report entitled “Report of Foundation Investigation”

Pdf 78 is Page 3 of the LeRoy Crandall report which states “Petroleum were noted at random depths in Boring 4. Tests to determine the extent and type of any hazardous materials beneath the site were not within the scope of this investigation.”

Pdf 91 is The Log of Boring 4 dated October 16, 1987 states “Petroleum stain and odor at random depths from 2-1/2 feet to 18 feet” below the surface. Water seepage was noted at 14 feet below the surface in Boring 4. JEO Note: It is possible the water seepage noted at 14 feet below the surface came into contact with the petroleum stain/odor at a depth of 18 feet below the surface possibly exacerbating the extent of contamination.

Pdf 94 is the Log of Boring 7 in which Petroleum Odor is noted at five feet below the surface.

Pdf 95 is the Log of Boring 8 in which Oil Stain is noted at five feet below the surface.

2) I have attached a Department of Toxic Substances and Control (DTSC) letter dated February 23, 2024 addressed to Mr. Peerapol Suree of the City of Torrance in which the author recommends “a proper evaluation of the Project is completed”. There are active links in the February 23, 2024 DTSC letter authored by Environmental Planner Mr. Dave Kereazis and is attached.

It is also noted in the attached 2/23/24 DTSC Letter on Page 1:

In July 2022, a Phase I Environmental Site Assessment (ESA) was prepared for the project by GEOCON West, Inc. The ESA identified past petroleum production at the site in addition to above-ground storage tanks, an oil derrick and well, and apparent waste oil and water ponds in addition to other recognized environmental concerns. All of these were reported

to be contaminated by "disposal surface impoundment". There are no records of any cleanup activities or oversight therefore, a Soil Management Plan (SMP) was recommended by GEOCON West, Inc. as noted in the Initial Study Mitigation Measure HAZ-1.

I will supply any additional information you may request. Here is a link to the City of Torrance Del Amo Project Environmental documents>

https://www.torranceca.gov/our-city/community-development/planning-division/reports-land-use-studies/environmental-documents/torrance-del-amo-project

You will find the July 2022 Phase I Environmental Site Assessment referenced above at Appendix F. I have also attached pdf 806 of 889 from the Phase I which is an aerial photograph from *1928 that shows the waste lagoon, four above-ground storage tanks and an oil derrick within the subject site boundaries*.

If you would like to have a meeting, I would be more than happy to make time for you. It my hope that you will compel the City of Torrance to *investigate the subject site to ensure that are no soil, soil vapor or groundwater impacts from former above-ground storage tanks, an oil derrick and well, apparent waste oil and water ponds, disposal surface impoundment, and petroleum production at the subject site.*

Respectfully yours,

Joseph E. Odencrantz, Ph.D., BCEE, PH, PE

Joe Odencrantz, Ph.D., P.E., BCEE, PH
Board Certified Environmental Engineer (Site Remediation)
Professional Hydrologist (Groundwater)
California Licensed Professional Civil Engineer
Editorial Board Member of REMEDIATION (Environmental Management Journal-Wiley)
Tri-S Environmental
Newport Beach, California
mobile (949) 698-8851
email jodencrantz@tri-s.com
web https://tri-s.com
LinkedIn https://www.linkedin.com/in/josephodencrantz/
Tri-S Environmental is Celebrating 29 years in Business-Since 1994

"One World, One Environment"

From: Landaverde, Carlos@Waterboards <Carlos.Landaverde@Waterboards.ca.gov>
Sent: Tuesday, July 2, 2024 8:54 AM
To: jodencrantz@tri-s.com
Subject: 2325 Crenshaw Blvd., Torrance

Hello Mr. Odencrantz,

I am writing to you to ask if you have any other information regarding the address site above. I have a copy of the PDF addressed to Mr. Sullivan, City Attorney of Torrance Attorney's Office, but if you have other PDFs regarding

site history or any environmental documents regarding the address site above, it would be great to get a copy of any PDFs that you may have with you.

Thank you,

Carlos M. Landaverde, P.G.
Engineering Geologist
Los Angeles Regional Water Quality Control Board
Site Cleanup Program Unit IV
320 West 4th Street, Suite 200
Los Angeles, CA 90013
D: 213-620-6070

DEPARTMENT of BUILDING & SAFETY

CITY OF TORRANCE

GRADING PERMIT

DATE 6-16-88

ISSUED BY T. Kelly

PERMIT NO. 027191 G (027191)

SOIL TYPE | PRELIM. SOIL REPORT | DATE RECEIVED

2325 Crenshaw

FOR APPLICANT TO FILL IN

JOB ADDRESS 2325 CRENSHAW Blvd TORRANCE

LOT ____ BLOCK ____ TRACT 44299

Parcel 2 of MAP No. 19013

OWNER So. CA. GAS Co TEL. NO. 818-307-2504

ADDRESS 3204 No. ROSEMEAD EL MONTE, CA

ARCHITECT OR ENGINEER CHCG

ADDRESS MONTCLAIR, CA

LIC. NO. C4973 TEL NO. 714-625-3924

OWNER/BUILDER DECLARATION

Section 7031 5 of the California Business and Professions code provides as follows:

"Each county or city which requires the issuance of a permit as a condition precedent to the construction, alteration, improvement, demolition or repair of any building or structure shall also require that each applicant for such a permit file as a condition precedent to the issuance of a permit a statement which he has prepared and signed stating that the applicant is licensed under the provisions of this chapter, giving the number of his license and stating that it is in full force and effect, or, if the applicant is exempt from the provisions of this chapter, the basis of the alleged exemption. Any violation of this section by any applicant for a permit shall be subject to a civil penalty of not more than five hundred dollars ($500.00)."

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale. (Section 7044, Business and Professions code: The contractor's license law does not apply to an owner of property who builds or improves thereon, and who does such work himself or through his employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvemnts is sold within one year of completion, the owner builder will have the burden of proving that he did not build or improve for the purpose of sale.)

☒ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project. (Section 7044 of the Business and Professions code: The contractor's license law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the contractor's license law.)

☐ I, as owner, am exempt under section ____ B and P code, for the reason: ____

Larry Blickinger for owner (Signature) 6/16/88 (Date)

LICENSED CONTRACTOR'S DECLARATION

I hereby declare that I am licensed under the provisions of Chapter 9 (commencing at section 7000) of Division 3 of the Business and Professions code, and my license is in full force and effect.

License Class B State Lic. No. 18299 City Lic. No. 5048

Larry Blickinger (Signature) 6/16/88 (Date)

Print Name and Address of Contractor BERRY CONSTRUCTION INC

1921 W. 11th Ty UPLAND, CA Phone 714-985-9661

WORKER'S COMPENSATION DECLARATION

I hereby declare that I have a certificate of consent to self insure, or a certificate of Worker's Compensation Insurance, or a certified copy thereof (Labor Code Section 3800).

Policy No. WP80254537

Company FIREMAN'S FUND INS. Co.

☐ A certified copy is hereby furnished. ON FILE

CERTIFICATE OF EXEMPTION FROM WORKER'S COMPENSATION INSURANCE

(This section need not be completed if the permit is for one hundred dollars ($100.00) or less)

I certify that in the performance of the work for which this permit is issued I shall not employ any person in any manner so as to become subject to the Worker's Compensation laws of the State of California.

(Signature) (Date)

NOTICE TO APPLICANT: If after making this certificate of exemption, you should become subject to the Worker's Compensation laws of the Labor Code, you must forthwith comply with such provisions or this permit shall be deemed revoked.

CONSTRUCTION LENDING AGENCY

I hereby affirm that there is a construction lending agency for the performance of the work for which this permit is issued (Section 3097 California Civil Code).

Lender's Name: N/A

Address: ____

DESCRIPTION OF WORK TO BE DONE

MAXIMUM DEPTH OF FILL ____ MAXIMUM DEPTH OF CUT ____

ESTIMATED CU. YDS. OF MATERIAL HANDLED FILL 2100 CUT 3500

PURPOSE OF WORK PAVE 295,700

SOIL AGENCY ____

CITY ____ TEL. NO. ____

GEOLOGIST ____

CITY ____ TEL. NO. ____

REMARKS

PLAN. DEPT. CASE NO. ____

FEES

PLAN CHECK FEE	$ 283	—
GRADING PERMIT FEE	$ 798	—
MICROFILM FEE	$ 4	90
OWNER BLDR. NOTIF.	$	
WORK. COMP. REVIEW	$ 3	10
SOIL REPORT REVIEW	$ 32	—
TOTAL	$ 1121	—

CORRECTIONS OR COMMENTS

NO GRADING WORK SHALL BE DONE WITHOUT NOTIFYING THE GRADING INSPECTOR AT LEAST ONE DAY IN ADVANCE

FINAL APPROVAL [signature] DATE 7-26-89

COMPACTION REPORT | SOIL AGENCY | DATE RECEIVED

REVIEW FOR RELEASE [signature] DATE 7/20/89

RIGHT OF ENTRY

I certify that I have read this application and state that the above information is correct. I agree to comply with all City and applicable County ordinances, and State laws relating to building construction, and hereby authorize representatives of the City to enter upon the above mentioned property for the purpose of inspections.

Larry Blickinger (Signature) 6/16/88 (Date)

VALID ONLY WHEN MACHINE STAMPED — VALIDATION OF THIS PERMIT SHALL NOT BE HELD TO PERMIT OR BE AN APPROVAL OF THE VIOLATION OF ANY APPLICABLE PROVISIONS OF THE CITY CODE COVERING THIS WORK, OR ANY OTHER PROVISIONS OF THE CITY OF TORRANCE CODE.

INSPECTOR 1

SMITH-EMERY COMPANY
The Full Service Independent Testing Laboratory, Established 1904

August 19, 1988

SECo File No. 17805

Southern California Gas Company
P.O. Box 3249, Terminal Annex
Los Angeles, California 90051

Attention: Ms. Barbara Effenberger, P.E.
ML 730A

Footing Excavations
Proposed South Coastal Division Headquarters Building
Crenshaw and Sepulveda Boulevards
Torrance, California

Madam:

Smith-Emery Company is the Geotechnical Engineer of Record and presently providing soil inspection on the subject project. We were asked to write this letter to provide clarification regarding the compacted fill at the bottom of footing inorder to provide proper support. We understand there should be at least three (3) feet of compacted fill and/or equivalent, at the contractor's option they can use two (2) or three (3) sack lean concrete.

Footing excavations that fall short on the required depth of compacted fill will be excavated. The footing shall be placed such that a line drawn downward at a 45 degree angle from the edge of the footing will intersect the compacted fill.

Prior to placing of fill soils or lean concrete, the bottom of the excavation shall be inspected and approved by Smith-Emery Company.

If you have any question regarding this letter, please feel free to call us.

Respectfully submitted,

SMITH - EMERY COMPANY

Raf Hutalla

RAF HUTALLA
Project Engineer

Raf Hutalla for

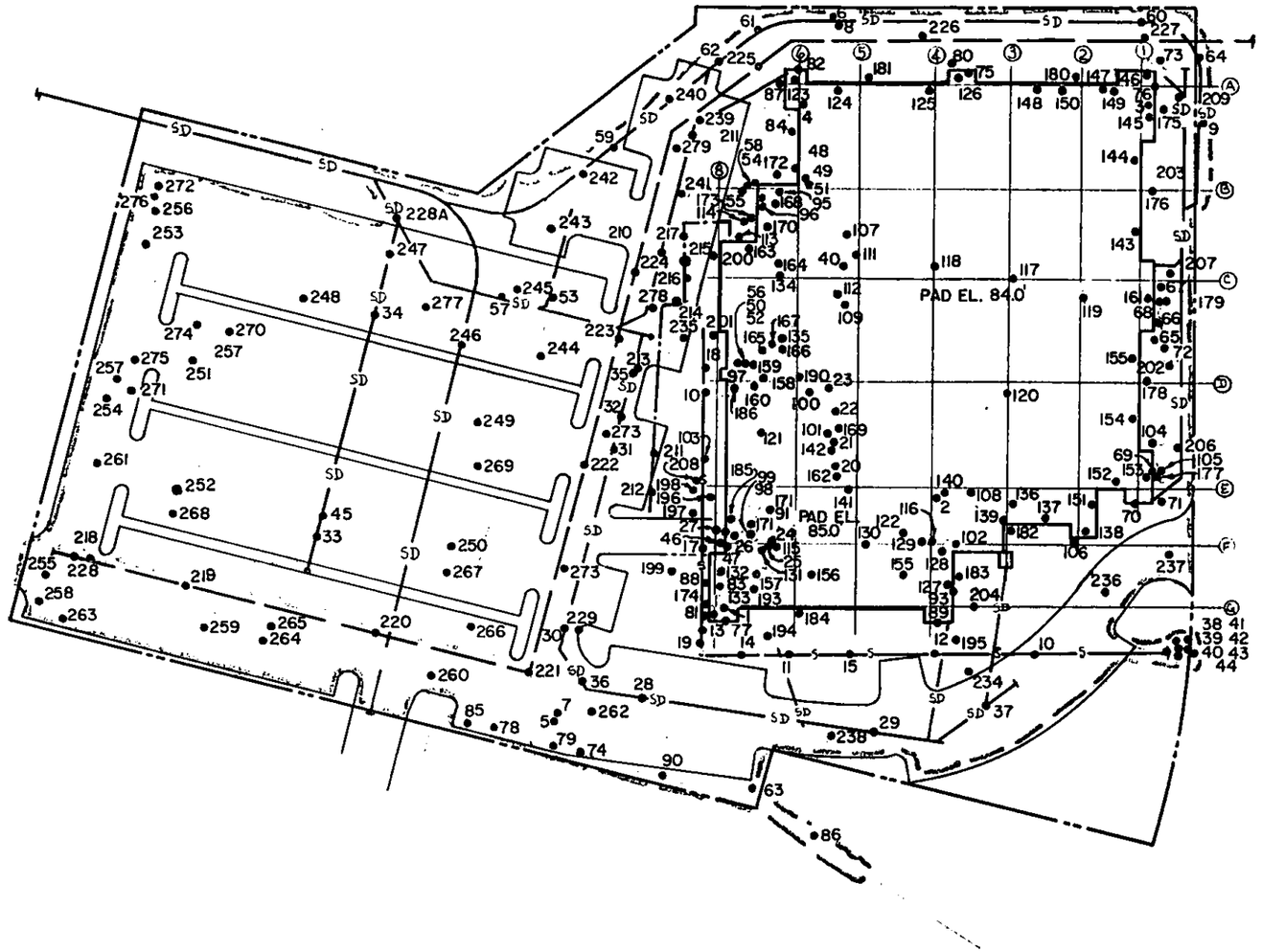
LUTZ KUNZE, R.G.E. 493
Vice President

RH/cc

APPROVED
EXCEPT AS NOTED, FOR STRUCTURAL DESIGN REQUIREMENTS ONLY. NOT RESPONSIBLE FOR ERECTION DIMENSIONS OR QUANTITIES.
THOMPSON AND LABRIE
STRUCTURAL ENGINEERS
BY [signature] DATE 8-19-88

N

SCALE: 1" = 60'



LEGEND

- • 279 — DENSITY TEST LOCATION
- SD — STORM DRAIN TRENCH BACKFILL
- FW — FIRE WATER TRENCH BACKFILL
- S — SEWER TRENCH BACKFILL
- LIMITS OF COMPACTED FILL

PLOT PLAN: SOUTH COAST DIVISION HEADQUARTERS

SCALE: 1" = 60'	APPROVED BY:	DRAWN BY RWG
DATE: 7-6-89		REVISED

SOUTHERN CALIFORNIA GAS COMPANY — S.E. Co. FILE No. 17805

SMITH-EMERY COMPANY — DRAWING NUMBER PLATE 'A'

SMITH-EMERY COMPANY
The Full Service Independent Testing Laboratory, Established 1904

781 East Washington Boulevard
Los Angeles, California 90021
(213) 749-3411
Fax (213) 746-7228

Hunters Point Shipyard, Bldg. 114
P.O. Box 886550
San Francisco, California 94188
(415) 822-8886
Fax (415) 822-5864

1248-Q East La Palma Avenue
Anaheim, California 92805
(714) 630-4910
Fax (714) 632-1741

June 21, 1988

Southern California Gas Company
Accounts Payable P.O. Box 3249
Terminal Annex MC 732A
Los Angeles, California 90051

Attention: Mr. Jerry Ellis

Letter of Responsibility
Proposed South Costal
Division Headquarters Building
Crenshaw and Sepulveda Boulevards
Torrance, California

Gentlemen:

INTRODUCTION

In accordance with your request, Smith-Emery Company is pleased to accept the responsibility of "Geotechnical Engineer of Record" for the subject project. We have reviewed the preliminary soils exploration report entitled:

"Report of Foundation Investigation
Proposed South Costal Division Headquarters Building
Crenshaw Boulevard and Sepulveda Boulevard
Torrance, California
For the Southern California Gas Company"
Prepared by LeRoy Crandall & Associates
Job No. A-87413 dated November 16, 1987

We are in general agreement with the recommendations outlined in the report and are prepared to observe the construction of the project in accordance with the plans and specifications and provide ongoing geotechnical consultation. We understand that there is a rough grading report in preparation by LeRoy Crandall & Associates. In order to undertake our scope of work we need a copy of that report as soon as it's available.

We Appreciate the opportunity to be of service to you. If you have any questions regarding the contents of this letter, please contact us.

Respectfully submitted,

SMITH - EMERY COMPANY

LUTZ KUNZE, R.G.E. 493
Vice President

cc: Berry Construction Inc.
1921 West Eleventh Street
Upland, California 91786-3599
Attn: Mr. Brent McMurray

City of Torrance
3031 Torrance Boulevard
Torrance, California 90509-2970
Attn: Mr. Jim Sheldon

LeRoy Crandall & Associates
P.O. Box 25088
900 Grand Central Avenue
Glendale, California 91201-3009

SMITH-EMERY COMPANY
The Full Service Independent Testing Laboratory, Established 1904

July 14, 1989

SECo File No. 17805
SECo Report No. G-89-5676

Southern California Gas Company
Property & Space Management
Section M/L 732A
Post Office Box 3749
Los Angeles, California 90051

Attention: Mr. Jerry Ellis

REPORT OF COMPACTED FILL
Coastal Division Headquarters Building
Crenshaw and Sepulveda Boulevard
Torrance, California

Gentlemen:

INTRODUCTION

Smith-Emery Company is pleased to present this report on the observation and inspection of compacted fill of the proposed headquarters building utility trench backfill and parking lot fine grading. Smith-Emery Company has witnessed the over-excavation and backfill placement and compaction of fill soils from June 22, 1988 to May 12, 1989. Our observations are based on the report entitled:

781 East Washington Boulevard
Los Angeles, California 90021
(213) 749-3411
Fax (213) 746-7228

Hunters Point Shipyard, Bldg. 114
P.O. Box 880550
San Francisco, California 94188
(415) 822-8880
Fax (415) 822-5864

5427 East La Palma Avenue
Anaheim, California 92807
(714) 693-1026
Fax (714) 693-1034

"Report of Foundation Investigation
Proposed South Coastal Division
Headquarters Building
Crenshaw Boulevard and Sepulveda Boulevard
Torrance, California"

for

Southern California Gas Company
Prepared by LeRoy Crandall and Associates
Report No. A-87413 dated November 16, 1987

and

"Interim Report of Compacted Fill
Proposed South Coastal Division
Headquarters Building
Crenshaw Boulevard and Sepulveda Boulevard
Torrance, California"

for

Southern California Gas Company
Prepared by LeRoy Crandall and Associates
Report No. B-88009 dated May 17, 1988

CONSTRUCTION ACTIVITIES

Site Preparation

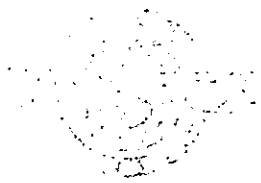
Prior to fill placement, the proposed construction site was stripped of vegetation. The trenches were excavated, pipe installed and the trenches were backfilled as required. The parking lot subgrade was scarified, moisture conditioned and compacted as required. All existing trash, concrete and debris was removed prior to and during the backfill and finish grading operations.

Material Types

On-site excavated soils consisted of brown silty sand. Imported fill material used consisted of class II crushed miscellaneous base.

Fill Placement

On-site excavated soils were also placed in six (6) inch to eight (8) inch loose lifts, brought to near optimum moisture content and compacted to the required 90 percent compaction. Imported materials were placed in four (4) to six (6) inch loose lifts, brought to near optimum moisture content and compacted to the required 95 percent of the maximum dry density as determined by ASTM D1557-78 (five-layer method). The equipment used for compaction consisted of handwackers, scraper, blade, backhoe, vibrating plate, vibrating plate with tamper, vibrating plate, skiploader, tamping rammers, powder puff, steel drum roller, water truck, 980 loader and a 966 loader. Density tests were taken in accordance with ASTM D1556-64 (sand cone method). Field density test locations are plotted on Plate A and test results are shown on Table 1. Results of the maximum density and optimum moisture determination of the materials encountered is tabulated on Table 2.



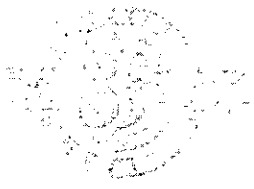
CONCLUSIONS

General

All fill placement and compaction was performed in accordance with the City of Torrance, and and Smith-Emery Company specifications.

Conclusion

Our description of the fill operations as well as observations and testing services herein, have been limited to those operations performed on June 22, 1988 thru May 12, 1989. No representation are made as to the quality or extent of the materials not observed. Based upon our observations and testing it is our opinion that the work performed has been accomplished in accordance with the job specifications as well as the requirements of the regulatory agencies. It is our further opinion that the site as graded is suitable for the proposed Southern California Gas Company Coastal Division Headquarters parking lot. This report should be considered subject to review by the controlling authorities.



The following tables, plates and certifications are attached and complete this report.

Table 1 - Result of Density Tests

Table 2 - Maximum Density/Optimum Moisture Tests

Plate A - Plot Plan

Engineer's Certificate of Compliance

Respectfully submitted,

SMITH - EMERY COMPANY

RICHARD W. GRANT
Field Supervisor

Reviewed and Approved By

LUTZ KUNZE, R.C.E. 493
Vice President

REGISTERED PROFESSIONAL ENGINEER
JEFFREY JANE-FU YANG
NO. C-043563
CIVIL
STATE OF CALIFORNIA

SMITH-EMERY COMPANY

July 14, 1989

SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY		METHOD KEY
SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
1	6-22	NG	83	9	106	93	90	1
LOCATION:		BUILDING PAD BACKFILL 10' N 4' E BUILDING LINE						
2	6-22	NG	83	9	105	93	90	1
LOCATION:		BUILDING PAD BACKFILL 4' OF CENTER E BUILDING LINE						
3	6-22	NG	83	8	105	92	90	1
LOCATION:		BUILDING PAD BACKFILL 10' S 4' E/NE CORNER BLDG. LINE						
4	6-22	NG	83	7	106	93	90	1
LOCATION:		BUILDING PAD BACKFILL NW CORNER OF BUILDING						
5	6-23	SC	80	9	99	87	90	1
LOCATION:		50' S 63' W FROM SW CORNER, TEST FAILED						
6	6-23	SC	83	6	102	89	90	1
LOCATION:		15' E 40' N, TEST FAILED						
7	6-23	SC	79	11	113	99	90	1
LOCATION:		RETEST OF TEST NO. 5						
8	6-23	SC	83	7	107	94	90	1
LOCATION:		RETEST OF TEST NO. 6						
9	6-23	SC	83	9	103	90	90	1
LOCATION:		15' E 6' S FROM NE CORNER						
10	9-1	NG	-3.5	10.7	108.3	95	90	1
LOCATION:		SEWERLINE TRENCH SOUTH 5' EAST OF EAST CLEANOUT						
11	9-1	SC	-3.5	11.1	114.8	100	90	1
LOCATION:		SEWERLINE TRENCH SOUTH 20' WEST OF WEST CLEANOUT						
12	9-1	SC	-2	11.0	112.2	98	90	1
LOCATION:		SEWERLINE TRENCH SOUTH BETWEEN CLEANOUTS						

July 14, 1989

SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY			METHOD KEY
SG-Subgrade	FSG-Finish Subgrade		SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base		NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom		DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
13	9-1	NG	-3.5	11.1	113.8	99	90	1
LOCATION:		SEWERLINE TRENCH WEST 20' SOUTH OF SOUTH CLEANOUT						
14	9-1	NG	SG	10.4	112.9	99	90	1
LOCATION:		SEWERLINE TRENCH SOUTH 30' EAST OF WEST END						
15	9-1	NG	SG	10.2	110.5	97	90	1
LOCATION:		SEWERLINE TRENCH SOUTH 10' WEST OF EAST CLEANOUT						
16	9-1	NG	-1.75	11.1	115.3	100+	90	1
LOCATION:		SEWERLINE TRENCH WEST 25' NORTH OF CLEANOUT						
17	9-1	NG	-1.5	11.2	112.4	99	90	1
LOCATION:		SEWERLINE TRENCH WEST 40' NORTH OF SOUTH END						
18	9-6	NG	SG	10.0	103.7	91	90	1
LOCATION:		SEWERLINE TRENCH WEST 30' SOUTH OF NORTH END						
19	9-6	NG	SG	10.4	107.4	94	90	1
LOCATION:		SEWERLINE TRENCH WEST 15' NORTH OF ELBOW						
20	9-12	SC	81	7.7	110.5	100	90	2
LOCATION:		FOOTING BACKFILL SOUTHEAST OF FOOTING D6-5.4						
21	9-12	SC	81	12.2	109.7	100	90	1
LOCATION:		FOOTING BACKFILL NORTHWEST OF FOOTING D6-5.4						
22	9-12	SC	81	7.3	108.8	99	90	2
LOCATION:		FOOTING BACKFILL SOUTHEAST FOOTING D2-5.4						
23	9-12	SC	81	6.4	109.4	100	90	2
LOCATION:		FOOTING BACKFILL NORTHWEST OF FOOTING D2-5.4						
24	9-12	NG	82	10.8	111.4	98	90	1
LOCATION:		FOOTING BACKFILL NORTHEAST OF FOOTING F-6.5						

SMITH-EMERY COMPANY - LOS ANGELES
TABLE 1

SMITH-EMERY COMPANY

July 14, 1989

SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY

SG-Subgrade FSG-Finish Subgrade
FG-Finish Grade FAB-Finish Agg. Base
AB-Aggregate Base BTM-Bottom

METHOD KEY

SC-Sandcone
NG-Nuclear Gauge
DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
25	9-12	NG	82	8.6	111.5	98	90	1
LOCATION:		FOOTING BACKFILL SOUTHWEST OF FOOTING F-6.5						
26	9-12	NG	82	6.7	113.3	99	90	1
LOCATION:		FOOTING BACKFILL NORTHEAST OF FOOTING F-7.4						
27	9-12	NG	82	9.5	110.2	97	90	1
LOCATION:		FOOTING BACKFILL SOUTHWEST OF FOOTING F-7.4						
28	9-12	NG	FSG-1.5	8.1	107.4	98	90	2
LOCATION:		STORM DRAIN TRENCH BACKFILL S OF BLDG PAD 50' W OF END						
29	9-12	NG	FSG-1.5	9.9	111.2	100+	90	2
LOCATION:		STORM DRAIN TRENCH BACKFILL S OF BLDG PAD 50' W OF END						
30	9-13	NG	FSG-1.5	6.1	113.4	99	90	1
LOCATION:		STORM DRAIN TRENCH W OF BLDG PAD 30' N OF S END						
31	9-13	NG	FSG-1.5	5.7	114.5	100	90	1
LOCATION:		STORM DRAIN W OF BLDG PAD LATERAL LINE 3' E OF MAIN TRENCH						
32	9-13	NG	FSG-1.5	6.6	113.6	99	90	1
LOCATION:		WEST OF BUILDING PAD STORM DRAIN 20' N OF LINE						
33	9-13	NG	FSG-2.5	6.8	109.1	96	90	1
LOCATION:		WEST STORM DRAIN 20' NORTH OF SOUTH END						
34	9-13	NG	FSG-2.5	7.5	112.1	98	90	1
LOCATION:		WEST STORM DRAIN 150' NORTH OF SOUTH END						
35	9-14	NG	FSG	7.1	106.2	93	90	1
LOCATION:		STORM DRAIN TRENCH BACKFILL W OF BLDG PAD N END						
36	9-14	NG	FSG	9.5	104.0	91	90	1
LOCATION:		STORM DRAIN WEST OF BUILDING PAD SOUTH END						

SMITH-EMERY COMPANY

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SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY		METHOD KEY
SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
37	9-14	NG	FSG	10.1	102.6	90	90	1
LOCATION:		STORM DRAIN SOUTH OF BUILDING PAD EAST END						
38	9-15	NG	FG-6	13.6	105.4	92	90	1
LOCATION:		SEWERLINE TIE IN BACKFILL						
39	9-15	NG	-5	8.6	110.0	96	90	1
LOCATION:		SEWERLINE TIE IN BACKFILL						
40	9-15	NG	-4	11.3	105.9	93	90	1
LOCATION:		SEWERLINE TIE IN BACKFILL						
41	9-15	NG	-3	12.7	109.2	96	90	1
LOCATION:		SEWERLINE TIE IN BACKFILL						
42	9-15	NG	-2	10.9	109.1	96	90	1
LOCATION:		SEWERLINE TIE IN BACKFILL						
43	9-16	SC	FG-1	12.1	108.4	95	90	1
LOCATION:		SEWERLINE TRENCH TIE IN BACKFILL						
44	9-16	SC	FG	13.9	106.8	94	90	1
LOCATION:		SEWERLINE TRENCH TIE IN BACKFILL						
45	9-19	NG	FG-1	5.8	107.3	94	90	1
LOCATION:		SOUTH END OF WESTERN STORM DRAIN						
46	9-20	NG	83	7.0	112.3	98	90	1
LOCATION:		FOOTING BACKFILL NORTH OF FOOTING F-7.4						
47	9-20	NG	83	4.0	107.6	94	90	1
LOCATION:		FOOTING BACKFILL SOUTH OF FOOTING F-7.4						
48	9-21	NG	77.5	10.4	110.5	97	90	1
LOCATION:		EAST OF FOOTING #A.9 AT 6.2						

SMITH-EMERY COMPANY

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Torrance, California

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SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
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AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
49	9-22	NG	BTM-1.5	7.4	106.5	93	90	1
LOCATION:		FOOTING #6 AT A.9						
50	9-22	NG	BTM.2	9.0	102.3	90	90	1
LOCATION:		FOOTING #7.4 AT C.7						
51	9-22	NG	BTM	7.6	105.9	93	90	1
LOCATION:		FOOTING #6 AT A.9						
52	9-22	NG	BTM-1	7.7	110.2	97	90	1
LOCATION:		FOOTING #7.4 AT C.7						
53	9-22	NG	FG	8.4	107.8	95	90	1
LOCATION:		WEST STORM DRAIN BACKFILL SOUTH END						
54	9-22	NG	79.5	9.5	99.6	87	90	1
LOCATION:		WEST OF FOOTING 6.7 AT A.9, TEST FAILED						
55	9-22	NG	79.5	9.2	106.8	94	90	1
LOCATION:		RETEST OF TEST NO. 54						
56	9-22	NG	BTM	7.9	107.6	94	90	1
LOCATION:		FOOTING #7.4 AT C.7						
57	9-23	SC	FG.3	9.5	109.4	96	90	1
LOCATION:		STORM DRAIN EAST/WEST TRENCH BACKFILL CENTER						
58	9-23	SCFTB/BTM+4		9.3	109.4	96	90	1
LOCATION:		SOUTHEAST OF FOOTING #6.7 AT A.9						
59	9-23	SC	FG-1.75	11.1	111.6	98	90	1
LOCATION:		STORM DRAIN NORTH/SOUTH TRENCH BACKFILL CENTER						
60	9-23	NG	FG-1.25	10.7	107.4	94	90	1
LOCATION:		STORM DRAIN EAST/WEST TRENCH BACKFILL EAST END						

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FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
61	9-23	NG	FG	10.1	109.4	96	90	1
LOCATION:		STORM DRAIN EAST/WEST TRENCH WEST CENTRAL AREA						
62	9-23	NG	FG	12.3	108.5	95	90	1
LOCATION:		STORM DRAIN NORTH/SOUTH TRENCH NORTH END						
63	9-23	NG	FG-2.5	11.7	104.0	91	90	1
LOCATION:		ELECTRICAL VAULT TRENCH TO TRANSFORMER SOUTH CENTRAL						
64	9-23	NG	FG	8.5	111.5	98	90	1
LOCATION:		STORM DRAIN EAST/WEST TRENCH EAST END						
65	9-26	NG	BTM+1	11.1	106.9	94	90	1
LOCATION:		SOUTH OF FOOTING 0.1 AT C.5						
66	9-26	NG	BTM+2	12.1	108.8	95	90	1
LOCATION:		NORTH OF FOOTING 0.1 AT C.5						
67	9-26	NG	BTM+3	11.2	102.6	90	90	1
LOCATION:		NORTH OF FOOTING 0.1 AT C.2						
68	9-27	NG	TOF	9	104.0	91	90	1
LOCATION:		EAST OF FOOTING 0.1 AT C.2						
69	9-27	NG	TOF-2	11.9	108.9	95	90	1
LOCATION:		BETWEEN FOOTING D7 AT 0.1 AND E.3 AT D.1						
70	9-28	SC	TOF	8.1	109.2	96	90	1
LOCATION:		BETWEEN FOOTING LINE E.3 0.1 AND 1.1						
71	9-28	SC	TOF	10.2	110.4	97	90	1
LOCATION:		EAST OF FOOTING E.3 #0.1						
72	9-28	SC	TOF	12.8	107.3	94	90	1
LOCATION:		SOUTH OF FOOTING C.7 #0.1						

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SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
73	9-28	SC	TOF-2	8.1	109.4	96	90	1
LOCATION:		BETWEEN FOOTING #0.1 LINE AA.1 AND A.2						
74	9-28	NG	SG-1.5	10.0	107.8	95	90	1
LOCATION:		ELECTRICAL TRENCH AT CURB						
75	9-29	NG	TOF-1.25	11.3	105.7	93	90	1
LOCATION:		BETWEEN FOOTING LINE AA.1 AND #3.4 23.7						
76	9-29	NG	TOF	8.4	105.2	92	90	1
LOCATION:		LINE A AT 0.1						
77	9-29	NG	TOF-1.5	11.7	106.8	94	90	1
LOCATION:		LINE G.9 BETWEEN # 7 AND 7.9						
78	9-29	NG	FSG	6.6	107.4	94	90	1
LOCATION:		ELECTRICAL SERVICE TRENCH IN PARKING LOT						
79	9-29	NG	FSG-2	15.0	102.1	90	90	1
LOCATION:		ELECTRICAL SERVICE TRENCH WEST OF CURB						
80	9-29	NG	TOF	8.6	103.8	91	90	1
LOCATION:		LINE AA.1 WEST OF 3.4						
81	9-29	NG	TOF	10.2	106.5	93	90	1
LOCATION:		LINE G.9 WEST OF 7.9						
82	9-29	NG	TOF-1.5	10.5	110.7	97	90	1
LOCATION:		LINE AA AT #6						
83	9-30	NG	TOF-1	10.7	108.2	95	90	1
LOCATION:		SOUTH OF F.6 AT 7.9						
84	9-30	NG	TOF	10.0	106.3	93	90	1
LOCATION:		NORTH OF A.3 AT 6.2						

SMITH-EMERY COMPANY - LOS ANGELES
TABLE 1

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Coastal Division Headquarters
Torrance, California

ELEVATION KEY		METHOD KEY
SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
85	9-30	NG	SG	5.7	104.2	91	90	1
LOCATION:		ELECTRICAL SERVICE TRENCH WEST OF CURB						
86	9-30	NG	SG	9.7	106.4	93	90	1
LOCATION:		ELECTRICAL SERVICE TRENCH EAST OF VAULT						
87	9-30	NG	TOF	8.0	105.8	93	90	1
LOCATION:		ON AA EAST OF 5.9						
88	9-30	NG	TOF	10.6	111.3	98	90	1
LOCATION:		ON 8 NORTH OF F.6						
89	10-3	NG	TOF-1.5	11.6	110.9	97	90	1
LOCATION:		ON G.9 BETWEEN 4 + 3.8						
90	10-3	NG	SG	11.6	105.5	92	90	1
LOCATION:		ELECTRICAL TRENCH 50' NORTH OF VAULT						
91	10-3	NG	SG	10.5	106.3	93	90	1
LOCATION:		ELECTRICAL TRENCH 20' SOUTH OF TRANSFORMER						
92	10-3	NG	SG	8.2	102.3	90	90	1
LOCATION:		ELECTRICAL TRENCH 20' WEST OF BUILDING						
93	10-4	NG	TOF	12.0	105.6	93	90	1
LOCATION:		ON 3.8 BETWEEN 6.9 AND F.7						
94	10-4	NG	TOF-1.5	10.8	107.4	94	90	1
LOCATION:		WEST OF FOOTING AT 3.8						
95	10-4	NG	TOF-2	10.9	110.0	96	90	1
LOCATION:		ON B WEST OF 6.2						
96	10-4	NG	TOF	9.8	106.1	93	90	1
LOCATION:		ON B.3 WEST OF 6.7						

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Torrance, California

ELEVATION KEY			METHOD KEY
SG-Subgrade	FSG-Finish Subgrade		SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base		NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom		DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
97	10-5	SC	TOF-2	10.1	107.7	94	90	1
LOCATION:		NORTH OF D AT 7						
98	10-5	SC	TOF-2	8.9	106.9	94	90	1
LOCATION:		NORTH OF E.6 AT 7.4						
99	10-5	SC	TOF	8.9	104.8	92	90	1
LOCATION:		SOUTH OF EG AT 7.4						
100	10-5	SC	TOF	9.1	108.4	95	90	1
LOCATION:		SOUTH OF D AT 6						
101	10-5	SC	TOF	10.3	112.9	99	90	1
LOCATION:		BETWEEN D.2 AND D.4 WEST OF 5.4						
102	10-5	SC	TOF	7.9	106.6	93	90	1
LOCATION:		EAST OF 3.8 ON F						
103	10-5	SC	SG-1.5	9.3	109.2	96	90	1
LOCATION:		SOUTHWEST TRENCH 5' EAST OF WEST SIDE OF BUILDING						
104	10-6	NG	TOF-2	11.3	108.8	95	90	1
LOCATION:		NORTH OF D-6						
105	10-6	NG	TOF	12.4	107.6	94	90	1
LOCATION:		SOUTH OF D-7						
106	10-6	NG	TOF	103.9	10.2	91	90	1
LOCATION:		ON E.9 EAST OF 2.1						
107	10-6	NG	TOF-2	12.1	108.8	95	90	1
LOCATION:		ON 5.1 NORTH OF B.5						
108	10-7	NG	TOF	8.9	109.9	96	90	1
LOCATION:		ON E EAST OF 3.8						

SMITH-EMERY COMPANY - LOS ANGELES
TABLE 1

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Torrance, California

ELEVATION KEY		METHOD KEY
SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
109	10-7	NG	TOF-2	10.6	112.7	99	90	1
LOCATION:		ON C.3 WEST OF 5.1						
110	10-7	NG	TOF	8.7	107.7	94	90	1
LOCATION:		ON 5.1 SOUTH OF B.8						
111	10-10	NG	TOF	11.4	107.8	94	90	1
LOCATION:		SOUTH OF B-5						
112	10-10	NG	TOF	6.8	107.3	94	90	1
LOCATION:		NORTH OF C-4						
113	10-10	NG	TOF	7.1	106.4	93	90	1
LOCATION:		NORTH OF B-4						
114	10-10	NG	TOF	9.0	105.9	93	90	1
LOCATION:		WEST OF B-3						
115	10-10	NG	TOF	10.7	106.9	94	90	1
LOCATION:		EAST OF F-6.5						
116	10-10	NG	TOF	10.8	103.5	91	90	1
LOCATION:		EAST OF F-4.1						
117	10-10	NG	TOF	12.1	104.1	91	90	1
LOCATION:		EAST OF C-3						
118	10-10	NG	TOF	7.0	106.1	93	90	1
LOCATION:		NORTH OF C-4						
119	10-10	NG	TOF	9.3	103.1	90	90	1
LOCATION:		SOUTH OF C-2						
120	10-10	NG	TOF	9.2	107.9	96	90	1
LOCATION:		SOUTH OF D-3						

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RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
121	10-13	NG	SG	12.3	108	95	90	1
LOCATION:		AT SOUTH WEST TRENCH D.6 AND 6.4						
122	10-13	NG	SC	9.3	106.6	93	90	1
LOCATION:		PLUMBING TRENCH ON G.9 BETWEEN 4.8 AND 4.1						
123	10-20	SC	TOF FSG	11.0	107.0	94	90	1
LOCATION:		BACKFILL AT LINE AA/LINE 6						
124	10-20	SC	TOF	10.0	104.0	92	90	1
LOCATION:		BACKFILL AT LINE A BETWEEN LINE 5 & 5.9						
125	10-20	SC	TOF	16.0	105.0	92	90	1
LOCATION:		BACKFILL AT LINE A BETWEEN LINE 4 & 5						
126	10-20	SC	TOF	12.0	103.0	90	90	1
LOCATION:		BACKFILL AT LINE AA BETWEN LINE 3.4 & 3.7						
127	10-24	SC	TOF	16.0	103.0	96	90	2
LOCATION:		BACKFILL AT LINE F & LINE 3.8						
128	10-24	SC	TOF FSG	11.0	107.0	99	90	2
LOCATION:		BACKFILL AT LINE F.7 & LINE 3.8						
129	10-24	SC	TOF FSG	10.0	102.0	94	90	2
LOCATION:		BACKFILL AT LINE F & LINE 4.1						
130	10-24	SC	TOF FSG	13.0	102.0	94	90	2
LOCATION:		BACKFILL AT LINE 4.7 & LINE F						
131	10-24	SC	TOF FSG	10.0	104.0	96	90	2
LOCATION:		BACKFILL AT LINE F & BETWEEN LINE 6.5 & 7.4						
132	10-24	SC	TOF FSG	9.0	101.0	94	90	2
LOCATION:		BACKFILL AT LINE F.6 & LINE 7.9						

SMITH-EMERY COMPANY - LOS ANGELES
TABLE 1

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RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
133	10-24	SC	TOF FSG	11.0	102.0	94	90	2
LOCATION:		BACKFILL AT LINE H & LINE 7.9						
134	10-25	SC	FSG	7.0	102.0	94	90	2
LOCATION:		BACKFILL SEWER LINE AT LINE C & LINE 6.4						
135	10-25	SC	FSG	13.0	105.0	97	90	2
LOCATION:		BACKFILL SEWERLINE AT LINE C.6 & LINE 6.2						
136	10-31	NG	FSG	7.9	105.5	93	90	1
LOCATION:		BACKFILL ALONG LINE 3 BETWEEN LINES E & E.6						
137	10-31	NG	FSG	10.5	102.6	90	90	1
LOCATION:		BACKFILL ALONG LINE E.6 BETWEEN LINES 2 & 3						
138	10-31	NG	FSG	6.7	106.5	93	90	1
LOCATION:		BACKFILL ALONG LINE E.9 BETWEEN LINES 1 & 2						
139	10-31	NG	FSG	9.5	109.0	95	90	1
LOCATION:		BACKFILL ALONG LINE 3 BETWEEN LINES F & E						
140	10-31	NG	FSG	8.6	105.7	93	90	1
LOCATION:		BACKFILL ALONG LINE E BETWEEN LINES 3 & 4						
141	10-31	NG	FSG	9.0	105.0	92	90	1
LOCATION:		BACKFILL ALONG LINE E BETWEEN LINES 5 & 6						
142	10-31	NG	FSG	12.3	106.0	93	90	1
LOCATION:		BACKFILL ALONG LINE 5A BETWEEN LINES D.6 & D.7						
143	10-31	NG	FSG	10.0	106.5	93	90	1
LOCATION:		BACKFILL ALONG LINE B.3 BETWEEN LINES 1 & 2						
144	10-31	NG	FSG	10.0	109.4	96	90	1
LOCATION:		BACKFILL ALONG LINE 1 BETWEEN LINES B & A.5						

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RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
145	10-31	NG	FSG	12.8	106.3	93	90	1
LOCATION:		BACKFILL ALONG LINE 0.1 BETWEEN LINES A.2 & A.5						
146	10-31	NG	FSG	12.5	104.0	91	90	1
LOCATION:		BACKFILL ALONG LINE AA BETWEEN LINES 0.1 & 1						
147	10-31	NG	FSG	12.1	98.5	86	90	1
LOCATION:		BACKFILL ALONG LINE A BETWEEN LINES 1.1 & 2, TEST FAILED						
148	10-31	NG	FSG	9.7	97.0	85	90	1
LOCATION:		BACKFILL ALONG LINE A BETWEEN LINES 2 & 3						
149	10-31	NG	FSG	11.9	105.8	93	90	1
LOCATION:		RETEST OF TEST NO. 147						
150	10-31	NG	FSG	9.8	108.8	95	90	1
LOCATION:		RETEST OF TEST NO. 148						
151	11-1	NG	FSG	6.4	105.5	93	90	1
LOCATION:		BACKFILL ALONG LINE 1.7 BETWEEN LINES E & E.7						
152	11-1	NG	FSG	9.7	105.2	97	90	2
LOCATION:		BACKFILL ALONG LINE E BETWEEN LINES 1 & 2						
153	11-1	NG	FSG	8.8	109.8	96	90	1
LOCATION:		BACKFILL ALONG LINE O BETWEEN LINES D.7 & E						
154	11-1	NG	FSG	10.3	110.5	97	90	1
LOCATION:		BACKFILL ALONG LINE 1 BETWEEN LINES D & D.6						
155	11-2	NG	FSG	3.7	105.2	92	90	1
LOCATION:		BUILDING PAD AREA BETWEEN LINES F6 & F7						
156	11-2	NG	FSG	3.2	105.4	92	90	1
LOCATION:		BUILDING PAD AREA BETWEEN LINES F5 & F6						

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FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
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RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
157	11-2	NG	FSG	3.0	106.6	93	90	1
LOCATION:		BUILDING PAD AREA BETWEEN LINES F4 & F5						
158	11-2	NG	FSG	6.3	109.7	96	90	1
LOCATION:		BACKFILL ALONG LINE D BETWEEN LINES 6.6 & 6.4						
159	11-2	NG	FSG	4.5	109.1	96	90	1
LOCATION:		BACKFILL ALONG LINE D BETWEEN LINES 7 & 6.6						
160	11-2	NG	FSG	10.0	109.4	96	90	1
LOCATION:		BACKFILL ALONG LINE 7.4 BETWEEN LINES C.7 & C.8						
161	11-3	NG	FSG	10.6	108.1	95	90	1
LOCATION:		BACKFILL ALONG LINE O BETWEEN LINES C.2 & 1.5						
162	11-3	NG	FSG	6.7	109.0	96	90	1
LOCATION:		BACKFILL ALONG LINE 5.4 BETWEEN LINES 5 & D.5						
163	11-3	NG	FSG	6.7	110.8	97	90	1
LOCATION:		BACKFILL ALONG LINE B.4 BETWEEN LINES 8 & 6.7						
164	11-3	NG	FSG	6.9	107.8	95	90	1
LOCATION:		BACKFILL ALONG LINE B.7 BETWEEN LINES 6.7 & 6.2						
165	11-3	NG	FSG	2.4	97.3	85	90	1
LOCATION:		BACKFILL ALONG LINE G6 BETWEEN LINES 7 & 6, TEST FAILED						
166	11-3	NG	FSG	6.3	97.1	85	90	1
LOCATION:		BACKFILL ALONG LINE G6 BETWEEN LINES 7 & 6, TEST FAILED						
167	11-3	SC	SG	7.9	113.2	99	90	1
LOCATION:		RETEST OF TEST NO. 165 AND 166						
168	11-7	SC	SG-2	10.2	106.3	96	90	3
LOCATION:		SOUTH OF B BETWEEN 6.2 AND 6.7						

SMITH-EMERY COMPANY - LOS ANGELES
TABLE 1

SMITH-EMERY COMPANY

July 14, 1989

SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY		METHOD KEY
SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
169	11-7	SC	SG	9.7	105.0	95	90	3
LOCATION:		ON D.4 WEST OF 5.4						
170	11-7	SC	SG	16.7	108.8	98	90	3
LOCATION:		ON B.3 EAST OF 6.7						
171	11-7	SC	SG	16.8	107.9	97	90	3
LOCATION:		SOUTH OF E.6 BETWEEN 7 & 6.6						
172	11-8	SC	SG-2	6.6	107.3	94	90	1
LOCATION:		NORTH OF A9 BETWEEN 6.2/6.7						
173	11-8	SC	SG-2	7.9	105.7	93	90	1
LOCATION:		WEST OF 6.7 BETWEEN B/B.3						
174	11-8	SC	SG	9.1	106.4	93	90	1
LOCATION:		WEST OF 8 ON G						
175	11-15	NG	SG	16.6	111.4	100	90	3
LOCATION:		ON A.2 EAST OF 0						
176	11-15	NG	SG	20.5	107.8	97	90	3
LOCATION:		ON B EAST OF 1						
177	11-16	NG	SG	21.0	107.6	97	90	3
LOCATION:		ON D.7 EAST OF 0.1						
178	11-16	NG	SG	19.2	108.8	98	90	3
LOCATION:		ON D EAST OF 1						
179	11-16	NG	SG	30.1	107.5	97	90	3
LOCATION:		ON C.2 EAST OF 0.1						
180	11-16	NG	SG	8.6	104.2	91	90	1
LOCATION:		ON 2 EAST OF A						

SMITH-EMERY COMPANY - LOS ANGELES
TABLE 1

SMITH-EMERY COMPANY

July 14, 1989

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Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY			METHOD KEY
SG-Subgrade	FSG-Finish Subgrade		SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base		NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom		DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
181	11-18	SC	SG	8.9	104.2	91	90	1
LOCATION:		NORTH OF A EAST OF 5						
182	11-18	SC	SG	15.2	105.9	95	90	3
LOCATION:		SOUTH OF E.7 EAST OF 2.9						
183	11-18	SC	SG	14.7	108.3	97	90	3
LOCATION:		ON F.7 EAST OF 3.8						
184	11-21	NG	SG	7.1	105.9	93	90	1
LOCATION:		SOUTH OF G ON 6						
185	11-21	NG	SG	6.5	106.3	93	90	1
LOCATION:		BETWEEN E & E.6 WEST OF 7.4						
186	11-21	NG	SG	6.7	106.0	93	90	1
LOCATION:		EAST OF 7.5 SOUTH OF D						
187	11-28	NG	FTG-10	13.1	109.5	96	90	1
LOCATIION:		FOOTING NORTH ELECTRICAL VAULT						
188	11-28	NG	12"	10.6	107.1	94	90	1
LOCATION:		BACKFILL IN TRASH ENCLOSURE BETWEEN FOOTINGS SOUTHWEST						
189	11-29	SC	BTM-6"	11.1	114.0	100	90	1
LOCATION:		TRASH ENCLOSURE BOTTOM						
190	11-29	SC	BTM	13.0	113.9	100	90	1
LOCATION:		MICROWAVE WALL FOOTING						
191	12-14	SC	FSG	11.0	107.0	94	90	1
LOCATION:		BACKFILL WALL FOOTING AT LINE F2 TRASH ENCLOSEMENT						
192	12-14	SC	FSG	9.0	107.0	94	90	1
LOCATION:		BACKFILL WALL FOOTING AT LINE F6 TRASH ENCLOSEMENT						

SMITH-EMERY COMPANY

July 14, 1989

SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY		METHOD KEY
SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
193	12-14	SC	FSG	9.0	106	93	90	1
LOCATION:		BACKFILL BETWEEN LINE F2 & F6 & LINE 7.9						
194	12-29	SC	FSG	11.0	113.0	99	90	1
LOCATION:		BACKFILL SOUTHWEST AT LINE 6.8 & LINE H.1						
195	12-29	SC	FSG	10.0	112.0	98	90	1
LOCATION:		BACKFILL SOUTHWEST AT LINE 3.8 & LINE H.1						
196	1-11	SC	SG-1	13.8	111.3	98	90	1
LOCATION:		BACKFILL WALL PROPANE TANK ENCLOSURE						
197	1-11	SC	SG-0.5	12.5	105.7	93	90	1
LOCATION:		BACKFILL WALL PROPANE TANK ENCLOSURE						
198	1-11	SC	FSG	8.4	111.3	98	90	1
LOCATION:		BACKFILL WALL PROPANE TANK ENCLOSURE						
199	1-11	SC	SG-1	11.1	107.2	94	90	1
LOCATION:		BACKFILL WALL TRASH ENCLOSURE						
200	1-26	SC	FSG	8.1	111.4	98	90	1
LOCATION:		STEP & WALKWAY AREA LINES 8, B.5						
201	1-26	SC	FSG	9.8	104.9	92	90	1
LOCATION:		STEP & WALKWAY AREA LINES 8, C.2						
202	2-2	SC	-1FSG	9.0	103	90	90	1
LOCATION:		BACKFILL STORM DRAIN E OF LINE O, BETWEEN LINE C.5 & D						
203	2-2	SC	-1FSG	8.0	108	95	90	1
LOCATION:		BACKFILL STORM DRAIN E OF LINE O & @ LINE B						
204	2-2	SC	-1FSG	9.0	107	94	90	1
LOCATION:		BACKFILL STORM DRAIN @ LINE 3.3 & @ LINE H						

SMITH-EMERY COMPANY

July 14, 1989

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Torrance, California

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SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
205	2-2	SC	FSG	10.0	111	97	90	1
LOCATION:		BACKFILL STORM DRAIN @ LINE 3.3 & @ LINE G						
206	2-2	SC	FSG	7.0	109	95	90	1
LOCATION:		BACKFILL STORM DRAIN E OF LINE O & @ LINE D.4						
207	2-2	SC	FSG	10.0	107	94	90	1
LOCATION:		BACKFILL STORM DRAIN E OF LINE O & @ LINE B.7						
208	2-3	SC	FSG	10.0	104	91	90	1
LOCATION:		BACKFILL STORM DRAIN N OF PROPANE TANK ENCLOSURE & @ LINE D.						
209	2-3	SC	FSG	9.0	106	93	90	1
LOCATION:		BACKFILL STORM DRAIN E OF LINE O & @ LINE A						
210	2-7	SC	FSG	11.7	102.4	90	90	1
LOCATION:		BACKFILL STORM DRAIN NORTHWEST						
211	2-7	SC	FSG	11.7	103.8	91	90	1
LOCATION:		BACKFILL STORM DRAIN NORTHWEST						
211A	2-20	SC	-1'FSG	7	105	92	90	1
LOCATION:		39' NORTH EDGE TRENCH LPG LINE						
212	2-20	SC	-1'FSG	6	102.1	90	90	1
LOCATION:		15' NORTH EDGE TRENCH LPG LINE						
213	2-21	SC	FSG	8	107	93	90	1
LOCATION:		BACKFILL @ 90' LPG LINE EDGE TRENCH						
214	2-21	SC	FSG	8	104	92	90	1
LOCATION:		BACKFILL @ 143' LPG LINE EDGE TRENCH						

SMITH-EMERY COMPANY

July 14, 1989

SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY

SG-Subgrade FSG-Finish Subgrade
FG-Finish Grade FAB-Finish Agg. Base
AB-Aggregate Base BTM-Bottom

METHOD KEY

SC-Sandcone
NG-Nuclear Gauge
DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
215	2-21	SC	3-FSG	9	106	93	90	1
LOCATION:		BACKFILL @ 165' LPG LINE EDGE TRENCH						
216	2-22	SC	-1FSG	6	103	90	90	1
LOCATION:		BACKFILL TRENCH LPG LINE 155' NORTH EDGE TRENCH						
217	2-22	SC	FSG	9	106	93	90	1
LOCATION:		BACKFILL TRENCH LPG LINE 172' NORTH EDGE TRENCH						
218	2-28	SC	-2'SG	6.7	100.5	88	90	1
LOCATION:		FIRELINE TRENCH THRU S END OF PARKING LOT, TEST FAILED						
219	2-28	SC	-2'SG	6.3	102.4	90	90	1
LOCATION:		FIRELINE TRENCH THRU S END OF PARKING LOT						
220	2-28	SC	-2'SG	9.6	108.2	95	90	1
LOCATION:		FIRELINE TRENCH THRU S END OF PARKING LOT						
221	2-28	SC	-2'SG	7.2	102.6	90	90	1
LOCATION:		FIRELINE TRENCH THRU S END OF PARKING LOT						
222	2-28	SC	-2'SG	7.9	105.4	92	90	1
LOCATION:		FIRELINE TRENCH BACKFILL W OF BLDG N THRU PRKNG LOT						
223	2-28	SC	-2'SG	8.3	111.9	98	90	1
LOCATION:		FIRELINE TRENCH BACKFILL W OF BLDG N THRU PRKNG LOT						
224	2-28	SC	-2'SG	7.7	106.0	93	90	1
LOCATION:		FIRELINE TRENCH BACKFILL W OF BLDG N THRU PRKNG LOT						
225	2-28	SC	-2'SG	7.6	106.1	93	90	1
LOCATION:		FIRELINE TRENCH BACKFILL @ NW CORNER OF BLDG						
226	2-28	SC	-2'SG	8.6	108.9	96	90	1
LOCATION:		FIRELINE TRENCH BACKFILL N SIDE OF BLDG						

SMITH-EMERY COMPANY

July 14, 1989

SECo File No.: 17805
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Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY		METHOD KEY
SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
227	2-28	SC	-2'SG	7.1	105.4	92	90	1
LOCATION:		FIRELINE TRENCH BACKFILL @ N SIDE OF BLDG						
228	2-28	SC	-2'SG	7.4	103.4	91	90	1
LOCATION:		RETEST OF TEST NO. 218						
229	3-15	SC	1-FSG	7.1	104.3	91	90	1
LOCATION:		STORM DRAIN N SIDE PARKING LOT LINE A/COLUMN 3.7-3.4						
230	3-15	SC	FSG	6	96.6	84	90	1
LOCATION:		FIRE HYDRANT SE CORNER PARKING LOT/LINE D, TEST FAILED						
231	3-15	SC	FSG	12.7	1126	98	90	1
LOCATION:		S SIDE STORM DRAIN N SIDE PARKING LOT LINE A/3.7-3.4						
232	3-24	SC	18"FG	7.5	106.2	93	90	1
LOCATION:		BACKFILL TRENCH NORTH SECTION						
233	3-27	SC	FG	18	106.4	93	90	1
LOCATION:		BACKFILL TRENCH NORTHWEST SECTION						
234	3-27	SC	FG	16	108.9	95	90	1
LOCATION:		BACKFILL TRENCH SOUTH SECTION						
234A	4-19	SC	FSG	6.7	114.1	100	90	1
LOCATION:		BUILDING PAD SUTH SIDEWALK						
235	4-19	SC	FSG	6.0	117.2	100+	90	1
LOCATION:		BUILDING PAD WEST SIDEWALK						
236	4-24	SC	FSG	5.2	104.3	91	90	1
LOCATION:		SOUTHEAST DRIVE APPROACH						
237	4-24	SC	FSG	10.2	109.3	95	90	1
LOCATION:		SOUTHEAST DRIVE APPROACH						

SMITH-EMERY COMPANY

July 14, 1989

SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY

SG-Subgrade FSG-Finish Subgrade
FG-Finish Grade FAB-Finish Agg. Base
AB-Aggregate Base BTM-Bottom

METHOD KEY

SC-Sandcone
NG-Nuclear Gauge
DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
238	4-24	SC	FSG	10.7	104.9	92	90	1
LOCATION:		SOUTHEAST DRIVE APPROACH						
239	5-1	SC	FSG	4.8	109.5	96	90	1
LOCATION:		NORTH PARKING STALL						
240	5-1	SC	FSG	5.6	103.3	90	90	1
LOCATION:		NORTH PARKING STALL						
241	5-1	SC	FSG	6.7	109.4	96	90	1
LOCATION:		NORTH PARKING STALL						
242	5-1	SC	FSG	6.3	110.3	96	90	1
LOCATION:		NORTHEAST PARKING STALL						
243	5-1	SC	FSG	7.5	109.3	95	90	1
LOCATION:		NORTHEAST PARKING STALL						
244	5-1	SC	FSG	9.0	108.2	94	90	1
LOCATION:		NORTH PARKING LOT						
245	5-1	SC	FSG	8.6	109.0	95	90	1
LOCATION:		NORTH PARKING LOT						
246	5-1	SC	FSG	10.2	115.4	100+	90	1
LOCATION:		NORTH PARKING LOT						
247	5-1	SC	FSG	6.7	112.7	98	90	1
LOCATION:		NORTH PARKING LOT						
248	5-1	SC	FSG	6.3	113.0	99	90	1
LOCATION:		NORTH PARKING LOT						
249	5-5	SC	FSG	5.8	112.0	98	90	1
LOCATION:		NORTH PARKING LOT 2ND STALL SOUTH END						

SMITH-EMERY COMPANY

July 14, 1989

SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

ELEVATION KEY

SG-Subgrade FSG-Finish Subgrade
FG-Finish Grade FAB-Finish Agg. Base
AB-Aggregate Base BTM-Bottom

METHOD KEY

SC-Sandcone
NG-Nuclear Gauge
DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
250	5-5	SC	FSG	7.2	109.3	96	90	1
LOCATION:		NORTH PARKING LOT 3RD STALL SOUTH END						
251	5-5	SC	FSG	4.7	111.9	98	90	1
LOCATION:		NORTH PARKING LOT 2ND STALL NORHT END						
252	5-5	SC	FSG	11.7	105.9	93	90	1
LOCATION:		NORTH PARKING LOT 3RD STALL NORTH END						
253	5-8	SC	FSG	1.5	110.2	97	90	1
LOCATION:		NORTH PARKING LOT 1ST STALL NORTHWEST CORNER						
254	5-8	SC	FSG	1.5	113.1	99	90	1
LOCATION:		NORTH PARKING LOT 2ND STALL WEST SIDE						
255	5-8	SC	FSG	1.5	112.2	98	90	1
LOCATION:		NORTH PARKING LOT 3RD STALL SOUTHWEST CORNER						
256	5-8	SC	FSG	5.5	106.1	93	90	1
LOCATION:		RETEST OF TEST NO. 253						
257	5-9	SC	FSG	14.2	98.2	86	90	1
LOCATION:		RETEST OF TEST NO. 254, TEST FAILED						
258	5-9	SC	FSG	5.9	98.7	87	90	1
LOCATION:		RETEST OF TEST NO. 255, TEST FAILED						
259	5-9	SC	FSG	6.8	101.8	90	90	1
LOCATION:		RETEST OF TEST NO. 256						
260	5-9	SC	FSG	5.3	106.7	94	90	1
LOCATION:		N PARKING LOT MIDDLE OF S SIDE 3RD STALL						
261	5-9	SC	FSG	7.8	107.8	95	90	1
LOCATION:		RETEST OF TEST NO. 257 & 258						

SMITH-EMERY COMPANY

July 14, 1989

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Coastal Division Headquarters
Torrance, California

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SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
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AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
262	5-9	SC	FSG	6.5	109.2	96	90	1
LOCATION:		N PARKING LOT S SIDE E CORNER						
263	5-11	SC	FAB	6.5	125.7	98	95	2
LOCATION:		N PARKING LOT SW CORNER						
264	5-11	SC	FAB	7.8	120.4	94	95	2
LOCATION:		N PARKING LOT S SIDE MIDDLE OF 4TH STALL, TEST FAILED						
265	5-11	SC	FAB	7.3	124.6	97	95	2
LOCATION:		RETEST OF TEST NO. 264						
266	5-11	SC	FAB	7.9	122.5	96	95	2
LOCATION:		N PARKING LOT SE SIDE OF 4TH STALL						
267	5-11	SC	FAB	11.1	125.3	98	95	2
LOCATION:		N PARKING LOT SE SIDE 3RD STALL						
268	5-12	SC	FAB	10.3	129.0	100	95	2
LOCATION:		N PARKING LOT SW SIDE 3RD STALL						
269	512	SC	FAB	9.6	121.0	95	95	2
LOCATION:		N PARKING LOT SE SIDE 2ND STALL						
270	5-12	SC	FAB	7.1	118.9	93	95	2
LOCATION:		N PARKING LOT OF NW SIDE IN 2ND STALL, TEST FAILED						
271	5-12	SC	FAB	6.4	120.7	94	95	2
LOCATION:		N PARKING LOT W SIDE BETWEEN 2ND/3RD STALL, TEST FAILED						
272	5-12	SC	FAB	7.8	130.3	94	95	2
LOCATION:		N PARKING LOT NW CORNER, TEST FAILED						
273	5-12	SC	FAB	7.4	122.1	95	95	2
LOCATION:		RETEST OF TEST NO. 270						

SMITH-EMERY COMPANY

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Project: Southern California Gas Company
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Torrance, California

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SG-Subgrade	FSG-Finish Subgrade	SC-Sandcone
FG-Finish Grade	FAB-Finish Agg. Base	NG-Nuclear Gauge
AB-Aggregate Base	BTM-Bottom	DT-Drive Tube

RESULTS OF DENSITY TESTS

Test No.:	Date	Test Type	Elev. Depth (ft.)	Moisture Content (%)	Dry Density (p.c.f.)	Relative Compaction Field (%)	Relative Compaction Specified (%)	Soil Type
274	5-12	SC	FAB	8.4	123.9	97	95	2
LOCATION:		N PARKING LOT E SIDE AT 3RD STALL						
275	5-12	SC	FAB	7.5	126.3	99	95	2
LOCATION:		RETEST OF TEST NO. 271						
276	5-12	SC	FAB	7.6	122.6	96	95	2
LOCATION:		RETEST OF TEST NO. 272						
277	5-12	SC	FAB	7.8	123.0	96	95	2
LOCATION:		SE SIDE IN 1ST STALL						
278	5-12	SC	FAB	7.1	122.4	96	95	2
LOCATION:		SE SIDE OF 1ST STALL						
279	5-12	SC	FAB	9.1	124.1	97	95	2
LOCATION:		FAR NE CORNER OF N PARKING LOT						

SMITH-EMERY COMPANY - LOS ANGELES
TABLE 1

SMITH-EMERY COMPANY

July 14, 1989

SECo File No.: 17805
SECo Report No.: G-89-5676

Project: Southern California Gas Company
Coastal Division Headquarters
Torrance, California

RESULTS OF MAXIMUM DENSITY/OPTIMUM MOISTURE TESTS

Soil Type	Classification	Maximum Density (PCF)	Optimum Moisture, (%)
1	LIGHT BROWN SILTY SAND	114.0	12.0
2	BROWN SILT SAND	110.0	10.0
3	GRAY FINE TO MEDIUM SAND	108.0	14.0
4	GREEN FINE TO MEDIUM SAND	111.0	13.0
5	CLASS II CRUSHED MISC. BASE	128.0	7.5

SMITH-EMERY COMPANY - LOS ANGELES
TABLE 2

File No.: 17805
Report No.: G-89-5676

CITY OF TORRANCE

DEPARTMENT OF BUILDING & SAFETY

ENGINEER'S CERTIFICATE OF COMPLIANCE FOR COMPACTED EARTH FILLS

LOCATION OF FILL: Coastal Division Headquarters Parking Lot, Fine Grading and Trench Backfill

JOB ADDRESS: Crenshaw Boulevard and Sepulveda Boulevard

SOIL TESTING AGENCY: SMITH-EMERY COMPANY

PROPERTY OWNER'S NAME: Southern California Gas Company

OWNER'S ADDRESS: Section M/L 732A, P.O. Box 3749 Los Angeles, California

PER REPORTS ON OUR PROJECT NO. 17805

DATE WORK STARTED ON PROJECT: June 22, 1988

DATE FILL WAS COMPLETED: May 12, 1989

DATE OF THIS CERTIFICATE: July 14, 1989

TO THE SUPERINTENDENT OF THE BUILDING: Jerry Ellis

* I HEREBY CERTIFY THAT I HAVE PERSONALLY INSPECTED AND TESTED THE PLACING OF COMPACTED EARTH FILL ON THE ABOVE DESCRIBED PROPERTY, AND ON THE BASIS OF THESE INSPECTIONS AND TESTS IT IS MY OPINION THAT THE SAME WAS PLACED IN CONFORMITY WITH THE REQUIREMENTS OF THE CITY OF TORRANCE BUILDING CODE.

Luty Kuo

GEOTECHNICAL ENGINEER
CALIFORNIA CERTIFICATE NO. GE 90-043563

REGISTERED PROFESSIONAL ENGINEER
JEEF JANE-FU YANG
STATE OF CALIFORNIA
CIVIL

* FOR THE PURPOSE OF THIS CERTIFICATE, TO "HAVE PERSONALLY INSPECTED AND TESTED" SHALL INCLUDE INSPECTION AND TESTING PERFORMED BY ANY PERSON RESPONSIBLE TO THE LICENSED ENGINEER SIGNING THIS CERTIFICATE. WHERE THE INSPECTION AND TESTING OF ALL OR PART OF THE WORK ABOVE IS DELEGATED, FULL RESPONSIBILITY SHALL BE ASSUMED BY THE LICENSED ENGINEER WHOSE SIGNATURE IS AFFIXED THEREON.

HORN & ASSOC., INC.

4650 ARROW HWY., SUITE E-4, MONTCLAIR, CA 91763
714 - 624-1906 OR 624-1280

June 27, 1989

CITY OF TORRANCE
BUILDING DEPARTMENT
3031 Torrance Blvd.
Torrance, CA 90503

Atten: JIM SHELDON, Building Offical

Subject: FINAL GRADING CERTIFICATION

Ref. site: SO. CALIF. GAS CO., SOUTH COASTAL DIVISION HEADQUARTERS
Grading Plan by Carl W. Donmoyer & Assoc.,
Dwg. #C0.1, C1.1, Approved 6/16/88

Dear Mr. Sheldon:

We find the final grading of the above referenced site has been completed substantially per plan for line and grade.

Sincerely yours,

ALLEN D. MORRISON
RCE 11724, Exp. 12/31/92

REGISTERED CIVIL ENGINEER
ALLEN D. MORRISON
No. 11724
Exp. 12-31-92
STATE OF CALIFORNIA

ADM/pd
cc: 88-023

TDC
Transpacific Development Company

Corporate Headquarters
2377 Crenshaw Boulevard
Suite 300
Torrance, California 90501-3325
(213) 618-3600

June 9, 1988

CITY OF TORRANCE
Grading Division
Department of Building and Safety
3031 Torrance Boulevard
Torrance, CA 90501

ATTN: Mr. Bill Becker

RE: Acceptance of drainage from Parcel 2 of Parcel Map No. 19013 (P.M.B. 202/51-55)

Gentlemen:

We are the owners of Parcel 1 of Parcel Map No. 19013 (P.M.B. 202/51-55). The drainage runoff onto our property from Parcel 2 of Parcel Map No. 19013 as shown on the Grading and Drainage Plan for said Parcel 2 prepared by Carl W. Donmoyer and Associates, Inc. and dated April 27, 1988, is acceptable to us.

PARK DEL AMO OWNERS' ASSOCIATION, a California non-profit mutual benefit corporation

By _____
President

By _____
Attorney in fact

TDC
Transpacific Development Company

Corporate Headquarters
2377 Crenshaw Boulevard
Suite 300
Torrance, California 90501-3325
(213) 618-3600

June 9, 1988

CITY OF TORRANCE
Grading Division
Department of Building and Safety
3031 Torrance Bouevard
Torrance, CA 90501

ATTN: Mr. Bill Becker

RE: Acceptance of drainage from Pacel 2 of Parcel Map No. 19013 (P.M.B. 202/51-55)

Gentlemen:

We are the owners of Parcel 3 of Parcel Map No. 19013 (P.M.B. 202/51-55). The drainage runoff onto our property from Parcel 2 of Parcel Map No. 19013 as shown on the Grading and Drainage Plan for said Parcel 2 prepared by Carl W. Donmoyer and Associates, Inc. and dated April 27, 1988, is acceptable to us.

TORRANCE INVESTMENT CO., a general partnership
By: CGW&A COMPANY, a general partnership, partner
By: CRENSHAW ASSOCIATES, a general partnership, partner
By: SC ENTERPRISES, a limited partnership, partner

By: Shurl Curci
Shurl Curci, general partner

Date: 6-9-88 By [illegible] attorney in fact

TDC
Transpacific Development Company

Corporate Headquarters

2377 Crenshaw Boulevard
Suite 300
Torrance, California 90501-3325
(213) 618-3600

June 9, 1988

CITY OF TORRANCE
Grading Division
Department of Building and Safety
3031 Torrance Bouevard
Torrance, CA 90501

ATTN: Mr. Bill Becker

RE: Acceptance of drainage from Parcel 2 of Parcel Map No. 19013 (P.M.B. 202/51-55)

Gentlemen:

We are the owners of Lot 7 of Tract No. 44299 (M.B. 1068/53-60). The drainage runoff onto our property from Parcel 2 of Parcel Map No. 19013 as shown on the Grading and Drainage Plan for said Parcel 2 prepared by Carl W. Donmoyer and Associates, Inc. and dated April 27, 1988, is acceptable to us.

TORRANCE INVESTMENT CO., a general partnership
By: CGW&A COMPANY, a general partnership, partner
By: CRENSHAW ASSOCIATES, a general partnership, partner
By: SC ENTERPRISES, a limited partnership, partner

By: Shurl Curci
Shurl Curci, general partner By [illegible] attorney in fact

Date: 6-9-88

SOUTHERN CALIFORNIA gas COMPANY
BOX 3249 TERMINAL ANNEX, LOS ANGELES, CALIFORNIA 90051

TRANSMITTAL

Date June 30, 1988

To: Mr. Bill Becker
City of Torrance
Dept. of Bldg. & Safety

Attention:

Regarding: 2325 Crenshaw Blvd. - So Calif Gas property.

Here are:

- ☐ Brochures
- ☐ Shop Drawings
- ☐ Working Drawings
- ☐ Samples
- ☐ _____
- ☐ _____

Sets/Copies	Description
1 copy	May 17, 1988 LeRoy Crandall report.

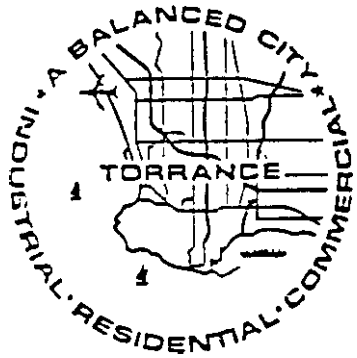
Remarks: I believe that this is the only information that you are missing with respect to our site. You have the 11/16/87 report (foundation investigation). If we are required to submit any further information for certification of compaction, please let me know.

- ☐ For Approval
- ☐ Approved as Noted
- ☐ Correct and Resubmit
- ☐ Approved as Submitted

Thanks.

By G. Shein Conley

LEROY J. JACKSON
CITY MANAGER



CITY OF TORRANCE
3031 TORRANCE BOULEVARD, TORRANCE, CALIFORNIA
TELEPHONE (213) 618-5880 90503

Telefax No. (213) 618-5891

TRANSMISSION INFORMATION SHEET

THE FOLLOWING PAGES ARE FOR:

Name of Individual: Elaine Trovati / S.J. Schafmacher

Name of Firm: Transpacific Development Co (TDC)

City and State: Torrance CA

FROM: Bill Becker (Mgr), City of Torrance, Bldg Dept.

Special Instructions: _____

_____

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VERIFICATION INFORMATION:

Date: _____ Time: _____ By Whom: _____

Transpacific Development Company

Corporate Headquarters
2377 Crenshaw Boulevard
Suite 200
Torrance, California 90501-3325
(213) 618-3600

QWP TRANSMITTAL

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: Mary / Bldg. & Safety **DATE:** 7-13-88

COMPANY: City of Torrance

FROM: Steve J. Schafenacker

COMPANY: Transpacific Development Co. (TDC)

PROJECT: CERRITOS TOWNE CENTER

TOTAL NUMBER OF PAGES INCLUDING COVER PAGE: 2

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL (213) 618-3656 **AS SOON AS POSSIBLE.**

ADDITIONAL COMMENTS:

Mary -
If you could "fax" me an executed copy I'd really appreciate it. I believe there were 3 separate letters.
Thanks -
Elaine Trovato

FAX NO. 320-9242

CARL W. DONMOYER & ASSOCIATES INC.

CIVIL ENGINEERS
MAY 17, 1988

LAND SURVEYORS
JN 87-67

MR. STEVEN J. SCHAFENACKER
TRANSPACIFIC DEVELOPMENT COMPANY
2377 CRENSHAW BOULEVARD, SUITE 300
TORRANCE, CALIFORNIA 90501-3325

RECEIVED
MAY 18 1988
CHCG

Dear Mr. Schafenacker:

As we discussed in our telephone conversation on May 16, 1988, I am sending you copies of the draft drainage acceptance letters for completion by the owners of Lot 7 of Tract No. 44299 and Parcels 1 and 3 of Parcel Map No. 19013, in the City of Torrance. The City of Torrance is requiring the owner of Parcel 2, Southern California Gas Company, to obtain permission from the adjoining property owners for draining onto their property.

The actual portion of Parcel 2 of Parcel Map No. 19013 draining to the adjoining properties consists of an 8-foot wide strip along the westerly property line and a 10-foot wide strip along the northerly property line where fill slopes will be constructed to match the existing ground. Variable width strips along the easterly and southerly property lines are also included. These areas are shown on the Grading and Drainage Plan for Parcel No. 2 prepared by Carl W. Donmoyer & Associates, Inc., dated April 27, 1988, and highlighted on the two copies of the plan which are enclosed for your reference.

The enclosed letters may be reproduced or re-typed on the appropriate letterhead. They should be sent to the City of Torrance, as addressed. We would appreciate receiving copies of the signed letters for our files.

Thank you for your courtesy and cooperation in this matter.

Very truly yours,
CARL W. DONMOYER & ASSOCIATES, INC.

A.J. Marciuska

COPY

AJM/dp
Enclosure
cc: G. Sheri Conley, Southern California Gas Company
Won K. Kim, C.H.C.G. Architects, Inc.

609 EAST ALOSTA AVENUE, SUITE B ☐ GLENDORA, CALIFORNIA 91740 ☐ (818) 963-5710 ☐ (818) 335-4046

CARL W. DONMOYER & ASSOCIATES INC.

CIVIL ENGINEERS LAND SURVEYORS

HYDROLOGY STUDY

AND

HYDRAULIC CALCULATIONS

FOR

PARCEL 2

OF

PARCEL MAP NO. 19013

(P.M.B. 202/51-55)

IN THE CITY OF TORRANCE

PREPARED FOR

SOUTHERN CALIFORNIA GAS COMPANY

C/O C.H.C.G. ARCHITECTS, INC.

9525 MONTE VISTA AVENUE, SUITE 250

MONTCLAIR, CALIFORNIA 91763

SHEET 1 OF 26
MAY 19, 1988
JN 87-67

609 EAST ALOSTA AVENUE, SUITE B ☐ GLENDORA, CALIFORNIA 91740 ☐ (818) 963-5710 ☐ (818) 335-4046

TABLE OF CONTENTS

REFERENCES

(1) GRADING AND DRAINAGE PLAN FOR PARCEL 2 OF PARCEL MAP NO. 19013 (P.M.B. 202/51-55)

(2) GRADING PLAN FOR TRACT NO. 44299 (BOOK 1068/53-60) (DATED 01-08-86, REVISED 01-05-88) PREPARED BY E.L. PEARSON & ASSOCIATES, INC.

(3) GRADING PLAN FOR TRACT NO. 43377 (BOOK 1043/60-62) (DATED 08-01-84, REVISED 11-02-87 AND 12-03-87) WITH ATTACHMENT PREPARED BY E.L. PEARSON & ASSOCIATES, INC.

(4) GRADING PLAN FOR A PORTION OF LOTS 5 AND 6 OF TRACT NO. 44299 (DATED 04-08-87) PREPARED BY DALCIN CUMMINS ASSOCIATES FOR MARRIOTT CORPORATION COURTYARD PROJECT.

(5) HYDROLOGY STUDY AND HYDRAULIC CALCULATIONS FOR TRACT NO. 44299 STORM DRAIN (M.T.D. 1158) (DATED 02-28-86, REVISED 11-02-87) PREPARED BY E.L. PEARSON & ASSOCIATES, INC.

(6) ON-SITE HYDROLOGY STUDY MAP FOR TRACT NO. 44299 (DATED 02-28-86, REVISED 06-05-86) PREPARED BY E.L. PEARSON & ASSOCIATES, INC.

(7) STORM DRAIN PLAN FOR TRACT NO. 44299 (CITY OF TORRANCE PLAN NO. S.D. - 434, DATED 08-26-86; M.T.D. 1158)

(8) L.A.C.F.C.D. HYDROLOGY MANUAL (DATED DECEMBER 1971, REVISED OCTOBER 1982)

(9) KING'S HANDBOOK OF HYDRAULICS

(10) L.A.C.F.C.D. HYDRAULIC DESIGN MANUAL (DATED MARCH 1982)

PROPOSED DRAINAGE

THE EXISTING RETENTION BASIN ON PARCEL 2 WAS FILLED IN AND BROUGHT TO PROPOSED ROUGH GRADE IN ACCORDANCE WITH THE APPROVED, REVISED GRADING PLAN FOR TRACT NO. 44299 (REFERENCE ITEM NO. 2). LINE "H" OF THE PROPOSED STORM DRAIN AND INLETS FOR LINES "E-2", "E-3" AND "H-1" WERE TO BE INSTALLED BEFORE THE ROUGH GRADING WAS STARTED. THE DRAINAGE FROM LOT 7 OF 44299 ALONG THE NORTHERLY PROPERTY LINE OF PARCEL 2 WILL BE CONVEYED TO THE INLET ON LINE "H-1" IN GRADED DITCHES. THE PROPOSED PRIVATELY-MAINTAINED CATCH BASIN NO. 2 AT THE TERMINUS OF LINE "H" WILL INTERCEPT & COLLECT THE DRAINAGE FROM PARCEL 1 EAST OF PARCEL 2. THE PROPOSED PARKING AREA ON PARCEL 1 SOUTH OF PARCEL 2 WILL DRAIN TO THE SOUTH AS SHOWN ON THE APPROVED, REVISED GRADING PLAN FOR TRACT NO. 43377, REFERENCE ITEM NO. 3. A PORTION OF THE DRAINAGE FROM PARCEL 3 WILL BE COLLECTED BY THE INLET ON LINE "E-2" OR WILL FLOW TO THE SOUTHWEST AWAY FROM PARCEL 2.

THE PROPOSED DRAINAGE ON-SITE WILL BE COLLECTED BY PRIVATELY-MAINTAINED ON-SITE DRAIN SYSTEMS CONNECTED TO THE PROPOSED PRIVATELY-MAINTAINED CATCH BASIN NO. 3 (LINE "E-3") AND THE PROPOSED PRIVATELY-MAINTAINED CATCH BASIN NO. 2 ON THE EASTERLY PROPERTY LINE OF PARCEL 2. BASED ON A STORM WITH A 50-YEAR RECURRENCE INTERVAL, THE PROPOSED FLOW WILL BE 13 CFS FOR THE PROPOSED CATCH BASIN NO. 3 AND LINE "E-3", IF THE ON-SITE DRAIN LINES OR INLETS PLUG UP. THE ON-SITE DRAIN LINES AND INLETS WERE DESIGNED FOR A 10-YEAR STORM RECURRENCE INTERVAL (SEE SHEETS 13 TO 22), WITH THE MAINLINE STORM DRAIN PEAK FLOW BASED ON A 50-YEAR STORM RECURRENCE INTERVAL. A RUNOFF COEFFICIENT OF 0.95 WAS USED FOR ALL SUBAREAS IN THE CALCULATION OF FLOW RATES. THIS IS CONSISTENT W/ L.A.C.F.C.D. RECOMMENDED COMMERCIAL VALUES, AND IT IS REPRESENTATIVE OF THE ACTUAL PROPOSED SITE IMPROVEMENTS.

EXISTING DRAINAGE

THE EXISTING PROJECT SITE (PARCEL 2 OF PARCEL MAP NO. 19013) PREVIOUSLY SERVED AS A RETENTION BASIN FOR LOT 7 OF TRACT NO. 44299 ALONG THE NORTHERLY PROPERTY LINE OF PARCEL 2 AND FOR PARCELS 1 AND 3 OF PARCEL MAP NO. 19013 ALONG THE EASTERLY, SOUTHERLY AND WESTERLY PROPERTY LINES OF PARCEL 2. LOT 4 OF TRACT NO. 34383 ALONG THE NORTHERLY AND NORTHWESTERLY PROPERTY LINES OF PARCEL 2 DRAINS TO THE NORTHWEST AWAY FROM PARCEL 2. THE MARRIOTT CORP. PROJECT ALONG THE SOUTHERLY PROPERTY LINE OF PARCEL 2 IS CURRENTLY UNDER CONSTRUCTION. ACCORDING TO THE APPROVED GRADING PLAN FOR THE MARRIOTT SITE, THAT PROPERTY WILL DRAIN TO THE SOUTH.

THE PROJECT SITE HAS BEEN ROUGH GRADED AND A TEMPORARY STORM DRAIN INLET (LATERAL E-3 OF M.T.D. 1158, REF. ITEM NO. 7) WAS INSTALLED ON-SITE. AN INLET WAS ALSO INSTALLED ON PARCEL 3 TO COLLECT DRAINAGE FROM THAT PROPERTY.

— LOS ANGELES COUNTY FLOOD CONTROL DISTRICT —

Hydrology Calculation Sheet

PROJECT PARCEL 2, P.M. NO. 19013
FREQUENCY 50 YEAR
ISOHYETAL ZONE "K"

PROPOSED
ON-SITE CATCH BASIN NO. 3
(Q 50 W/ Tc=10.0 MIN)

CALCULATED BY ALGIS J. MARCIUSKA
CHECKED BY MARK S. LAMOUREUX
DATE MAY 19, 1988

DRAINAGE AREA	Soil & Development	A Acres	I in/hr.	C	ΔQ CFS	ΣQ CFS	SLOPE	SECTION	v FPS	L FT.	T MIN.	ΣT MIN.	REMARKS
(1)	010-Comm.	0.43											
(2)		0.42											
(3)		0.42											
(4)		0.47											
(5)		0.11											
(6)		0.29											
(7)		0.22											
(8)		0.13											
(9)		0.14											
(10)		0.25											
(11)		0.27											
(12)		0.23											
(13)		0.19											
(14)		0.24											
(15)		0.11											
(16)		0.25											
(17)		0.03											
												10.0	SIZE INLET & CONNECTOR PIPE FOR TOTAL TRIB. AREA BASED ON A 50 YR. STORM
	ΣA=	4.20	3.25	0.95	13.0								

DA-2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

Hydrology Calculation Sheet $Q_{10} \approx 0.70\, Q_{50}$ (PER LACFCO)

PROJECT PARCEL 2 P.M. NO. 19013
FREQUENCY 10 YEAR
ISOHYETAL ZONE "K"

PROPOSED
ON-SITE STORM DRAIN SYSTEM
(Q 10 W/ INITIAL Tc=10.0 MIN)

CALCULATED BY ALGIS J. MARCIUSKA
CHECKED BY MARK S. LAMOUREUX
DATE MAY 19, 1988

	DRAINAGE AREA	Soil & Development	A Acres	I in/hr. (10 YR.)	C	ΔQ C FS	ΣQ C FS	SLOPE	SECTION	v FPS	L FT.	T MIN.	ΣT MIN.	REMARKS
LINE "A"	(4)	010-Comm.	0.47	2.28	0.95	1.0							10.0	(INITIAL SUBAREA)
	(3)	↓	0.42	2.24	0.95	0.9	1.0		8" PIPE	2.9	73	0.4	10.4	
	(2)	↓	0.42	2.24	0.95	0.9	1.9		8" PIPE	5.4	68	0.2	10.6	
							2.8	← LINE "A"						
LINE "B"	(17)	010-Comm.	0.03	2.28	0.95	0.1							10.0	(INITIAL SUBAREA
	(16)	↓	0.25	2.28	0.95	0.5	0.1					—	10.0	(17), (16) & (15))
	(15)	↓	0.11	2.28	0.95	0.2	0.6					—	10.0	
	(14)	↓	0.24	2.24	0.95	0.5	0.8		8" PIPE	2.3	74	0.5	10.5	
	(13)	↓	0.19	2.14	0.95	0.4	1.3		12" PIPE	1.7	100	1.0	11.5	
	(12)	↓	0.23	2.07	0.95	0.5	1.7		12" PIPE	2.2	84	0.6	12.1	
	(11)	↓	0.27	2.00	0.95	0.5	2.2		12" PIPE	2.8	130	0.8	12.9	
	(10)	↓	0.25	2.00	0.95	0.5	2.7		12" PIPE	3.4	26	0.1	13.0	JUNCTION W/ LINES "C" & "G"
							3.2							
LINE "C"	(9)	010-Comm.	0.14	2.28	0.95	0.3							10.0	(INITIAL SUBAREA
	(8)	↓	0.13	2.28	0.95	0.3	0.3					—	10.0	(9) & (8))
	(7)	↓	0.22	2.24	0.95	0.5	0.6		8" PIPE	1.7	52	0.5	10.5	
	(6)	↓	0.29	2.24	0.95	0.6	1.1					—	10.5	JUNCTION W/ LINES "B" & "G"
							1.7							
	CONFLUENCE													
	LINES "B" & "C"						← FROM SHEET 9							
	(5) LINE "F"	010-Comm.	0.11	2.00	0.95	0.2	4.7		15" PIPE	3.8	45	0.2	13.0	JUNCTION W/
							4.9	← LINE "G"					13.2	LINE "G"

DA-2

— LOS ANGELES COUNTY FLOOD CONTROL DISTRICT —

Hydrology Calculation Sheet

PROJECT PARCEL 2, P.M. No. 19013
FREQUENCY 10 YEAR
ISOHYETAL ZONE "K"

CALCULATED BY ALGIS J. MARCIUSKA
CHECKED BY MARK S. LAMOUREUX
DATE MAY 19, 1988

	DRAINAGE AREA	Soil & Development	A Acres	I in/hr. (10 YR.)	C	ΔQ C FS	ΣQ C FS	SLOPE	SECTION	v FPS	L FT.	T MIN.	ΣT MIN.	REMARKS
LINE "D"	⟨18⟩	010- Comm.	0.09	2.28	0.95	0.2						—	10.0	(INITIAL Tc)
	⟨19⟩	010-Comm.	0.19	2.28	0.95	0.4	0.2						10.0	
							0.6							
LINE "E"	⟨21⟩	010-Comm.	0.21	2.28	0.95	0.5								
	⟨20⟩	010-Comm.	0.31	2.28	0.95	0.7	0.5						10.0	(INITIAL Tc)
							1.2					—	10.0	
		TOTAL Q_{10} TO C.B. NO. 2 ON E'LY PR.					1.8							

DA-2

Q_{10} TO LINE "G" BASED ON THE ANALYSIS OF THE CONFLUENCE OF LINES "B" & "C"

$$Q_{10} = Q_1 + \left(\frac{I_1}{I_2}\right) Q_2 \quad \text{AT } T_{C_1}$$

OR

$$Q_{10} = \left(\frac{I_1}{I_2}\right) Q_1 + Q_2 \quad \text{AT } T_{C_2}$$

IN WHICH, $I_1 < I_2$

T_{C_1}: $Q_1 = 3.2$ CFS
(13.0 MIN.) $I_1 = 2.00$ IN/HR.

T_{C_2}: $Q_2 = 1.7$ CFS
(10.5 MIN.) $I_2 = 2.24$ IN/HR.

$$Q_{10} = 3.2 + \left(\frac{2.00}{2.24}\right)(1.7) = 4.7 \text{ CFS} \quad \text{AT } T_{C_1}$$

OR

$$Q_{10} = \left(\frac{2.00}{2.24}\right) 3.2 + 1.7 = 4.6 \text{ CFS} \quad \text{AT } T_{C_2}$$

Q_{10} TO LINE "G" = 4.7 CFS AT T_C = 13.0 MIN.

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

Hydrology Calculation Sheet $Q_{10} \doteq 0.70\ Q_{50}$ (PER LACFCD)

PROJECT PARCEL 2, P.M. NO. 19013

FREQUENCY 10 YEAR

ISOHYETAL ZONE "K"

(Q 10 FOR INLETS - Tc = 10.0 MIN)

CALCULATED BY ALGIS J. MARCIUSKA

CHECKED BY MARK S. LAMOUREUX

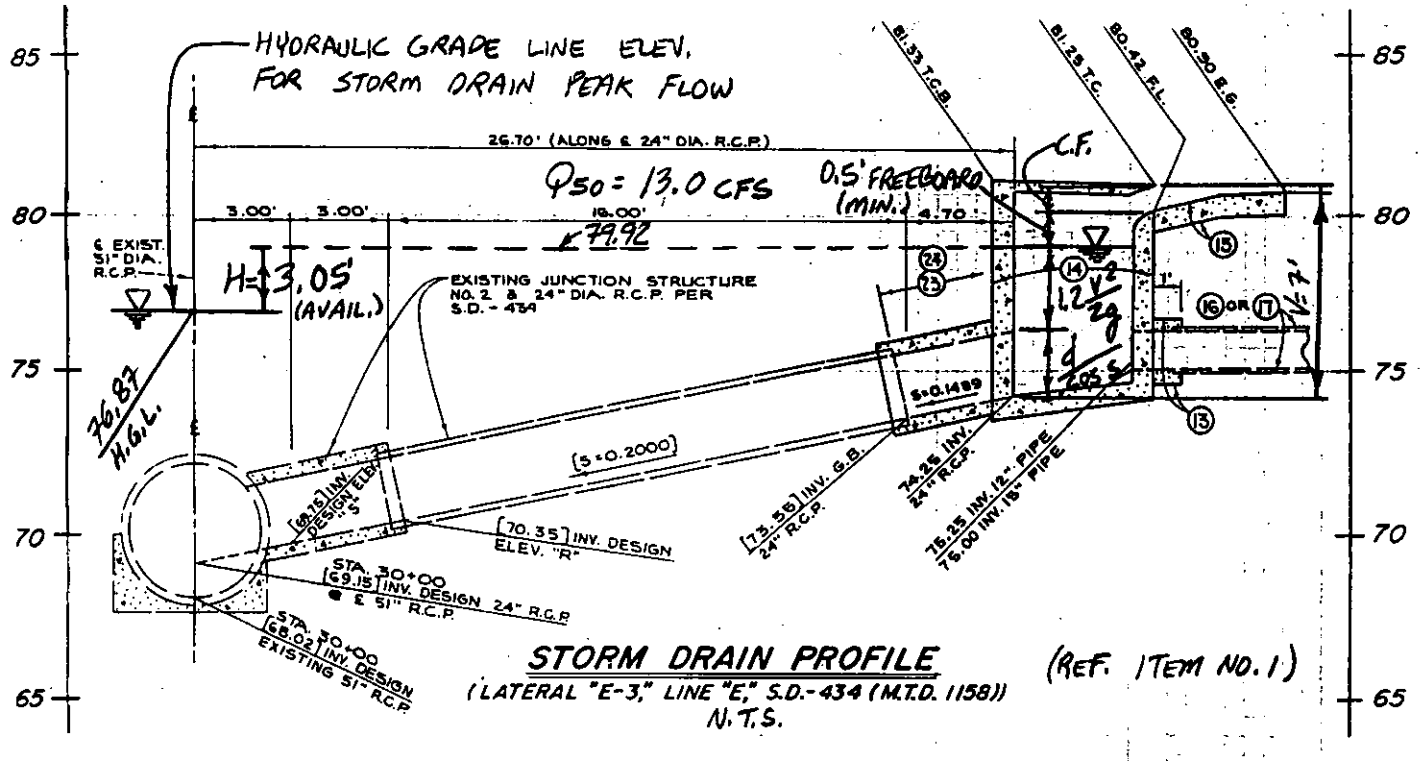
DATE MAY 19, 1988

INLET NO.	DRAINAGE AREA	Soil & Development	A Acres	I in/hr. 10 YR.	C	ΔQ C FS	ΣQ C FS	SLOPE	SECTION	v FPS	L FT.	T MIN.	ΣT MIN.	REMARKS
1A	4	010 - Comm.	0.47	2.28	0.95	1.0							10.0	
2A	3		0.42	2.28	0.95	0.9								
3A	2		0.42	2.28	0.95	0.9								
1B	16		0.25	2.28	0.95	0.5								
2B	14		0.24	2.28	0.95	0.5								
3B	13		0.19	2.28	0.95	0.4								
4B	12		0.23	2.28	0.95	0.5								
5B	10		0.25	2.28	0.95	0.5								
1C	9		0.14	2.28	0.95	0.3								
2C	7		0.22	2.28	0.95	0.5								
1D	18		0.09	2.28	0.95	0.2								
1F	5		0.11	2.28	0.95	0.2								

DA-2

ON-SITE PRIVATELY-MAINTAINED CATCH BASIN NO. 3 (W=14'; V=7')

Q_{50} = 13.0 CFS (SHEET 6)



STORM DRAIN PROFILE (REF. ITEM NO. 1)
(LATERAL "E-3," LINE "E," S.D.-434 (M.T.D. 1158))
N.T.S.

CATCH BASIN "V" DISTANCE

24" DIA. CONNECTOR PIPE
$A = 3.142\ FT^2$

$Q = VA$ $\quad V = Q/A$

$= 13.0 / 3.142$

$V = 4.1\ FT/S$

MINIMUM "V" DISTANCE = C.F. + 0.5 + $1.2\left(\frac{V^2}{2g}\right) + \frac{d}{\cos S}$ (81.25 - 80.42)
(REF. ITEM 10, P. D-3)

$= 0.83 + 0.5 + 1.2\left(\frac{(4.1)^2}{2(32.2)}\right) + 2.00$

$= 0.83 + 0.5 + 0.31 + 2.00$

MINIMUM "V" DIST. = 3.64 FT. < "V" = 7' PROVIDED (ADEQUATE)

CAPACITY OF 24" DIA. R.C.P. (FULL FLOW CONDITION)

$$Q_{CAP} = \frac{A\sqrt{2gH}}{\sqrt{1.2 + \frac{0.021(L)}{D^{1.2}}}}$$ (REF. ITEM NO. 10 CHART D-30)

$$= \frac{3.142\sqrt{2(32.2)(3.05)}}{\sqrt{1.2 + \frac{0.021(23.7)}{(2.00)^{1.2}}}}$$

IN WHICH,

$Q_{50} = 13.0$ CFS
$H = 3.05$ FT.
$A = 3.142$ FT.^{2}
$L = 23.7$ FT.
$D = 2.00$ FT.
$g = 32.2$ FT./S^2

$Q_{CAP} = 37.00$ CFS $> Q_{50} = 13.0$ CFS (ADEQUATE)

LENGTH OF CATCH BASIN OPENING (SUMP CONDITION)

$$Q = 4.3 A D^{0.6}$$ (REF. ITEM NO. 10 CHART D-26)

$$A = \frac{Q}{4.3 D^{0.6}} = \frac{13.0}{4.3(0.48)^{0.6}}$$

$A = 4.70$ FT^2

$$W_{MIN.} = \frac{A}{0.486} = \frac{4.70}{0.486}$$

$W_{MIN.} = 9.7$ FT.

IN WHICH,

$A = W \times 0.486$ ← OPENING (W 10" C.F. GUTTER & 6" NORMAL C.F.)

$D = 80.90$ E.G. $- 80.42$ F.L. (PONDING WITHIN LOCAL DEPRESSION)

$D = 0.48$ FT.

$Q = Q_{50} = 13.0$ CFS

MAXIMUM FLOW TO BE ACCEPTED WITH PONDING CONFINED IN THE LOCAL DEPRESSION

$$Q = 4.3(14)(0.486)(0.48)^{0.6}$$

$Q = 18.8$ CFS $> Q_{50} = 13.0$ CFS (ADEQUATE)

ON-SITE PRIVATELY-MAINTAINED STORM DRAIN SYSTEM

HYDRAULIC GRADE LINE CONTROL AT ON-SITE CATCH BASIN NO. 3 (LATERAL "E-3", LINE "E" REF. ITEM NO. 7)

H.G.L. = 76.87 AT MAINLINE STORM DRAIN STA. 30+00.00 (SHEET 11) (REF. ITEM NOS. 6 & 7)

$$H.G.L.\ @\ CB.\ NO.\ 3 = 76.87 + h_{FRICTION} + h_{ENTRANCE}$$

($h_{FRICTION}$: 24" R.C.P.)

FRICTION LOSS (h_F) (FLOWING FULL)

$L = 23.7$ FT. (SHT. 11)

$$Q = \frac{K'}{n} d^{8/3} S_f^{1/2}$$ (TABLE 7-14, REF. ITEM NO. 9)

$$S_f = \left(\frac{Q\,n}{K'\,d^{8/3}}\right)^2 = \left(\frac{13.0\,(0.015)}{0.463\,(2.00)^{8/3}}\right)^2$$

$$S_f = 0.0044$$

$$h_F = (S_f)(L) = (0.0044)(23.7)$$

$$h_F = 0.10 \text{ FT.}$$

IN WHICH,

$Q = Q_{50} = 13.0$ CFS (SHT. 6)

$K' = 0.463$

$n = 0.015$

$d = 24$ IN. $= 2.00$ FT.

S_f = FRICTION SLOPE

ENTRANCE LOSS (h_E)

$$h_E = K_e \left(\frac{V^2}{2g}\right)$$

$$= (0.5)(0.26)$$

$$h_E = 0.13 \text{ FT.}$$

IN WHICH,

$K_e = 0.5$ ← FLUSH ENTRANCE (REF. ITEM NO. 9, P. 4-26)

$$\frac{V^2}{2g} = \frac{(4.1)^2}{2(32.2)}$$ $V = 4.1$ FT/S (SHT. 11)

$$\frac{V^2}{2g} = 0.26 \text{ FT.}$$

$$H.G.L.\ @\ C.B.\ NO.\ 3 = 76.87 + h_F + h_E = 76.87 + 0.10 + 0.13$$

H.G.L. @ C.B. NO. 3 = 77.10

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FILENAME : A: JN87-67A

LINE "A"

STORM DRAIN ANALYSIS RESULTS

Line No	Q_{10} (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	Sf-full (ft/ft)	V 1 (fps)	V 2 (fps)	(INV.) FL 1 (ft)	(INV.) FL 2 (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	TW CK
1	Hydraulic grade line control =				77.10		(H.G.L. AT C.B. NO. 3, SHEET 13)										
[2]	2.8	12	0	.74	.72	Full	.00822	3.6	3.6	75.25	75.94	77.10	77.66	1.85	1.72	.00	.00
[3]	1.9	8	0	.67	.62	Full	.03291	5.4	5.4	76.12	76.78	77.55	79.79	1.43	3.01	.00	.00
[4]	1.0	8	0	.52	.47	Full	.00912	2.9	2.9	76.78	77.47	80.31	80.93	3.53	3.46	.00	.00
[5]	1.0	8	0	.28	.47	Full	.00912	2.9	2.9	77.47	77.80	81.00	[81.05]	3.53	3.25	81.17	81.30

H.G.L. AT (1A) = 81.05 < 81.30 (T.O.G. - 0.5' FREEBOARD)

3	Hydraulic grade line control =				77.60		(DRAINBOX (3A))										
[6]	.9	8	0	.29	.45	Full	.00739	2.6	2.6	75.94	76.19	77.60	[77.64]	1.66	1.45	77.74	80.69

H.G.L. AT (3A) = 77.64 < 80.70 (T.O.G - 0.5' FREEBOARD)

4	Hydraulic grade line control =				80.05		(DRAINBOX (2A))										
[7]	.9	8	0	.30	.45	Full	.00739	2.6	2.6	76.78	77.00	80.05	[80.08]	3.27	3.08	80.19	81.00

H.G.L. AT (2A) = 80.08 < 81.00 (T.O.G. - 0.5' FREEBOARD)

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INPUT DATA LISTING

CD	L2	MAX Q/10	ADJ Q/10	LENGTH	(INV.) FL 1	(INV.) FL 2	CTL/TW	D	W	S	KJ	KE	KM	LC	L1	L3	L4	A1	A3	A4	J	N
9	1						77.10															
2	2	2.8	2.8	68.00	75.25	75.94	.00	12.	0.	3	.00	.00	.00	1	3	6	0	0.	45.	0.	.00	.015
2	3	1.9	1.9	68.00	76.12	76.78	.00	8.	0.	3	.00	.00	.00	0	4	7	0	0.	45.	0.	.00	.015
2	4	1.0	1.0	68.00	76.78	77.47	.00	8.	0.	3	.00	.00	.00	0	5	0	0	45.	0.	0.	.00	.015
2	5	1.0	1.0	5.00	77.47	77.80	81.30	8.	0.	1	.00	.00	.00	0	0	0	0	0.	0.	0.	.00	.015
2	6	.9	.9	5.00	75.94	76.19	80.69	8.	0.	1	.00	.00	.00	3	0	0	0	0.	0.	0.	.00	.015
2	7	.9	.9	5.00	76.78	77.00	81.00	8.	0.	1	.00	.00	.00	4	0	0	0	0.	0.	0.	.00	.015

STORM DRAIN ANALYSIS RESULTS

LINES "G", "B" AND "F"

Line No	Q10 (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	Sf-full (ft/ft)	V 1 (fps)	V 2 (fps)	(INV.) FL 1 (ft)	(INV.) FL 2 (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	TW CK
1	Hydraulic grade line control =				77.10	(H.G.L. AT C.B. NO. 3, SHEET 7)											
[2]	4.9	15	0	.77	.90	Full	.00766	4.0	4.0	75.00	76.53	77.10	77.86	2.10	1.33	.00	.00
[3]	4.7	15	0	.77	.88	Seal	.00705	3.8	5.1	76.53	77.19	77.90	78.07	1.37	.88	.00	.00 HJ
	X = 15.20	X(N) = .00	X(J) = 36.04	F(J) = 1.12	D(BJ) = .79	D(AJ) = .98											
[4]	3.2	12	0	.78	.77	Full	.01074	4.1	4.1	77.19	77.50	78.60	78.88	1.41	1.38	.00	.00
	X = .00	X(N) = 1.74															
[5]	2.7	12	0	1.00	.70	Full	.00765	3.4	3.4	77.50	77.76	79.01	79.39	1.51	1.63	.00	.00
[6]	2.2	12	0	.78	.63	Full	.00508	2.8	2.8	77.76	78.21	79.52	79.92	1.76	1.71	.00	.00
	X = .00	X(N) = 70.29															
[7]	1.7	12	0	.64	.55	Full	.00303	2.2	2.2	78.21	78.67	80.00	80.26	1.79	1.59	.00	.00
	X = .00	X(N) = 16.58															
[8]	1.3	12	0	.53	.48	Full	.00177	1.7	1.7	78.67	79.26	80.33	80.51	1.66	1.25	.00	.00
	X = .00	X(N) = 7.46															
[9]	.8	8	0	.46	.42	Full	.00583	2.3	2.3	79.26	79.89	80.52	80.96	1.26	1.07	.00	.00
	X = .00	X(N) = 5.70															
[10]	.6	8	0	.42	.36	Full	.00329	1.7	1.7	79.89	80.25	81.03	[81.23]	1.14	.98	81.27	82.50
	X = .00	X(N) = 10.00															

H.G.L. AT (1B) = 81.23 < 82.50 (T.O.G. -0.5' FREEBOARD)

3	Hydraulic grade line control =				77.88	(DRAINBOX (1F), LINE "F")											
[11]	.2	8	0	.16	.21	Seal	.00037	.6	2.2	76.53	78.00	77.88	[78.21]	1.35	.21	78.28	81.00 HJ
	X = 27.71	X(N) = 45.06	X(J) = 43.12	F(J) = .02	D(BJ) = .16	D(AJ) = .25											

H.G.L. AT (1F) = 78.21 < 81.00 (T.O.G. - 0.5' FREEBOARD)

5	Hydraulic grade line control =				78.95	(DRAINBOX (5B))											
[12]	.5	8	0	.21	.33	Full	.00229	1.4	1.4	77.50	77.75	78.95	[78.96]	1.45	1.21	78.99	80.75

H.G.L. AT (5B) = 78.96 < 80.75 (T.O.G. - 0.5' FREEBOARD)

7	Hydraulic grade line control =				79.96	(DRAINBOX (4B))											
[13]	.5	8	0	.20	.33	Full	.00228	1.4	1.4	78.21	78.50	79.96	[79.97]	1.75	1.47	80.00	81.50

H.G.L. AT (4B) = 79.97 < 81.50 (T.O.G. - 0.5' FREEBOARD)

(DRAINBOX (3B))

8	Hydraulic grade line control =				80.29	H.G.L. AT (3B) = 80.30 < 82.35 (T.O.G. - 0.5' FREEBOARD)											
[14]	.4	8	0	.14	.29	Full	.00146	1.1	1.1	79.67	79.35	80.29	[80.30]	1.62	.95	80.32	82.35

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STORM DRAIN ANALYSIS RESULTS

Line No	Q/10 (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	Sf-full (ft/ft)	V 1 (fps)	V 2 (fps)	FL 1 (INV.) (ft)	FL 2 (INV.) (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	TW CK
9	Hydraulic grade line control =						80.51						(DRAINBOX (2B))				
[15]	.5	8	0	.20	.33	Full	.00228	1.4	1.4	79.26	79.65	80.51	[80.53]	1.25	.88	80.56	82.15

H.G.L. AT (2B) = 80.53 < 82.15 (T.O.G. - 0.5' FREEBOARD)

Project : JN 87-67 - PCL. 2, P.M. 19013, TORRANCE (CHCG/SOCAL GAS CO.) Date: 5/16/1988 Time: 11:17:22

INPUT DATA LISTING

CD	L2	MAX Q/10	ADJ Q/10	LENGTH	(INV.) FL 1	(INV) FL 2	CTL/TW	D	W	S	KJ	KE	KM	LC	L1	L3	L4	A1	A3	A4	J	N
8	1						77.10															
2	2	4.9	4.9	99.00	75.00	76.53	.00	15.	0.	3	.00	.00	.00	1	3	11	0	0.	45.	0.	.00	.015
2	3	4.7	4.7	45.00	76.53	77.19	.00	15.	0.	3	.00	.00	.00	0	4	0	0	45.	0.	0.	.00	.015
2	4	3.2	3.2	26.00	77.19	77.50	80.75	12.	0.	3	.00	.00	.00	0	5	0	12	0.	0.	45.	.00	.015
2	5	2.7	2.7	50.00	77.50	77.76	.00	12.	0.	3	.00	.00	.00	0	6	0	0	0.	0.	0.	.00	.015
2	6	2.2	2.2	80.00	77.76	78.21	81.50	12.	0.	3	.00	.00	.00	0	7	0	13	0.	0.	45.	.00	.015
2	7	1.7	1.7	84.00	78.21	78.67	82.35	12.	0.	3	.00	.00	.00	0	8	0	14	45.	0.	45.	.00	.015
2	8	1.3	1.3	100.00	78.67	79.26	82.15	12.	0.	3	.00	.00	.00	0	9	0	15	45.	0.	45.	.00	.015
2	9	.8	.8	75.00	79.26	79.89	.00	8.	0.	3	.00	.00	.00	0	10	0	0	0.	0.	0.	.00	.015
2	10	.6	.6	59.00	79.89	80.25	82.50	8.	0.	1	.00	.00	.00	0	0	0	0	45.	0.	0.	.00	.015
2	11	.2	.2	59.00	76.53	78.00	81.00	8.	0.	1	.00	.00	.00	3	0	0	0	0.	0.	0.	.00	.015
2	12	.5	.5	5.00	77.50	77.75	80.75	8.	0.	1	.00	.00	.00	5	0	0	0	0.	0.	0.	.00	.015
2	13	.5	.5	5.00	78.21	78.50	81.50	8.	0.	1	.00	.00	.00	7	0	0	0	0.	0.	0.	.00	.015
2	14	.4	.4	5.00	78.67	79.35	82.35	3.	0.	1	.00	.00	.00	8	0	0	0	0.	0.	0.	.00	.015
2	15	.5	.5	7.00	79.26	79.65	82.15	8.	0.	1	.00	.00	.00	9	0	0	0	0.	0.	0.	.00	.015

Project : JN 87-67 - POL. 2, P.M. 19013, TORRANCE (CHCG/SOCAL GAS CO.) Date: 5/16/1988 Time: 12: 5: 2

LINE "C"

STORM DRAIN ANALYSIS RESULTS

Line No	Q_{10} (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	Sf-full (ft/ft)	V 1 (fps)	V 2 (fps)	(INV.) FL 1 (ft)	(INV.) FL 2 (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	TW CK
1	Hydraulic grade line control = 78.07 (H.G.L. AT CONFLUENCE W/ LINE "G", SHEET 16)																
2	1.7	12	0	.57	.55	Part	.00303	2.3	3.?	77.19	77.69	78.07	78.26	.88	.57	.00	.00
	X =		.00	X(N) =	58.96												
3	1.1	8	0	.43	.50	Full	.01103	3.2	3.2	77.69	77.92	78.55	78.68	.86	.76	.00	.00
	X =		.00	X(N) =	5.97												
4	.6	8	0	.41	.36	Full	.00328	1.7	1.?	77.92	78.26	78.86	79.03	.94	.77	.00	.00
	X =		.00	X(N) =	8.05												
5	.3	8	0	.31	.25	Full	.00082	.9	.?	78.26	78.40	79.10	79.12	.84	.72	.00	.00
	X =		.00	X(N) =	9.51												
6	.3	8	0	.13	.25	Seal	.00082	.9	2.5	78.40	79.15	79.13	79.40	.73	.25	79.50	82.25 HJ
	X =		.60	X(N) =	.00	X(J) =	2.90	F(J) =	.05	D(BJ) =	.15	D(AJ) =	.40				
	H.G.L. AT (1C) = 79.40 < 82.25 (T.O.G. - 0.5' FREEBOARD)																
4	Hydraulic grade line control = 78.77																
7	.5	8	0	.18	.33	Seal	.00228	1.4	2.?	77.92	78.40	78.77	78.73	.85	.33	78.86	80.90 HJ
	X =	1.96		X(N) =	.00	X(J) =	4.36	F(J) =	.07	D(BJ) =	.29	D(AJ) =	.38				
	H.G.L. AT (2C) = 78.73 < 80.90 (T.O.G. - 0.5' FREEBOARD)																

Project : JN 87-67 - PCL. 2, P.M. 19013, TORRANCE (CHCG/SOCAL GAS CO.) Date: 5/16/1988 Time: 12: 5: 2

INPUT DATA LISTING

CD	L2	MAX Q %	ADJ Q %	LENGTH	(INV.) FL 1	(INV.) FL 2	CTL/TW	D	W	S	KJ	KE	KM	LC	L1	L3	L4	A1	A3	A4	J	N
8	1						78.07															
2	2	1.7	1.7	64.00	77.19	77.69	.00	12.	0.	3	.00	.00	.00	1	3	0	0	45.	0.	0.	.00	.015
2	3	1.1	1.1	12.00	77.69	77.92	.00	8.	0.	3	.00	.00	.00	0	4	7	0	0.	45.	0.	.00	.015
2	4	.6	.6	52.00	77.92	78.26	.00	8.	0.	3	.00	.00	.00	0	5	0	0	0.	0.	0.	.00	.015
2	5	.3	.3	32.00	78.26	78.40	.00	8.	0.	3	.00	.00	.00	0	6	0	0	45.	0.	0.	.00	.015
2	6	.3	.3	7.00	78.40	79.15	82.25	8.	0.	1	.00	.00	.00	0	0	0	0	0.	0.	0.	.00	.015
2	7	.5	.5	5.00	77.92	78.40	80.90	8.	0.	1	.00	.00	.00	4	0	0	0	0.	0.	0.	.00	.015

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LINE "E"

STORM DRAIN ANALYSIS RESULTS

Line No	Q_{10} (cfs)	D (in)	W (in)	Dn (ft)	Dc (ft)	Flow Type	Sf-full (ft/ft)	V 1 (fps)	V 2 (fps)	FL 1 (INV.) (ft)	FL 2 (INV.) (ft)	HG 1 Calc	HG 2 Calc	D 1 (ft)	D 2 (ft)	TW Calc	TW CK
1	Hydraulic grade line control =						79.30	(H.G.L. AT C.B. NO. 2 (REF. ITEM NO. 7))									
[2]	1.2	8	0	.51	.52	Full	.01313	3.4	3.4	77.97	78.03	79.30	79.35	1.33	1.32	.00	.00
[3]	.6	8	0	.17	.36	Seal	.00328	1.7	2.0	78.30	79.19	79.72	79.72	1.42	.53	.00	.00
	X =		5.20	X(N) =		.00											
[4]	.2	8	0	.22	.21	Part	.00037	.6	.8	79.19	79.40	79.83	[79.84]	.64	.44	79.85	81.90

H.G.L. AT (10) = 79.84 < 81.90 (T.O.G. - 0.5' FREEBOARD)

Project : JN 87-67 - PCL. 2, P.M. 19013, TORRANCE (CHCG/SOCAL GAS CO.) Date: 5/16/1988 Time: 12:38:13

INPUT DATA LISTING

CD	L2	MAX Q/10	ADJ Q/10	LENGTH	(INV.) FL 1	(INV.) FL 2	CTL/TW	D	W	S	KJ	KE	KM	LC	L1	L3	L4	A1	A3	A4	J	N
8	1						79.30															
3	2	1.2	1.2	4.00	77.97	78.03	.00	9.	0.	3	.00	.00	.00	1	3	0	0	90.	0.	0.	.00	.015
2	3	.6	.6	6.00	78.30	79.19	.00	9.	0.	3	.00	.00	.00	0	4	0	0	45.	0.	0.	.00	.015
2	4	.2	.2	34.00	79.19	79.40	81.90	8.	0.	1	.00	.00	.00	0	0	0	0	0.	0.	0.	.00	.015

LIST OF ABBREVIATIONS

V 1, FL 1, D 1 and HG 1 refer to downstream end

V 2, FL 2, D 2 and HG 2 refer to upstream end

X - Distance in feet from downstream end to point where HG intersects soffit in seal condition

X(N) - Distance in feet from downstream end to point where water surface reaches normal depth by either drawdown or backwater

X(J) - Distance in feet from downstream end to point where hydraulic jump occurs in line

F(J) - The computed force at the hydraulic jump

D(BJ) - Depth of water before the hydraulic jump (upstream side)

D(AJ) - Depth of water after the hydraulic jump (downstream side)

SEAL indicates flow changes from part to full or from full to part

HJ indicates that flow changes from supercritical to subcritical through a hydraulic jump

HJU indicates that hydraulic jump occurs at the junction at the upstream end of the line

HJD indicates that hydraulic jump occurs at the junction at the downstream end of the line

HYDRAULIC CALCULATIONS FOR INLETS (HEAD REQUIRED)

(1) INLET NO.	(2) GRATE SIZE	(3) NET AREA (FT^2)	(4) Q_{10} (CFS)	(5) V (FT/S)	(6) HEAD LOSS $1.2(V^2/2g)$ (FT.)	(7) T.O.G. ELEV.	(8) PONDING ELEV.	(9) DRAINAGE RELEASE ELEV.
1A	24"X24"	1.00	1.0	1.0	0.02	81.80	81.82	81.92 E.G.
2A	24"X24"	1.00	0.9	0.9	0.02	81.50	81.52	81.63 E.G.
3A	24"X24"	1.00	0.9	0.9	0.02	81.20	81.22	81.33 E.G.
1B	24"X24"	1.00	0.5	0.5	0.01	83.00	83.01	83.50 F.S.
2B	24"X24"	1.00	0.5	0.5	0.01	82.65	82.66	82.84 F.L.
3B	24"X24"	1.00	0.4	0.4	0.01	82.85	82.86	83.20 A.C.
4B	24"X24"	1.00	0.5	0.5	0.01	82.00	82.01	82.50 A.C.
5B	24"X24"	1.00	0.5	0.5	0.01	81.25	81.26	82.00 A.C.
1C	18"X18"	0.56	0.3	0.5	0.01	82.15	82.16	82.65 T.C.
2C	24"X24"	1.00	0.5	0.5	0.01	81.40	81.41	81.95 A.C.
1D	18"X18"	0.56	0.2	0.4	0.01	82.40	82.41	82.8 F.G.
1F	24"X24"	1.00	0.2	0.2	0.01	81.50	81.51	81.95 A.C.

NOTES

(1) INLET NUMBER AS SHOWN ON ATTACHED HYDROLOGY STUDY MAP (APPENDIX "B").

(2) GROSS DIMENSIONS OF DRAINBOX GRATE.

(3) NET AREA OF GRATE OPENING (NET DIMENSIONS OF THE GRATE OPENING ARE ASSUMED TO BE 1/2 OF THE GROSS DIMENSIONS):
FOR 24"X24" GRATE, NET AREA = 1.00 FT. X 1.00 FT. = 1.00 FT^2
FOR 18"X18" GRATE, NET AREA = 0.75 FT. X 0.75 FT. = 0.56 FT^2

(4) FLOW RATES (Q_{10}) BASED ON A TIME OF CONCENTRATION OF 10 MINUTES (MIN. FOR SMALL SUBAREAS, PER L.A.C.F.C.D.) AND A 10-YEAR STORM INTENSITY. (SEE SHEET 10).

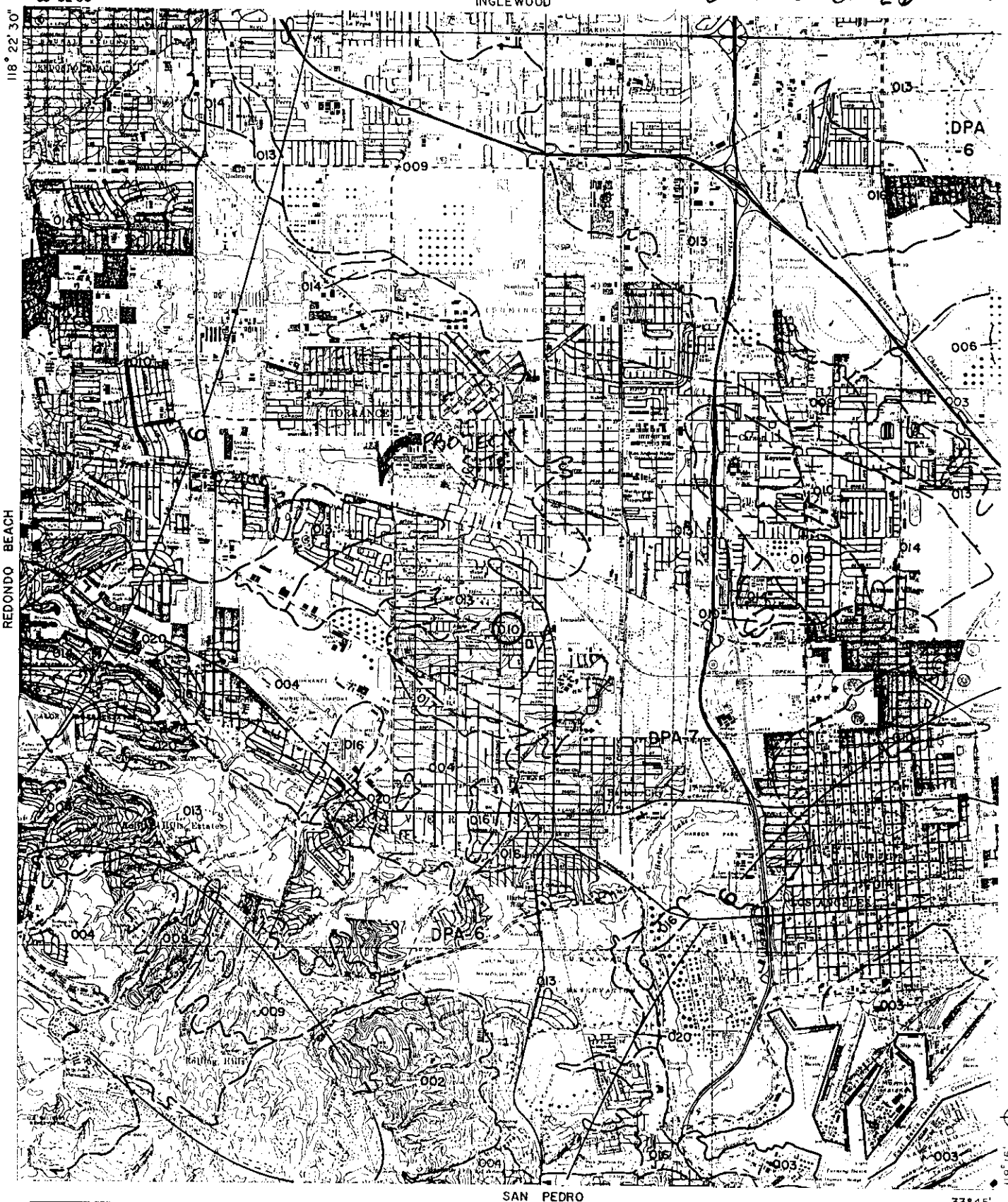
(5) VELOCITY DETERMINED USING Q_{10} AND NET AREA.

(6) HEAD LOSS DUE TO THE GRATE (PONDING).

(7) TOP OF GRATE ELEVATION.

(8) WATER PONDING ELEVATION = (T.O.G. ELEV. + HEAD LOSS).

(9) DRAINAGE RELEASE ELEVATION.



SOIL 010, RAINFALL ZONE "K"

LEGEND

JN87-67

——— SOIL CLASSIFICATION AREA

····· DEBRIS POTENTIAL AREA

(K) RAINFALL ZONE

—12— 50-YEAR ISOHYET (MAX. 24-HOUR AMOUNT)

L A C F C D

hydrology manual

N

0 FEET 5000

TORRANCE

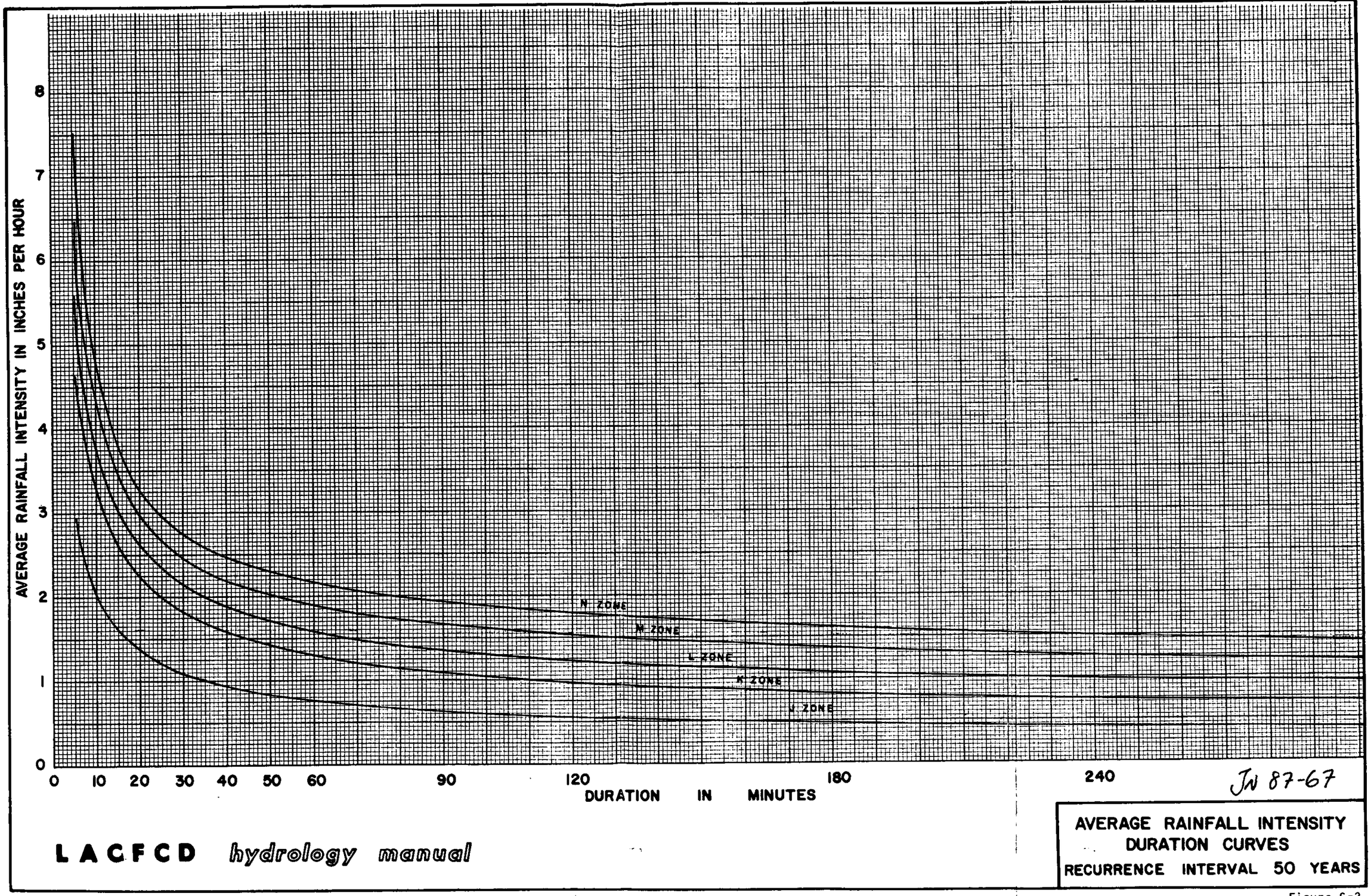
1964

Revised (10/82)

hydrologic map

APPENDIX "A"

Figure C1.4



JN 87-67

LACFCD *hydrology manual*

AVERAGE RAINFALL INTENSITY DURATION CURVES
RECURRENCE INTERVAL 50 YEARS

Figure C-2

COPY 2 OF 2
TEAM WORKING COPY

REPORT OF FOUNDATION INVESTIGATION
PROPOSED SOUTH COASTAL DIVISION HEADQUARTERS BUILDING
CRENSHAW BOULEVARD AND SEPULVEDA BOULEVARD
TORRANCE, CALIFORNIA
FOR THE
SOUTHERN CALIFORNIA GAS COMPANY
(OUR JOB NO. A-87413)

LeROY CRANDALL AND ASSOCIATES geotechnical consultants □ p.o. box 25088 □ 900 grand central ave. □ glendale, ca. 91201-3009
a subsidiary of Law Engineering facsimile (818) 246-4308 telephone (818) 243-4140

November 16, 1987

Southern California Gas Company
Engineering Services Department
Box 3249, Terminal Annex
Los Angeles, California 90051

SoCal Contract No. 1752
(Our Job No. A-87413)

Attention: Ms. G. Sheri Conley, P.E.
Staff Engineer
Civil/Architectural Design
Engineering Services Department

Gentlemen:

Our "Report of Foundation Investigation, Proposed South Coastal Division Headquarters Building, Crenshaw Boulevard and Sepulveda Boulevard, Torrance, California, for the Southern California Gas Company" is herewith submitted.

The scope of the investigation was planned in collaboration with Ms. G. Sheri Conley. Information regarding the structural features of the proposed building and the requirements for the investigation were furnished us by Mr. James Thompson of Thompson and LaBrie, Structural Engineers, and by Mr. Mark S. Lamoureux of Carl W. Donmoyer & Associates, Civil Engineers.

Existing fill soils were not encountered in the borings drilled within the proposed building area. Compacted fill soils, six to eight feet in thickness, were encountered in three of the borings located in the proposed parking area. The natural soils beneath the site consist of silty sand, clayey sand, and clay. The upper natural soils are only moderately firm at present moisture content and would become weaker and more compressible when wet. The soils become firmer and less adversely affected by water with depth. We recommend that any uncompacted fill soils and the upper natural soils be excavated and compacted and that the required additional fill be properly compacted. If the grading recommendations are followed, the proposed building may be supported on spread footings established on properly compacted fill.

Recommendations for foundation design, for grading, and for floor slab and paving support are presented in the report. The results of corrosion studies by M. J. Schiff & Associates are also presented.

Respectfully submitted,

LeROY CRANDALL AND ASSOCIATES

by Marshall Lew
Marshall Lew, Ph.D.
Senior Engineer/Vice President

X87/MD/ge
(3 copies submitted)

cc: (2) CHCG Architects Inc.
Attn: Mr. Dasol Mashaka
(1) Thompson and LaBrie
(1) Carl W. Donmoyer & Associates

REPORT OF FOUNDATION INVESTIGATION

PROPOSED SOUTH COASTAL DIVISION HEADQUARTERS BUILDING

CRENSHAW BOULEVARD AND SEPULVEDA BOULEVARD

TORRANCE, CALIFORNIA

FOR THE

SOUTHERN CALIFORNIA GAS COMPANY

SCOPE

This report presents the results of a foundation investigation of the site of the subject proposed division headquarters building. The locations of the proposed building and our exploration borings are shown on Plate 1, Plot Plan. Also shown are the locations of borings drilled during prior investigations for the adjacent site developments (our Job Nos. ADE-81164 and A-83343).

This investigation was authorized to determine the static physical characteristics of the soils beneath the site for design purposes and to provide recommendations for foundation design and floor slab support for the proposed building. We were also to provide paving design data. The scope of this investigation did not include geologic and seismic studies for the site. Accordingly, our conclusions and recommendations are for static loading conditions only; however, this does not imply that there is a geologic or seismic hazard affecting the site. The results of the field explorations and laboratory tests, which form the basis of our recommendations, are presented in the attached

Appendix. The corrosion potential of the on-site soils was investigated for us by M. J. Schiff & Associates; the results of their study are presented in the Appendix.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared for the Southern California Gas Company and their design consultants to be used solely in the design of the proposed building. The report has not been prepared for use by other parties, and may not contain sufficient information for purposes of other parties or other uses.

STRUCTURAL CONSIDERATIONS

The proposed building, which is shown in plan on Plate 1, will be one story high and of steel frame construction. Maximum column loads will be on the order of 90 kips and wall loads will be on the order of 2 kips per lineal foot.

The floor of the building will be established at about the existing grade. There will be a large paved area for surface parking located to the west of the proposed building.

SITE CONDITIONS

The proposed building area and proposed parking area are currently vacant. There are large stockpiles of fill in the proposed parking area; the approximate limits of the stockpiles are shown on Plate 1.

SOIL CONDITIONS

Existing fill soils were not encountered in the borings drilled within the proposed building area. Compacted fill soils, six to eight feet in thickness, were encountered in Borings 7, 8, and 9 in the proposed parking area. The fill consists of silty sand and was firm at the boring locations. The fill was placed during grading for the adjacent development, which was observed and tested by our firm (our Job No. B-86213). The approximate limits of the compacted fill are shown on Plate 1.

The natural soils beneath the site consist of silty sand, clayey sand, and clay. The upper natural soils are only moderately firm at present moisture content and would become weaker and more compressible when wet. The soils become firmer and less adversely affected by water with depth.

Water seepage was encountered at depths of 10 and 14 feet in two of the exploration borings.

Petroleum stains and odors were noted at random depths in Boring 4. Tests to determine the extent or type of any hazardous materials beneath the site were not within the scope of this investigation.

RECOMMENDATIONS

FOUNDATIONS

General

The compacted fill soils encountered in Borings 7, 8, and 9 are firm; this fill was observed and tested by our firm during placement. The upper natural soils are only moderately firm at present moisture content and would become weaker and more compressible with increase in moisture content. The deeper soils are generally firm and dense.

We recommend that any uncompacted fill soils and the upper natural soils be excavated and compacted and that the required additional fill be properly compacted. If the grading recommendations are followed, the proposed building may be supported on spread footings established on properly compacted fill.

Recommendations for grading are presented in a following section. The excavation of the upper soils and the compaction of all required fill should be observed and tested by personnel of our firm.

Bearing Values

Footings for the building established in properly compacted fill may be designed to impose a net dead plus live load pressure of 3,000 pounds per square foot. A one-third increase may be used for wind or seismic loads. Footings should extend to a depth of at least two feet below the adjacent final grade or floor level, whichever is lower.

If desired, any loading dock walls or low retaining walls may be supported on shallower footings using a lesser bearing value. Footings

for such light loads established in properly compacted fill and extending at least one foot below the lowest adjacent grade may be designed to impose a pressure of 1,500 pounds per square foot.

Since the recommended bearing values are net values, the weight of concrete in the footings may be assumed to be 50 pounds per cubic foot, and the weight of soil backfill may be neglected when determining the downward load on the footings.

While the actual bearing value of the compacted fill will depend on the material used and the compaction methods employed, the quoted bearing values will be applicable if acceptable soils are used and are properly compacted. The bearing value of the compacted fill should be confirmed after completion of the grading.

The settlement of the proposed building, supported on spread footings in the manner recommended, will be on the order of one-half inch. Differential settlement between adjacent columns is expected to be one-fourth inch or less.

Lateral Loads

Lateral loads may be resisted by soil friction on footings and the floor slab and by the passive resistance of the soils. A coefficient of friction of 0.5 may be used between footings or the floor slab and the supporting soils. The passive resistance of the properly compacted fill against footings may be assumed to be 300 pounds per cubic foot. A one-third increase in the passive value may be used for wind or

seismic loads. The frictional resistance and the passive resistance of the soils may be combined without reduction in determining the total lateral resistance.

Footing Observation

To verify the presence of satisfactory soils at design elevations, all footing excavations should be observed by personnel of our firm. All required footing backfill and all utility trench backfill should be mechanically compacted; flooding should not be permitted.

GRADING

To provide improved support for spread footings, the building floor slab, and paving, any uncompacted fill should be excavated, the underlying natural soils should be reworked, and all required fill should be properly compacted. To provide support for shallow spread footings, the upper natural soils beneath footings should be excavated and replaced as compacted fill; footings should be underlain by at least three feet of compacted fill. The approximate limits of the fill tested by our firm are shown on Plate 1. The stockpiled fill has not been compacted and should be removed.

After clearing the site and removing the existing fill and vegetation, all uncompacted fill soils and disturbed natural soils should be excavated. Within footing areas and five feet beyond in plan, the soils should be excavated to a depth of at least three feet below the footing bottoms; the excavations should extend at least five feet beyond the footings in plan.

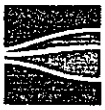
After excavating as recommended, the exposed soils should be inspected by our personnel to verify the removal of all unsuitable deposits. Next, the exposed natural soils should be scarified to a depth of at least six inches and rolled with heavy compaction equipment. The upper six inches of exposed natural soils should be compacted to at least 90% of the maximum density obtainable by the ASTM Designation D1557-70 method of compaction.

After compacting the exposed soils, the required fill should be placed in horizontal lifts not more than eight inches in thickness and compacted to at least 90%. The soils should be compacted at a moisture content varying no more than 2% below or above optimum moisture content.

The on-site soils, less any debris or organic matter within the existing fill, may be used in the required fills. Any required imported fill should consist of relatively non-expansive soils. The Expansion Index of the material should be less than 35. The material should contain sufficient fines (binder material) so as to be relatively impermeable when compacted to result in a stable subgrade.

The excavation of the fill, the reworking of the underlying soils, and the compaction of all required fill should be observed and tested by our firm. All required fill material should be approved for use prior to placing and compacting.

The governmental agencies having jurisdiction over the project should be notified prior to commencement of grading so that the necessary grading permits may be obtained and arrangements may be made for the required inspection(s).



WALLS BELOW GRADE

For design of any building walls used as low retaining walls, it may be assumed that the soils will exert a lateral pressure equal to that developed by a fluid with a density of 30 pounds per cubic foot.

All required backfill should be mechanically compacted in layers; flooding should not be permitted. Proper compaction of the backfill will be necessary to minimize settlement of the backfill and to minimize settlement of overlying slabs, walks, and paving. Backfill should be compacted to at least 90% of the maximum density obtainable by the ASTM Designation D1557-70 method of compaction.

FLOOR SLAB SUPPORT

If the subgrade is prepared as recommended, the building floor slab and adjacent walks and slabs may be supported on grade. If a floor covering that would be critically affected by moisture, such as vinyl, is to be used, we suggest that the floor slab be supported on a four-inch-thick layer of gravel or on a membrane as a capillary break. A suggested gradation for the gravel layer would be as follows:

Sieve Size	Percent Passing
3/4"	90 - 100
No. 4	0 - 10
No. 100	0 - 3

If a membrane is used, a low-slump concrete should be used to minimize possible curling of the slab. The concrete slab should be allowed to cure properly before placing vinyl or other moisture-sensitive floor covering.

PAVING

The California Bearing Ratio test indicated a CBR value of 13 for the on-site soils when compacted to 90%. The results of the test are presented in the Appendix.

Compaction of the subgrade to at least 90%, including trench backfills, will be important for paving support. The preparation of the subgrade should be done immediately prior to the placing of the base course and/or paving. Proper drainage of the paved areas should be provided since this will reduce moisture infiltration into the subgrade and increase the life of the paving.

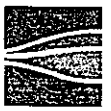
Assuming that the paving subgrade will consist of the on-site soils (or comparable import with a CBR value of at least 10), compacted to at least 90% as recommended, parking areas subject to automobile traffic (assumed Traffic Index of 4½) may be paved with three inches of asphaltic paving placed on the compacted subgrade. Driveways and areas subject to truck traffic (assumed Traffic Index of 5½) may be paved with three inches of asphaltic paving and four inches of base course placed on the compacted subgrade. The paving sections were established using the design recommendations of the Asphalt Institute.

Careful inspection is recommended to verify that the recommended thicknesses or greater are achieved and that proper construction procedures are used.

The base course should meet the specifications for Class 2 Aggregate Base as defined in Section 26 of the State of California, Department of Transportation, Standard Specifications, dated July 1984. Alternatively, the base course could meet the specifications for untreated base as defined in Section 200-2 of the 1985 edition of the Standard Specifications for Public Works Construction. The base course should be compacted to at least 95%.

-oOo-

A Plot Plan and Appendix are attached and complete this report.



APPENDIX

EXPLORATIONS

The soil conditions beneath the site were explored by drilling eight borings at the locations shown on Plate 1. The borings were drilled to depths of 6 to 25 feet below the existing grade using 20-inch-diameter bucket-type drilling equipment. Caving of the boring walls did not occur during drilling, and casing or drilling mud was not used to extend the borings to the depths drilled.

The soils encountered were logged by our field technician, and undisturbed and loose samples were obtained for laboratory inspection and testing. The logs of the borings are presented on Plates A-1.1 through A-1.8; the depths at which undisturbed samples were obtained are indicated to the left of the boring logs. The energy required to drive the sampler twelve inches is indicated on the logs. The soils are classified in accordance with the Unified Soil Classification System described on Plate A-2.

LABORATORY TESTS

The field moisture content and dry density of the soils encountered were determined by performing tests on the undisturbed samples. The results of the tests are shown to the left of the boring logs.

Direct shear tests were performed on selected undisturbed samples to determine the strength of the soils. Tests were also performed on remolded samples compacted to 90%. The tests were performed at field and increased moisture contents and at various surcharge

pressures. The yield-point values determined from the direct shear tests are presented on Plate 3, Direct Shear Test Data.

Confined consolidation tests were performed on three undisturbed samples and on one remolded sample compacted to 90% to determine the compressibility of the soils. Water was added to three of the samples during the tests to illustrate the effect of moisture on the compressibility. The results of the tests are presented on Plates A-4.1 through A-4.3, Consolidation Test Data.

The optimum moisture content and maximum dry density of the upper soils were determined by performing compaction tests on samples obtained from Borings 3 and 7. The tests were performed in accordance with the ASTM Designation D1557-70 method of compaction. After completion of the compaction tests, a California Bearing Ratio test was performed on the sample from Boring 7 in accordance with the ASTM Designation D1883-73 method. The results of the tests are presented on Plate A-5, Compaction and C.B.R. Test Data.

Soil corrosivity studies were performed for us by M. J. Schiff & Associates. The results are presented on Plates A-6.1 through A-6.3.

-oOo-

BORING 1

DATE DRILLED: October 16, 1987
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 78.5 *

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		
75	0	3.9	110	16	■	SM	SILTY SAND - fine, light reddish brown
		4.6	103	8	■		
	5	17.1	109	7	■	SC	CLAYEY SAND - fine to medium, brown to dark brown
70		17.1	112	8	■		
	10	12.4	123	7	■		Medium to coarse
65							
	15	10.3	130	13	■	CL	SILTY CLAY - some Sand, light greyish brown with mottled brown
60							
	20	24.8	104	7	■		

NOTE: Water not encountered. No caving.

* Elevations refer to datum of reference survey; see Plate 1 for location and elevation of bench mark.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

A-87413 DATE 10/27/87 F.T. JMK DF tmh O.E. MD W.P. dmh CHKD

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.1

BORING 2

DATE DRILLED: October 16, 1987
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 81.8

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		
80		4.5	109	26		SM	SILTY SAND - fine, brown
		4.1	103	7			Slightly Clayey
	5	5.1	101	2			
75		11.8	114	8			Slightly Clayey
	10	15.9	116	8		SC	CLAYEY SAND - fine to medium, brown
70							
	15	13.1	122	8			
65							
	20	19.4	110	7		CL	SANDY CLAY - greenish grey

NOTE: Water not encountered. No caving.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

A-87413 DATE 10/27/87 F.T. JMK L dmh O.E. MD W.P. dmh CHKD M

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.2

BORING 3

DATE DRILLED: October 16, 1987
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 78.0

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		
75	0	2.4	104	10		SM	SILTY SAND - fine, brown
		4.3	97	5			
	5	16.8	113	7		SC	CLAYEY SAND - fine, mottled brown and grey
70		18.1	111	5			
	10	13.0	123	5			Dark brown
65		19.1	112	5			
	15					CL	SILTY CLAY - light greyish brown with light mottled brown
60							
	20	31.0	93	5			

NOTE: Water not encountered. No caving.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

A-87413 DATE 10/27/87 F.T. JMK D dmh O.E. MD W.P. dmh CHKD MS

LOG OF BORING

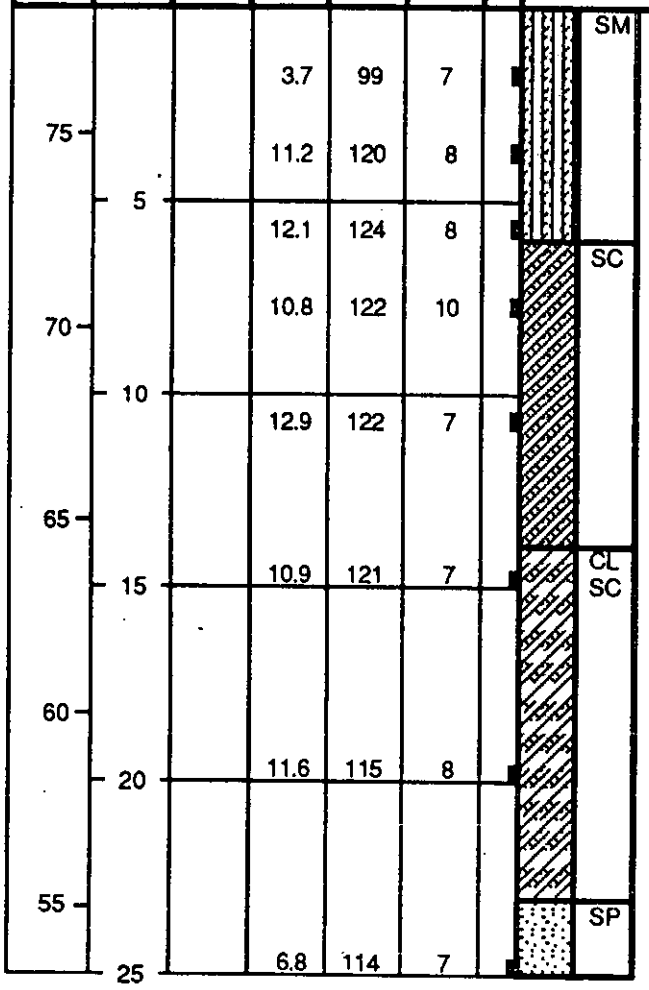
LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.3

BORING 4

DATE DRILLED: October 16, 1987
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 78.3



SILTY SAND - fine, dark brown

Petroleum stain and odor

Grey

CLAYEY SAND - fine, petroleum stain, greyish brown

SANDY CLAY and CLAYEY SAND (ALTERNATE LAYERS) - greenish brown

Petroleum odor

SAND - fine to medium, light reddish brown

NOTE: Water seepage encountered at a depth of 14'. No caving. Petroleum stain and odor at random depths from 2-1/2' to 18'.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

A-87413 DATE 10/27/87 F.T. JMK D dmh O.E. MD W.P. dmh CHKD MS

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.4

BORING 5

DATE DRILLED: October 16, 1987
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 83.9

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
		2.0	104	11		SM — SILTY SAND - fine, light reddish brown
80		3.9	104	10		Brown and light brown
	5	7.6	108	8		Brown
		7.7	104	5		
75						
	10	15.4	117	3		
70						SC — CLAYEY SAND - fine to medium, brown to dark brown
	15	14.1	117	7		
65						
	20	12.1	124	8		

NOTE: Slight water seepage encountered at a depth of 10'. No caving.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

A-87413 DATE 10/27/87 F.T. JMK D/ dmh O.E. MD W.P. dmh CHKD MS

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.5

BORING 6

DATE DRILLED: October 16, 1987
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 81.2

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
80		2.9	103	8		SM COMPACTED FILL - SILTY SAND - fine, light reddish brown
		4.3	101	8		
	5					
75		8.9	91	3		
	10					
70						
	15					

NOTE: Water not encountered. No caving.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

A-87413 DATE 10/27/87 F.T. JMK DF lmh O.E. MD W.P. dmh CHKD

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.6

J A-87413 DATE 10/27/87 F.T. JMK DF Jmh O.E. MD W.P. dmh CHKD

BORING 7

DATE DRILLED: October 16, 1987
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 81.3

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
80		5.3	112	13		SM COMPACTED FILL - SILTY SAND - fine, brown
		5.5	110	8		
	5	8.5	110	10		Petroleum odor
75						
	10					
70						
	15					

NOTE: Water not encountered. No caving.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.7

A-87413 DATE 10/27/87 F.T. JMK DF lmh O.E. MD W.P. dmh CHKD

BORING 8

DATE DRILLED: October 16, 1987
EQUIPMENT USED: 20" - Diameter Bucket

ELEVATION 87.1

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.		
85		5.1	112	13		SM	COMPACTED FILL - SILTY SAND - fine, light brown
		7.1	111	10			
	5	9.3	115	13			Oil stain
80						SM	SILTY SAND - fine, light reddish brown
	10	6.2	99	8			
75		8.0	101	7			
	15						

NOTE: Water not encountered. No caving.

Note : The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

LOG OF BORING

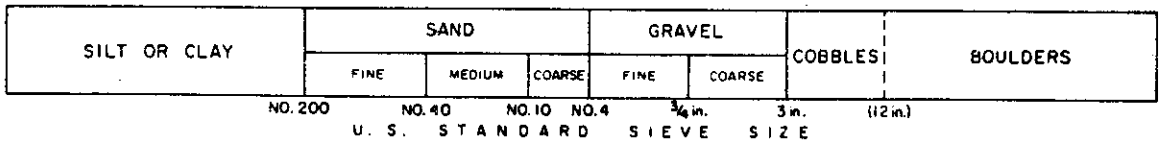
LeROY CRANDALL AND ASSOCIATES

PLATE A - 1.8

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. 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 sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS



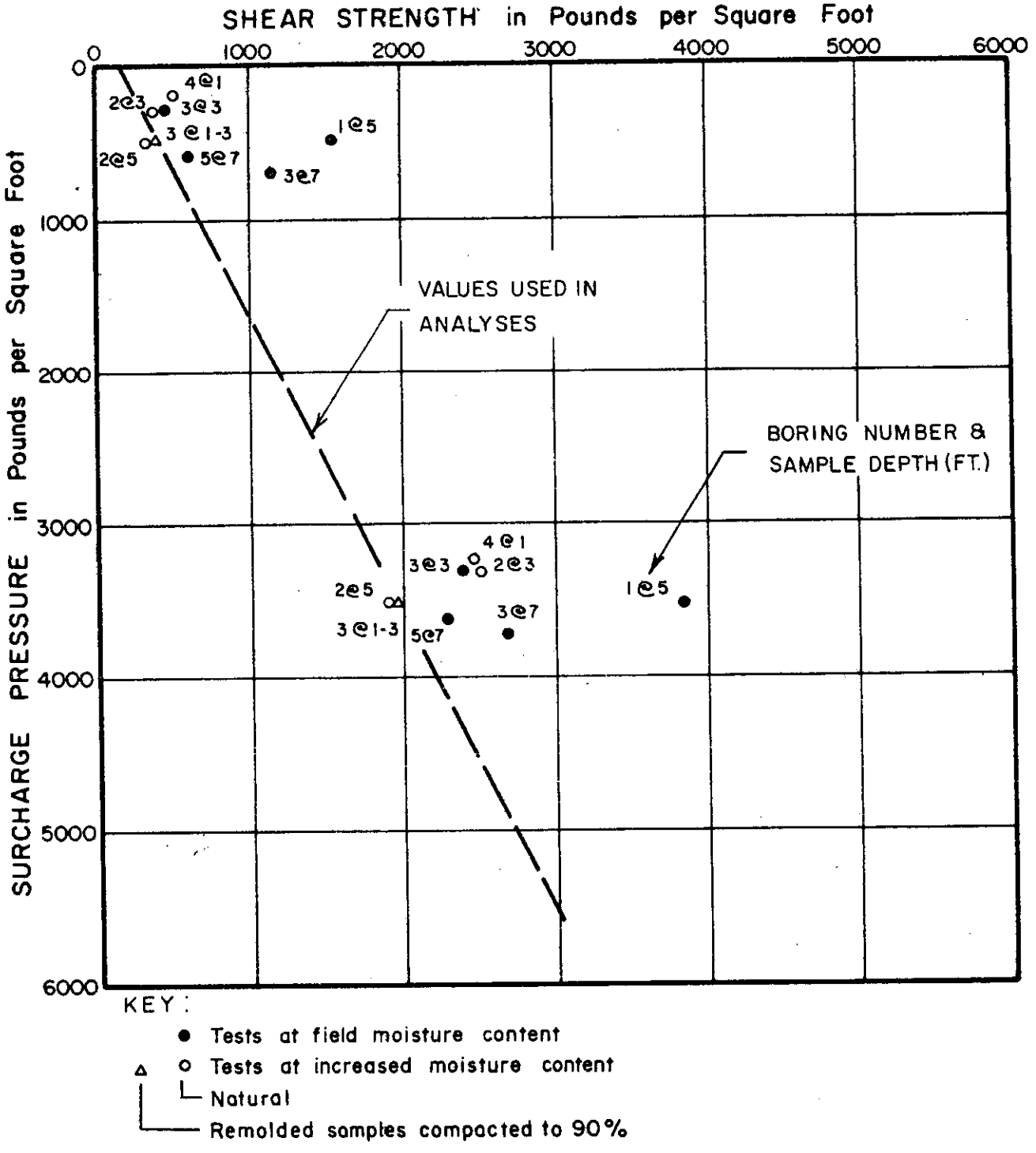
U. S. STANDARD SIEVE SIZE

UNIFIED SOIL CLASSIFICATION SYSTEM

Reference :
The Unified Soil Classification System, Corps of Engineers, U. S. Army Technical Memorandum No. 3-357, Vol. I, March, 1953. (Revised April, 1960)

LeROY CRANDALL AND ASSOCIATES

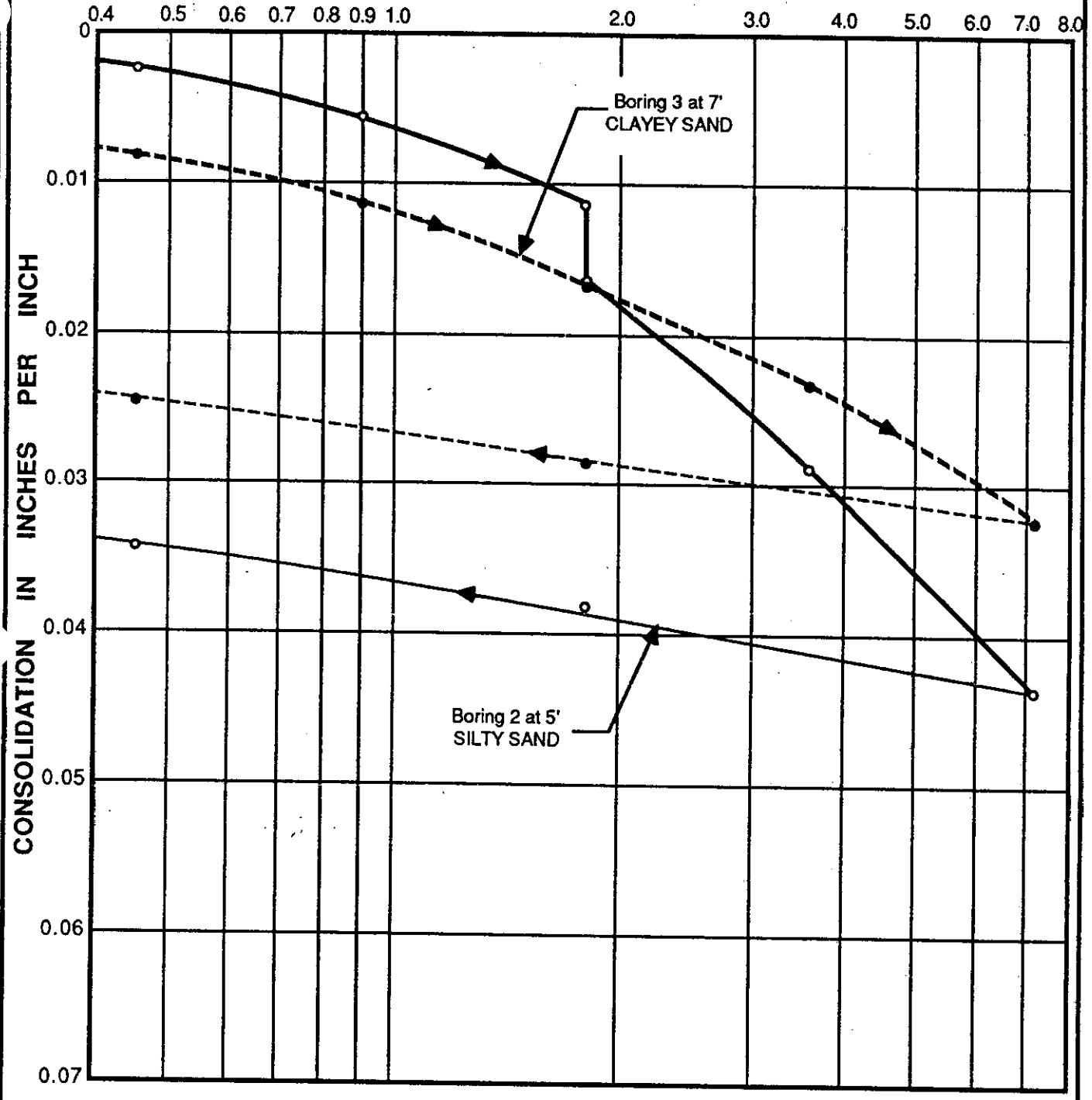
PLATE A-2



DIRECT SHEAR TEST DATA

LEROY CRANDALL & ASSOCIATES

PLATE A-3



NOTE: Water added to sample from Boring 2 after consolidation under a load of 1.8 kips per square foot. The other sample tested at field moisture content.

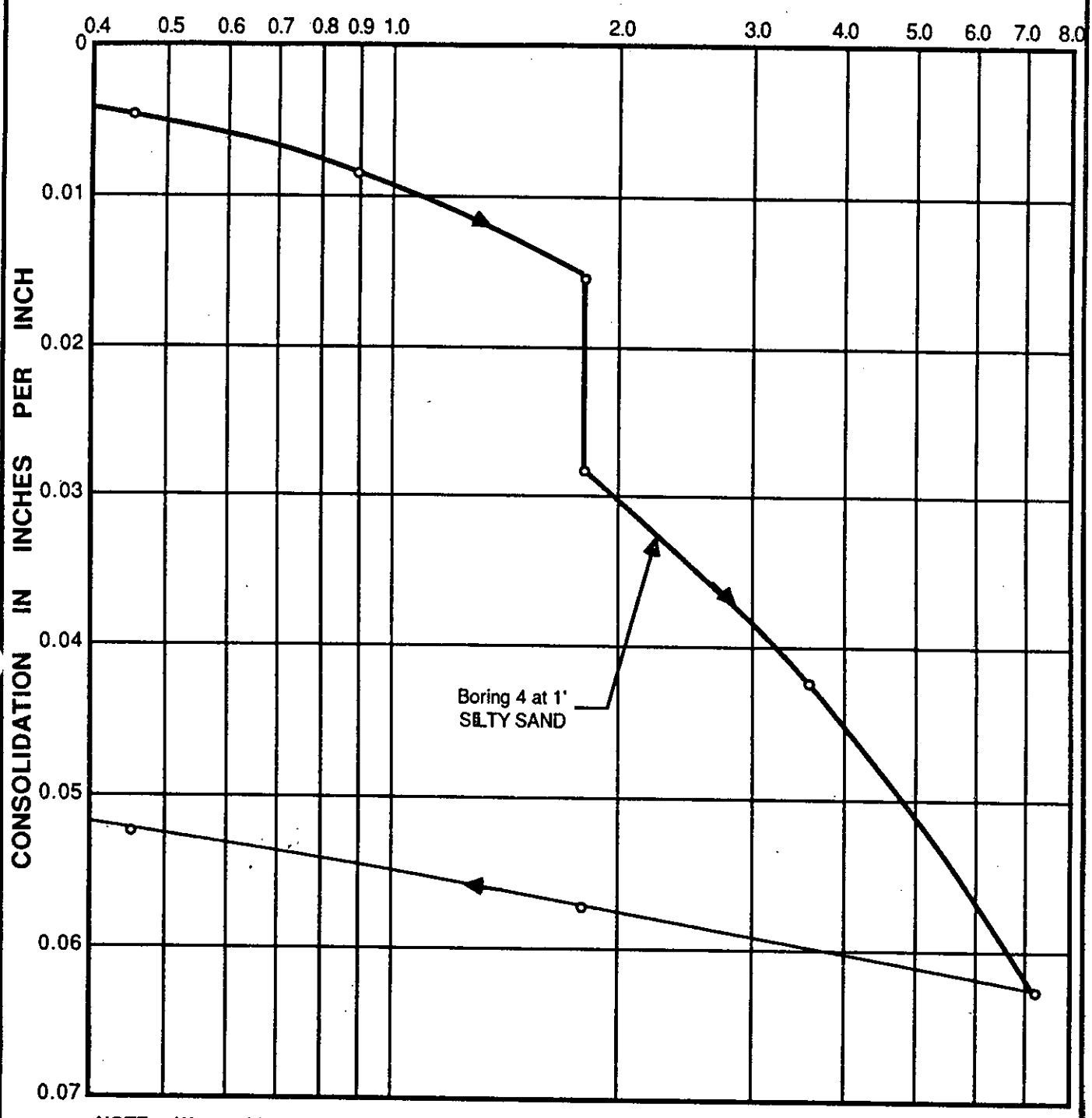
JOB A87413 DATE 11/2/87 DR. d W.P. dmh O.E. MD CHKD

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 4.1

JOB A87413 DATE 11/2/87 DR. c W.P. dmh O.E. MD CHKD

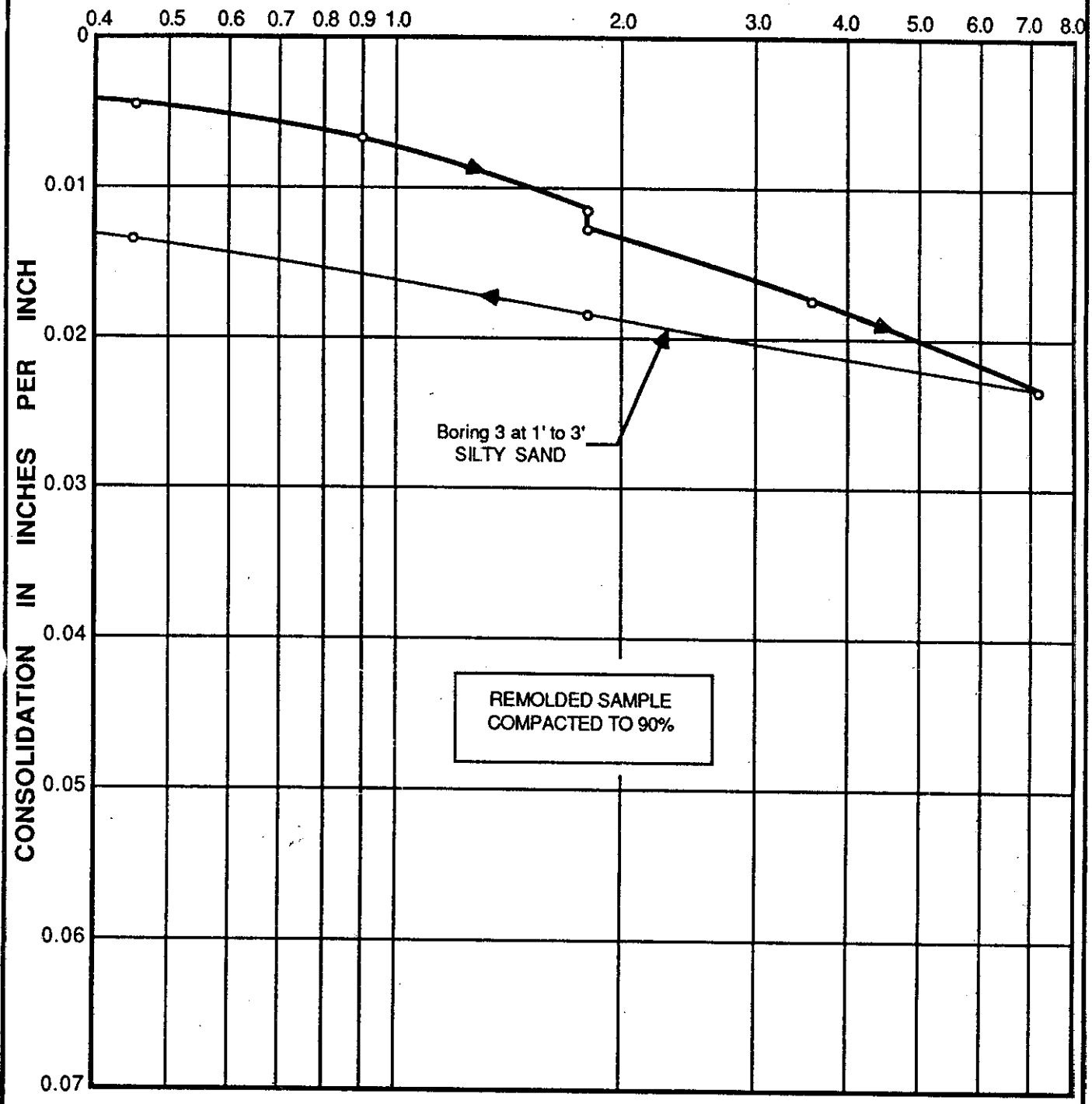


NOTE: Water added to sample after consolidation under a load of 1.8 kips per square foot.

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 4.2



NOTE: Water added to sample after consolidation under a load of 1.8 kips per square foot.

JOB A87413 DATE 11/2/87 DR. W.P. dmh O.E. MD CHKD

CONSOLIDATION TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 4.3

JOB A-87413 DATE 11/13/87 W dmh O.E. MD CHKD MS

BORING NUMBER AND SAMPLE DEPTH:	3 at 1' to 3'	7 at 1' to 3'
SOIL TYPE:	SILTY SAND	COMPACTED FILL - SILTY SAND
MAXIMUM DRY DENSITY*: (lbs./cu. ft.)	108	114
OPTIMUM MOISTURE CONTENT*: (% of dry wt.)	13	12
EXPANSION (%): (From optimum to saturated moisture content)	-	0.0
C. B. R.** (% of standard)		
AT 90% COMPACTION:	-	13
AT 95% COMPACTION:	-	44

* TEST METHOD: ASTM Designation D 1557 - 70.

** TEST METHOD: ASTM Designation D 1883 - 73.

COMPACTION AND C. B. R. TEST DATA

LeROY CRANDALL AND ASSOCIATES

PLATE A - 5

M. J. SCHIFF & ASSOCIATES

Consulting Corrosion Engineers

1291 NORTH INDIAN HILL BOULEVARD
CLAREMONT, CALIFORNIA 91711
(714) 626-0967

November 9, 1987

LeROY CRANDALL & ASSOCIATES
900 Grand Central Avenue
Glendale, California 91201-3009

Attention: Mr. Mohammad Dorri

Re: Soil Corrosivity Tests
Southern California Gas Company
Torrance, California
Your #A-87413, MJS&A #87199

Gentlemen:

Laboratory tests have been completed on four soil samples we selected from your borings for the subject project. The purpose of these tests was to determine if these soils may have deleterious effects on underground utilities and concrete foundations.

The electrical resistivity of each sample was measured in its as-received condition and again with distilled water added to create the standardized condition of saturation. Resistivities are at about their lowest value when the soil is saturated. The samples were chemically analyzed for the major anions and cations, and pH was measured. Results are shown in Table 1.

Electrical resistivities of soils are a measure of their resistance to the flow of corrosion currents. Corrosion currents, following Ohm's Law, tend to be lower in high resistivity soils. The electrical resistivity of a soil varies primarily with its chemical and moisture contents.

A commonly accepted correlation between electrical resistivity and corrosivity toward ferrous metals is:

below	1,000	ohm-centimeters	severely corrosive
1,000 to	2,000	" "	corrosive
2,000 to	10,000	" "	moderately corrosive
over	10,000	" "	mildly corrosive

Electrical resistivities measured in the laboratory with as-received moisture content were in the mildly corrosive category. When saturated, they were in mildly corrosive to corrosive categories. The resistivities of the samples dropped considerably with added moisture indicating that they were dry as-received. The wide variations in soil resistivity can create concentration type corrosion cells that increase corrosivity beyond what would be expected from the soil resistivities alone.

pH values varied from 7.2 to 7.6 which is neutral and mildly alkaline. This is not significant in evaluating corrosivity in this case. The chemical content of the samples was low.

Even though we classify this site as only moderately corrosive to ferrous metals, some precautions against corrosion should be taken.

Underground steel utilities should be given a high quality protective coating such as 40 mil extruded polyethylene, 20 mil plastic tape over primer per AWWA Standard C209, or hot applied coal tar enamel or tape per AWWA Standard C203.

Buried steel piping should be electrically insulated from dissimilar metals, cement-mortar or concrete coated steel, and above ground steel. Underground steel pipe must be bonded for electrical continuity if rubber gasketed, mechanical, grooved end, or other nonconductive type joints are used.

Cathodic protection is recommended for underground steel utilities.

Cast or ductile iron pipe, valves, and fittings should not be placed in contact with concrete, cement-mortar, or dissimilar metals. Polyethylene plastic sheets 8 mils thick and dielectric joints may be used to prevent such contact. Otherwise, no coating is necessary.

No special precautions are required for copper, asbestos-cement, or plastic utilities placed underground from a corrosion viewpoint. However, any iron valves or fittings should be protected as mentioned above.

Where metallic pipelines penetrate concrete structures such as building floors or walls, plastic sleeves, rubber seals, or other dielectric material should be used to prevent pipe contact with the concrete and reinforcing steel.

On any type of pipe, bare steel appurtenances such as bolts, joint harnesses, or flexible couplings should be coated with a coal tar or rubber based mastic after assembly.

Standard construction practices and concrete mixes may be used for concrete in contact with these soils using type 1 or 2 cement.

The scope of this study was limited to a determination of soil corrosivity and its general effects on materials likely to be used for construction. If the architect and/or engineers desire more specific information, designs, specifications, or review of design, we will be happy to work with them as a separate phase of this project.

Respectfully submitted,
M. J. SCHIFF & ASSOCIATES

Leon Arzumanian

cb

Enc: Table 1

L17

Table 1 - LABORATORY TESTS ON SOIL SAMPLES

Location and Depth	Soil Type	Soil Resistivity ohm-centimeters As Rec'd	Soil Resistivity ohm-centimeters Sat'd	pH	Chemical Analysis in mg/kg (ppm) of dry soil: Calcium Ca	Magnesium Mg	Sodium Na	Bicarbonate HCO3	Chloride Cl	Sulfate SO4
B1 1.5'	sand	120,000	21,000	7.2	trace	trace	23	trace	trace	trace
B2 10.5'	sand	12,000	1,800	7.5	40	trace	23	trace	71	30
B3 5.5'	sand	10,000	7,100	7.3	trace	trace	23	122	trace	15
B4 7.5'	sand	13,000	4,800	7.6	trace	trace	58	trace	71	15

Carbonates = 0 for all samples

Southern California Gas Company
Torrance, California
Your #A-87413, MJS&A #87199
F5

PLATE A-6.2

Department of Toxic Substances Control

Meredith Williams, Ph.D., Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Yana Garcia
Secretary for
Environmental Protection

Gavin Newsom
Governor

SENT VIA ELECTRONIC MAIL

February 23, 2024

Peerapol Suree
Planning Associate
City of Torrance
3031 Torrance Boulevard
Torrance, CA 90503
psuree@torranceca.gov

RE: MITIGATED NEGATIVE DECLARATION (MND) FOR THE TORRANCE DEL AMO PROJECT, DATED FEBRUARY 8, 2024 STATE CLEARINGHOUSE NUMBER: 2024020302

Dear Peerapol Suree,

The Department of Toxic Substances Control (DTSC) has reviewed the MND for the Torrance Del Amo Project, which evaluates the proposed development of a 272-unit, 3-5-story residential condominium development over a two-level subterranean parking garage located on a 239,632 square-foot lot (or 5.5 Acre).
In July 2022, a Phase I Environmental Site Assessment (ESA) was prepared for the project by GEOCON West, Inc. The ESA identified past petroleum production at the site in addition to above-ground storage tanks, an oil derrick and well, and apparent waste oil and water ponds in addition to other recognized environmental concerns. All of these were reported to be contaminated by “disposal surface impoundment”. There are no records of any cleanup activities or oversight therefore, a Soil Management Plan (SMP) was recommended by GEOCON West, Inc. as noted in the Initial Study Mitigation

Measure HAZ-1. Furthermore, asbestos-containing materials and lead-based paint could be encountered at the project site during demolition and remodeling phases. DTSC recommends the City of Torrance adhere to the following:

1. The City of Torrance enter into DTSC's Standard Voluntary Agreement (SVA) program or seek oversight with the Los Angeles County Site Mitigation Unit so a proper evaluation of the Project is completed. If entering into an SVA with DTSC, the FLUXX portal link is provided and the page also has a link to the Fluxx User Guide that can help you navigate the system. You will need to create a new profile and once in the system, click "Start a Request for Lead Agency Oversight Application." DTSC recommends that once the SVA is signed, a Preliminary Endangerment Assessment Report (PEA Report) be submitted for DTSC review. The PEA Report shall summarize all existing data and provide an evaluation of the possible risk to current and future users of the site. If you have any questions about the application portal, please contact the DTSC Brownfield Coordinator Gregory Shaffer or contact the Application Portal Inbox.
2. If buildings or other structures are to be demolished on any project sites included in the proposed project, surveys should be conducted for the presence of lead-based paints or products, mercury, asbestos containing materials, and polychlorinated biphenyl caulk. Removal, demolition, and disposal of any of the above-mentioned chemicals should be conducted in compliance with California environmental regulations and policies. In addition, sampling near current and/or former buildings should be conducted in accordance with DTSC's June 2006 Phase I Addendum Guidance.
3. DTSC recommends that all imported soil and fill material should be tested to ensure any contaminants of concern are within approved screening levels for the intended land use. To minimize the possibility of introducing contaminated soil and fill material there should be documentation of the

origins of the soil or fill material and, if applicable, sampling be conducted to ensure that the imported soil and fill material meets screening levels for the intended land use. The soil sampling should include analysis based on the source of the fill and knowledge of the prior land use.

DTSC appreciates the opportunity to review and comment on the MND for Torrance Del Amo Project. Thank you for your assistance in protecting California's people and environment from the harmful effects of toxic substances. If you have any questions or concerns, please contact me or a member of our CEQA Unit Team.

Sincerely,

Dave Kereazis

Dave Kereazis
Associate Environmental Planner
CEQA Unit-Permitting/HWMP
Department of Toxic Substances Control
Dave.Kereazis@dtsc.ca.gov

cc: (via email)

Governor's Office of Planning and Research

State Clearinghouse

State.Clearinghouse@opr.ca.gov

Scott Wiley

Associate Governmental Program Analyst

CEQA Unit-Permitting/HWMP

Department of Toxic Substances Control

Scott.Wiley@dtsc.ca.gov

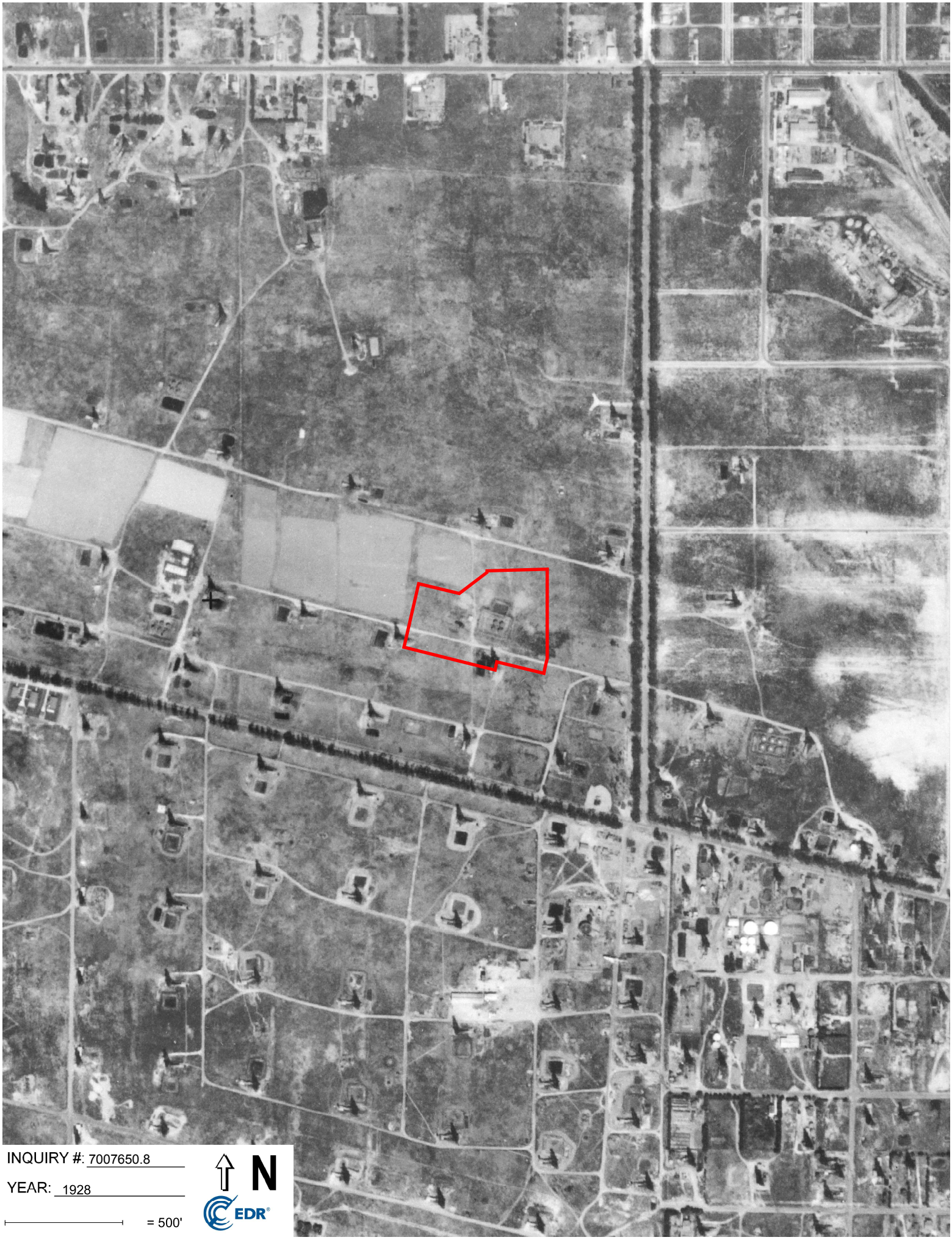
Tamara Purvis

Associate Environmental Planner

CEQA Unit-Permitting/HWMP

Department of Toxic Substances Control

Tamara.Purvis@dtsc.ca.gov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