INFORMATION HANDOUT

For Contract No. 07-3X3904
At 07-LA-1-8.7

Identified by
Project ID 0712000064

AGREEMENTS

License agreement between Tesoro Refining & Marketing Company LLC, and California Department of Transportation

MATERIALS INFORMATION

Site investigation report for new crib wall (RW 521) dated June 12, 2012

Site investigation report for four crib wall areas (RW 516, 517, 519 and 520) dated September 30, 2012

Foundation report for retaining wall repair at Tesoro refinery site dated February 11, 2013

Groundwater site investigation report for new crib walls dated June 24, 2013

INFORMATION HANDOUT

For Contract No. 07-3X3904
At 07-LA-1-8.7

Identified by
Project ID 0712000064

AGREEMENTS

License agreement between Tesoro Refining & Marketing Company LLC, and California Department of Transportation

LICENSE AGREEMENT

This License Agreement ("Agreement"), effective as of June 27, 2013 (the "Effective Date"), is made by and between Tesoro Refining & Marketing Company LLC, successor to Tesoro Refining and Marketing Company ("Licensor") and the State of California, Department of Transportation ("Licensee"). Licensor and Licensee are individually referred to as a "Party" and collectively referred to as the "Parties."

Recitals

A. Whereas, this Agreement concerns four (4) different right-of-way parcels of real property in Wilmington, California owned by the Licensor, as well as a staging (laydown) area for the temporary storage of soil and groundwater. These four (4) different right-of-way parcels are parcels 80335-1 (consisting of approximately 8,633 sq. ft), 80335-2 (consisting of approximately 9,204 sq. ft.), 80335-3 (consisting of approximately 6,896 sq. ft.) and 80335-4 (consisting of approximately 11,165 sq. ft), all as depicted on the Appraisal Map attached hereto as Exhibit A. The staging (laydown) area for the temporary storage of soil and groundwater consists of an area of land approximately 13,000 square feet in size and located in the approximate area depicted on Exhibit B. The above-referenced four (4) right-of-way parcels, as well as the above-referenced staging (laydown) area, are individually and collectively referred to as a "Parcel" or the "Parcels".

B. The Parcels are part of Licensor's refinery located at property commonly known as 2100 and 2101 East Pacific Coast Highway, Wilmington, California having Assessor's Parcel Numbers 7315-017-005 and 7428-007-009 (the "Refinery Property").

C. Whereas, Licensee desires to enter upon the Parcels in order to rehabilitate sections of the Licensee's crib walls that support Pacific Coast Highway, which rehabilitation work may include excavating shallow sections on the Parcels for the purpose of constructing temporary forms for retaining walls to support the crib walls rehabilitation and the temporary storage on the Parcels of soil and groundwater excavated, removed, pumped or generated during such work that may contain hazardous materials or hazardous substances (hereafter, all work reasonably necessary to rehabilitate the crib walls in the Parcels is referred to as the "Work").

D. Whereas, Licensor is willing to allow Licensee and its employees, as well as Licensee's third-party consultants, contractors, subcontractors, agents and representatives (such third parties are collectively referred to as "Consultants"), to enter upon the Parcels to perform the Work pursuant to the terms of this Agreement, and to access the Parcels via other portions of the Refinery Property, as more particularly described below.

E. Whereas, the soil and groundwater at or beneath the Parcels may be contaminated with hazardous materials and/or hazardous substances, including but not limited to petroleum hydrocarbons (including any fractions thereof), petroleum derivates, antinomy, arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, volatile organic compounds, semi-volatile organic compounds, and polyaromatic hydrocarbons (all of which, as well as any fuel additives and any other materials, substances or wastes defined or classified as "hazardous" or "extremely hazardous" under any federal or state law, statute or regulation, are individually and collectively referred to hereafter as "hazardous materials" or "hazardous substances").

Terms and Conditions

NOW, THEREFORE, in consideration of the mutual promises herein contained, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Licensor and Licensee agree as follows:

1. Grant of License. Licensor hereby grants to Licensee and its Consultants a non-exclusive license from the Effective Date until August 20, 2015 (the "Term"), subject to all leases, subleases, easements, restrictions, encumbrances, and reservations, recorded or unrecorded, now or subsequently in effect, to (a) access and enter upon the Parcels for the purposes of performing the Work, (b) access the Parcels in order to perform the Work using the routes on the Refinery Property denoted as "Route to Job Site" and "Routes to/from Laydown Area" on Exhibit B attached hereto and incorporated herein by this reference, and (c) park at the Refinery Property in the area denoted as "Parking" on Exhibit B while performing the Work.

2. Performance of Work. Licensee shall perform the Work, and otherwise utilize its rights and privileges under this Agreement, as follows:

(a) All Work, including but not limited to obtaining any permits associated with the Work, shall be at the sole cost and expense of Licensee.

(b) No Work shall be conducted on any portion of the Refinery Property other than the Parcels, nor shall Licensee or its Consultants enter upon any portion of the Refinery Property other than the Parcels, except (i) Licensee and its Consultants may access the Parcels via the routes marked as "Route to Job Site" and/or "Routes to/from Laydown Area" on Exhibit B, and (ii) Licensee and its Consultants may park in the area marked as "Parking" on Exhibit B. In no event shall Licensee or its Consultants enter upon any other portion of the Refinery Property, except when performing activities described in Section 2(p) herein or during emergencies at the Refinery Property that require the Licensee to use an alternative escape route.

(c) Licensee and its Consultants shall take all steps to minimize any impacts to Licensor's business activities at the Refinery Property, including without limitation (i) using only those portions of the Parcels reasonably necessary for the Work, and with respect to the same, only for such lengths of time reasonably necessary, (ii) accessing the Parcels either directly from Pacific Coast Highway or the routes denoted as "Route to Job Site" and/or "Routes to/from Laydown Area" on Exhibit B, (iii) conducting all Work at the Parcels between the hours of 7:00 a.m. and 5:30 p.m. Monday through Thursday, (iv) promptly and regularly advising Licensor of all planned activities on the Parcels, (v) promptly responding to all requests of Licensor for clarification as to Licensee's planned activities, (vi) following all reasonable requests of Licensor intended to minimize any impacts to Licensor's business operations at the Refinery Property, and (vii) following all reasonable request of Licensor intended to minimize any safety risks and security concerns at the Refinery Property.

(d) Licensee, at its sole cost and expense, shall acquire all applicable governmental permits, approvals and other authorizations required under all applicable federal, state and local laws, regulations, rules, orders and ordinances prior to conducting the Work, and all Work shall be conducted in accordance with all applicable federal, state and local laws, regulations, rules, orders and ordinances, as well as all industry standards.

(e) No materials associated with, or waste or debris generated from, the Work shall be stored on the Refinery Property (including any of the Parcels), except Licensee and its Consultants may temporarily store on the Parcels soil and groundwater containing hazardous materials or hazardous substances using bins/containers/Baker Tanks supplied by Licensee or its Consultants, provided such storage is, as required by Subsection 2(d), in compliance with all applicable federal, state and local laws, regulations, rules, orders and ordinances, and industry standards. The costs and expenses of complying with all such applicable federal, state and local laws, regulations, rules, orders and ordinances, and industry standards, including but not limited to those concerning secondary containment, shall be borne by Licensee. All such soil and groundwater shall, as required by Subsection 2(n), be properly disposed of or recycled at regulated offsite landfills or facilities, at Licensee's sole cost and expense.

(f) In no event shall the Work completely block or prevent vehicular or railroad access by Licensor or its contractors under Pacific Coast Highway. As for any vehicular access within the Parcels (but not under Pacific Coast Highway), Licensee shall take any and all reasonable steps to ensure such vehicular access is restricted for the minimum time necessary, and shall never restrict vehicular access if it would create a safety hazard at the Refinery Property. Licensee, at its sole cost, shall provide any and all "flagmen" required for the safe operation of any vehicles, including trains, on, across or near the Parcels.

(g) Licensee and its Consultants shall comply with all safety and security-related rules, requirements and requests of Licensor while on the Refinery Property, including the Parcels. In addition, should it be necessary for Licensee or its Consultants to access the Parcels directly from Pacific Coast Highway, Licensee shall, at its sole cost and expense, hire contractors to remove any fencing that reasonably needs to be removed in conjunction with the same, replace any fencing that was so removed, and install any temporary fencing to ensure the Refinery Property is fenced when the Work is not actually occurring. No fencing shall be removed or installed without providing Licensor at least fifteen (15) days advanced written notice. Licensor may request Licensee to use a fencing contractor chosen and selected by Licensor (but paid for by Licensee).

(h) Prior to the expiration of the Term of this Agreement, Licensee and its Consultants shall promptly remove all equipment and material associated with the Work from the Parcels at Licensee's sole cost and expense, and shall restore the Parcels to their condition existing prior to the Work.

(i) Licensee represents and warrants to Licensor that it is self-insured. Nonetheless, Licensee shall cause all of its Consultants who enter upon the Refinery Property to maintain at least $1,000,000 per occurrence in insurance coverage under all of the following types of policies: automobile liability insurance, commercial general liability insurance (which shall include coverage for both personal injury and broad form property damage), and worker's compensation insurance as required by law. Licensor shall be named as additional insureds on all such policies except for the worker's compensation policies.

(j) Licensee shall keep the Refinery Property (including the Parcels) free and clear of any mechanic's and material liens, and shall take any and all actions to immediately cause any such liens to be released.

(k) No modifications or amendments to the scope of the Work shall be allowed without the express written consent of Licensor, which consent Licensor may withhold or condition in its sole discretion.

(l) Except for fencing as described above in Subsection (g), in no event shall Licensee or its Consultants remove, modify, alter, damage or destroy any equipment, improvements or structures on the Parcels (or any other portion of the Refinery Property). All such equipment, improvements and structures shall be protected in place during the period of Work and access to the Parcels, at Licensee's sole cost and expense.

(m) No utilities on, at, under or near the Parcels may be removed, altered, relocated, interfered with or disrupted for any length of time without the advance written consent of Licensor, which consent Licensor may withhold in its sole discretion.

(n) In the event any soil containing hazardous materials or hazardous substances, including but not limited to petroleum hydrocarbons, is encountered during the Work, Licensee shall be solely responsible, at its sole cost and expense, for properly recycling the contaminated soil offsite or disposing of the same at a regulated landfill, and for replacing said soil with clean backfill. Licensor shall not be listed as the generator of such material on any manifests or similar documents. Licensee shall not, however, be responsible for any long-term remediation or monitoring of any unexcavated soil that remains *in situ* in the subsurface at the Refinery Property (except to the extent Licensee releases or discharges hazardous substances or hazardous materials into such soil).

(o) Without limiting any other provision of this Agreement, any person of Licensee or its Consultants handling and/or excavating any contaminated soil or groundwater (i) must wear personal protective equipment ("PPE") appropriate for the conditions, including but not limited to, a VOC monitor, LEL monitor, respirator, fresh air provider, Tyvek coveralls and/or gloves, and (ii) must be HAZWOPPER-trained. Without limiting any other provision of this Agreement, Licensee further agrees that any Consultant excavating contaminated soil must have an AQMD Rule 1166 permit.

(p) Without limiting any other provision in this Agreement, in the event Licensee or its Consultants uncover any groundwater contaminated with hazardous materials or hazardous substances in, at or under the Parcels that needs to be disposed of as part of the Work (or so that Licensee may conduct or complete the Work), Licensee shall, at its sole cost and expense, properly dispose of the same, as required by Subsection 2(d), in compliance with all applicable federal, state and local laws, regulations, rules, orders and ordinances, and industry standards. Licensor shall not be listed as the generator of such groundwater on any manifests or similar documents. Licensee may temporarily store such contaminated groundwater in Baker Tanks on the Parcels, which Baker Tanks shall be provided and maintained by Licensee at its sole cost and expense. Notwithstanding any other provision of this Agreement, should Licensee request, the contents of such Baker Tanks may be disposed of, from time to time, in the slop system at the Refinery Property using Licensee's Consultants (at Licensee's sole cost and expense) to transport the groundwater from the Baker Tanks to the slop system; provided, however, that Licensor's obligation to accept the contents of such Baker Tanks in its slop system is contingent upon its slop system then having the capacity to

accept such contents without affecting Licensor's business operations at the Refinery Property (and Licensor is under no obligation to ensure the slop system has any such capacity at any given time). Licensee shall not, however, be responsible for any long-term remediation or monitoring of any groundwater impacted with hazardous substances or hazardous materials that remains *in situ* in the subsurface at the Refinery Property (except to the extent Licensee releases or discharges hazardous substances or hazardous materials into such groundwater).

Any breach by any Consultant of Licensee of any duty or obligation of such Consultant as set forth in this Agreement shall also be deemed to be a breach of this Agreement by Licensee, although this provision shall in no way serve as a limitation on such Consultant's responsibility or liability to Licensor.

3. Reports and Correspondence. Licensee shall keep Licensor informed of the progress of the Work by promptly providing Licensor, at no cost to Licensor, with copies of all written reports Licensee provides to any governmental agency concerning the Work, as well as copies of any written correspondence sent to or received from any governmental agency regarding the Work.

4. Payment. In consideration for Licensor entering into this Agreement, Licensee shall pay Licensor, within 45 days of the Effective Date, the sum of Three Hundred and Eight Thousand Dollars ($308,000.00).

5. Indemnity. In further consideration for Licensor entering into this Agreement, and except to the extent attributable to any wrongful or negligent acts or omissions by any Indemnified Party (as defined below), Licensee agrees to protect, hold harmless, indemnify and defend Licensor and its parents, subsidiaries, and affiliates, each of their predecessors and successors, and each manager, member, shareholder, director, officer, employee, consultant, customer, invitee, attorney, insurer, agent and representative of any of the foregoing (collectively, "Indemnified Parties") from and against any and all suits, claims, causes of actions, assessments, taxes, demands, damages, liens, losses, injuries, liabilities, orders, directives, fines, penalties, costs and expenses (including reasonable attorneys' fees and costs, expert witness fees, and bond costs) related to, arising from or based upon: (i) the Work, (ii) Licensee and/or its Consultants entering upon the Refinery Property (including the Parcels) or otherwise exercising any of its rights under this Agreement, and/or (iii) any breach of this Agreement. The terms and conditions of this Section shall survive any termination or expiration of this Agreement.

6. Release. In further consideration for Licensor entering into this Agreement, and except for any of Licensor's duties and obligations under this Agreement, Licensee hereby forever and fully releases, acquits, exonerates and discharges Licensor and its parents, subsidiaries, and affiliates, each of their predecessors and successors, and each manager, member, shareholder, director, officer, employee, consultant, customer, invitee, attorney, insurer, agent and representatives of any of the foregoing (collectively, "Released Parties") from and against any and all past, present

and future suits, claims, causes of actions, assessments, taxes, demands, damages, liens, losses, injuries, liabilities, orders, directives, fines, penalties, costs and expenses (including reasonable attorneys' fees and costs, expert witness fees, and bond costs) of whatever kind, nature, character and description in law, equity or otherwise, whether known or unknown, suspected or unsuspected, anticipated or unanticipated, liquidated or unliquidated, regarding, based upon, arising from or related to, directly or indirectly, the Work, including but not limited to any soil and/or groundwater contaminated with hazardous materials or hazardous substances that may be encountered during the Work. The terms and conditions of this Section shall survive any termination or expiration of this Agreement.

7. Waiver of Section 1542. Licensee represents and warrants that it has been advised of the existence of Section 1542 of the California Civil Code, which provides as follows:

> A general release does not extend to claims which the creditor does not know or suspect to exist in his or her favor at the time of executing the release, which if known by him or her must have materially affected his or her settlement with the debtor.

Notwithstanding this provision, this Agreement will constitute a full release of the matters released in Section 6. Licensee knowingly and voluntarily waives the provisions of Section 1542, as well as any other statute, law or rule of similar effect, and acknowledges and agrees that this waiver is an essential and material term of this Agreement, and that without this waiver this Agreement would not have been entered into by Licensor.

8. Notice. Any notices or the like required hereunder shall be in writing and shall be deemed delivered, provided or received, as required by the applicable provision, (i) when delivered if personally delivered, (ii) upon written fax confirmation if sent via fax, (iii) the next business day if sent via overnight carrier for guaranteed delivery the next business day with delivery confirmation, or (iv) five (5) business days after being sent by United States first class certified mail – return receipt requested, postage prepaid, if mailed. Any notices or the like required hereunder shall be sent as follows:

If to Licensor: Tesoro Refining & Marketing Company LLC
2101 East Pacific Coast Highway
Wilmington, CA 90744
Fax: 310-522-6475
Attn: William A. Kuhns

If to Licensee: State of California
Department of Transportation – District 7
100 S. Main Street, MS-6
Los Angeles, CA 90012
Fax: 213-897-7023
Attn: Aline Antaramian

The foregoing addressees may be changed from time to time by a Party in a manner in compliance with this Section. If any notice sent via personal delivery or fax is received by the recipient on a Saturday, Sunday, legal holiday or after 5:00 p.m. on a business day, it shall be deemed delivered, provided and received on the next business day.

9. Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of California.

10. Counterparts. This Agreement may be executed in counterparts, which counterparts shall constitute a single, integrated agreement.

11. Modification; Waiver. This Agreement cannot be modified, amended or altered, or any of the terms hereof waived, except by a writing referring specifically to this Agreement and its intent to modify, amend, alter or waive the same, manually signed by the Party against whom enforcement of the modification, amendment, alteration or waiver is sought. Furthermore, no such waiver shall be deemed to be a subsequent waiver of such provision or a waiver of any subsequent breach of the same or any other provision hereof.

12. Recording. Licensee may not record this Agreement or a memorandum referring to this Agreement without the express written consent of Licensor, which consent Licensor may withhold in its sole discretion.

13. Entire Agreement. This Agreement contains all agreements and understandings between the Parties pertaining to the subject matter hereof. There are no oral or other written agreements, representations, stipulations or warranties, express or implied, with respect to the same which are not fully set forth herein. Accordingly, the document entitled "Environmental Concerns for Caltrans Replacement of Crib Wall on Tesoro Refinery and Pacific Coast Highway" is not a part of this Agreement, nor is it intended to supplement, amend or modify this Agreement.

14. Headings. The paragraph headings in this Agreement are intended solely for convenience of reference and shall not in any manner amplify, limit, modify or otherwise affect the interpretation of any provision of this Agreement, and the masculine,

feminine or gender neutral, as well as the singular and plural, shall be deemed to include the other gender and numbers whenever the context so indicates or requires.

15. Non-Waiver. Nothing in this Agreement shall be construed as an express or implied waiver of any rights, claims, causes of action, defenses or privileges which Licensor has or may have against Licensee or any other person or entity regarding any the Work, including but not limited to any rights, claims, causes of action, defenses or privileges concerning any act or omission which gave rise to, in whole or in part, the need for the Work.

16. No Third Party Beneficiaries. Except for the Indemnified Parties and Released Parties, there are no third party beneficiaries to this Agreement.

17. No Joint Venture. The Parties acknowledge and agree that this Agreement shall not be construed to create a partnership, joint venture, employment or agency relationship between the Parties.

18. Authority to Execute. Each of the persons signing this Agreement on behalf of each Party hereby represents and warrants that he/she is authorized to execute this Agreement on behalf of the Party for whom he/she is signing.

19. Limited Scope of Agreement. Except for the non-exclusive license granted in Section 1, nothing in this Agreement is intended to grant or convey to Licensee any legal or equitable interest in the Refinery Property (or any Parcel), or to waive any of Licensor's rights regarding the same.

IN WITNESS WHEREOF, the Parties have duly entered into this Agreement to be effective as of the Effective Date.

LICENSOR:

TESORO REFINING & MARKETING COMPANY LLC

By:_____
Name: _____
Its: _____

LICENSEE:

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION

By: Michael Miles
Name: Michael Miles
Its: District 7 District Director

feminine or gender neutral, as well as the singular and plural, shall be deemed to include the other gender and numbers whenever the context so indicates or requires.

15. Non-Waiver. Nothing in this Agreement shall be construed as an express or implied waiver of any rights, claims, causes of action, defenses or privileges which Licensor has or may have against Licensee or any other person or entity regarding any the Work, including but not limited to any rights, claims, causes of action, defenses or privileges concerning any act or omission which gave rise to, in whole or in part, the need for the Work.

16. No Third Party Beneficiaries. Except for the Indemnified Parties and Released Parties, there are no third party beneficiaries to this Agreement.

17. No Joint Venture. The Parties acknowledge and agree that this Agreement shall not be construed to create a partnership, joint venture, employment or agency relationship between the Parties.

18. Authority to Execute. Each of the persons signing this Agreement on behalf of each Party hereby represents and warrants that he/she is authorized to execute this Agreement on behalf of the Party for whom he/she is signing.

19. Limited Scope of Agreement. Except for the non-exclusive license granted in Section 1, nothing in this Agreement is intended to grant or convey to Licensee any legal or equitable interest in the Refinery Property (or any Parcel), or to waive any of Licensor's rights regarding the same.

IN WITNESS WHEREOF, the Parties have duly entered into this Agreement to be effective as of the Effective Date.

LICENSOR:

TESORO REFINING & ~~MARKETING~~ COMPANY LLC

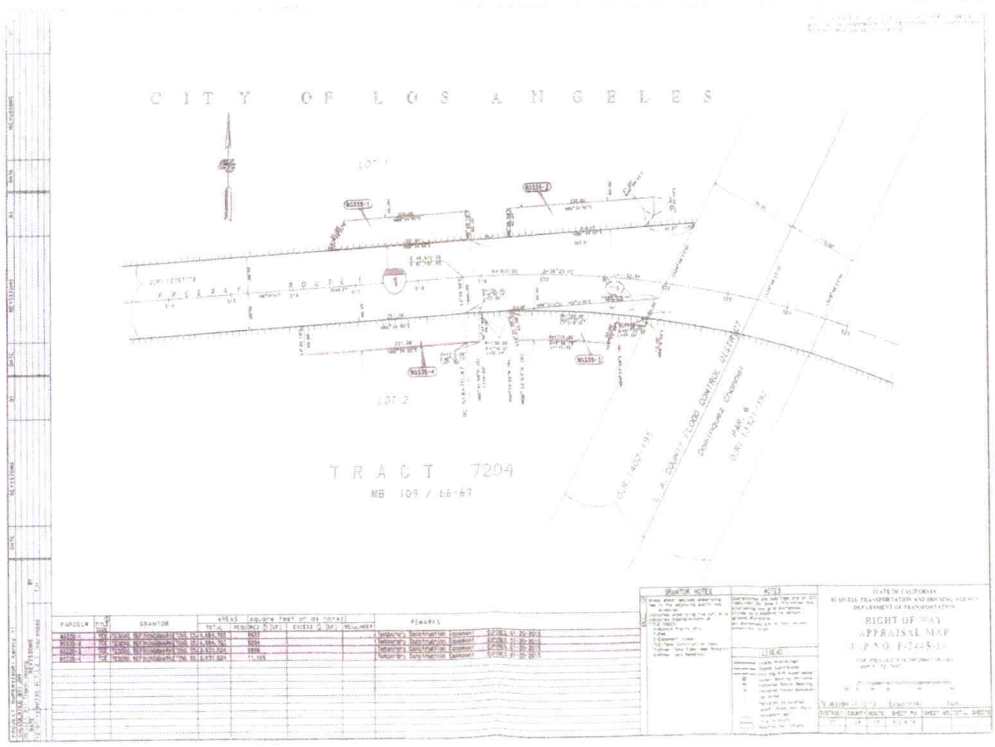
By: _____ SKV
Name: DANIEL C. CARLSON
Its: VICE PRESIDENT

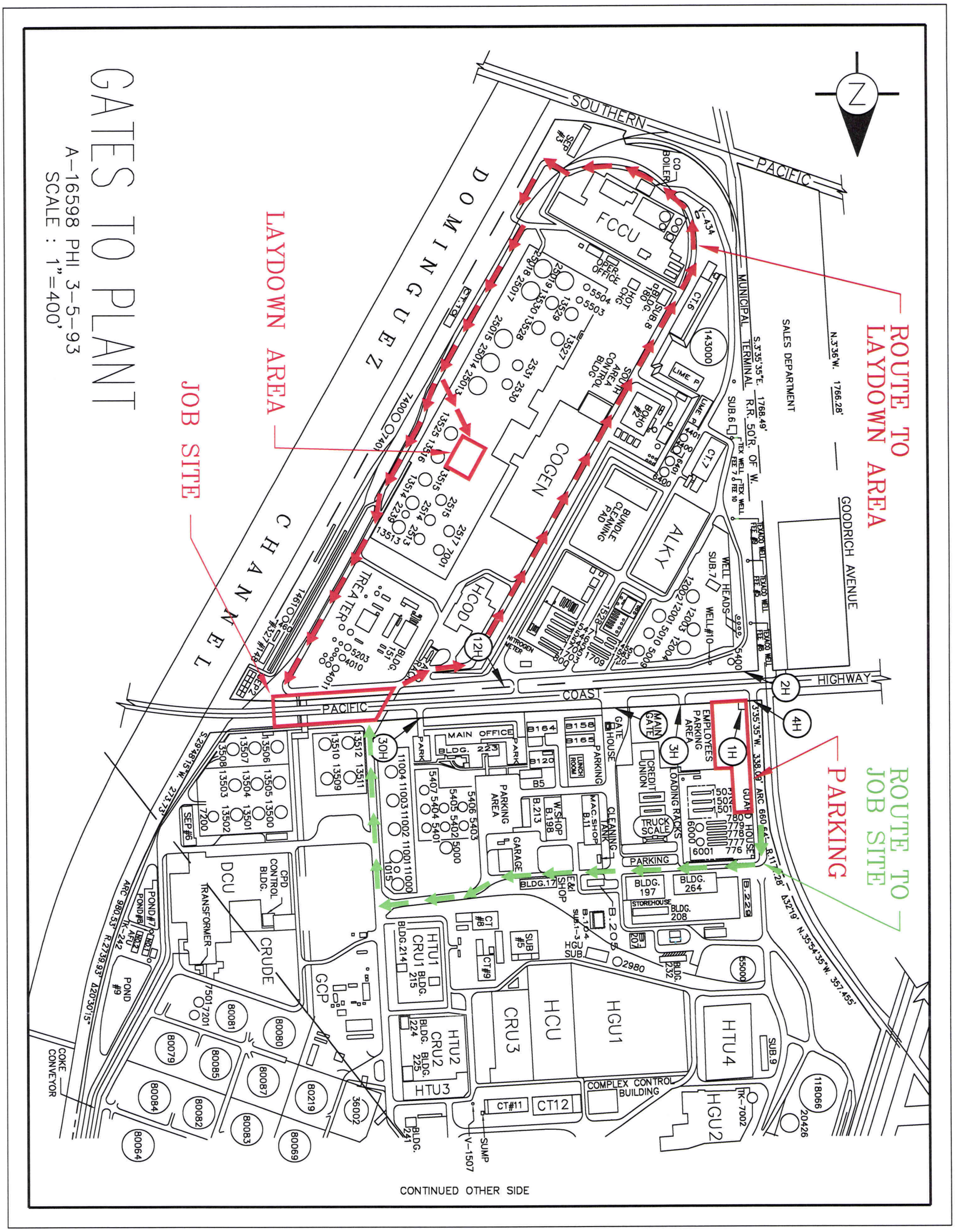
LICENSEE:

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION

By: _____
Name: _____
Its: _____

Exhibit A to License Agreement




GATES TO PLANT
A-16598 PHI 3-5-93
SCALE : 1"=400'
LAYDOWN AREA
JOB SITE
ROUTE TO LAYDOWN AREA
ROUTE TO JOB SITE
PARKING
SOUTHERN PACIFIC
DOMINGUEZ CHANNEL
PACIFIC COAST HIGHWAY
GOODRICH AVENUE
MUNICIPAL TERMINAL
SALES DEPARTMENT
FCCU
COGEN
ALKY
HCU
HGU1
HGU2
HTU4
CRU3
HTU1 CRU1
HTU2 CRU2
HTU3
DCU
CRUDE
GCP
TREATER
BUNDLE CLEANING PAD
COKE CONVEYOR
POND #9
CONTINUED OTHER SIDE

INFORMATION HANDOUT

For Contract No. 07-3X3904
At 07-LA-1-8.7

Identified by
Project ID 0712000064

MATERIALS INFORMATION

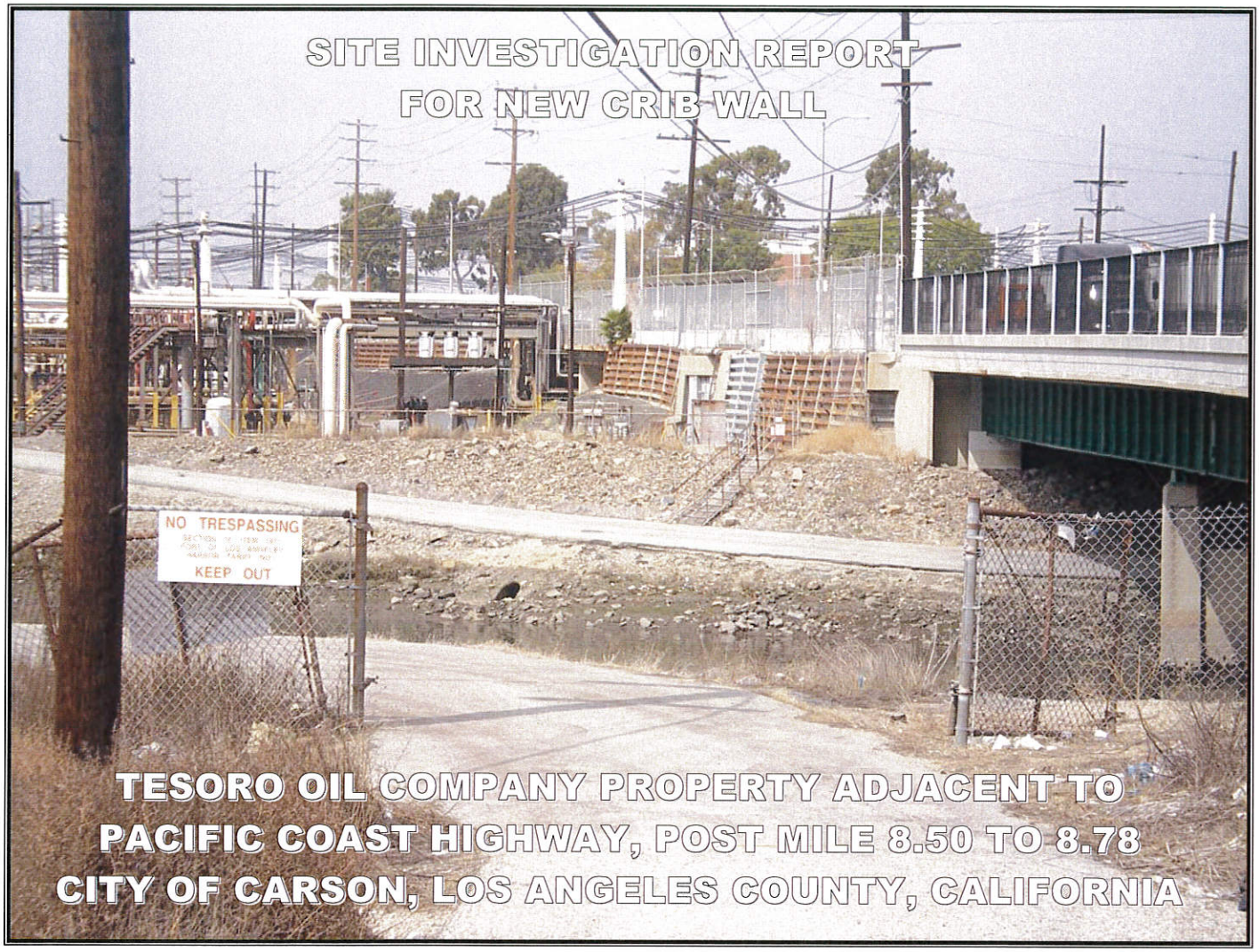
Site investigation report for new crib wall (RW 521) dated June 12, 2012

Site investigation report for four crib wall areas (RW 516, 517, 519 and 520) dated September 30, 2012

Foundation report for retaining wall repair at Tesoro refinery site dated February 11, 2013

Groundwater site investigation report for new crib walls dated June 24, 2013

SITE INVESTIGATION REPORT FOR NEW CRIB WALL



TESORO OIL COMPANY PROPERTY ADJACENT TO PACIFIC COAST HIGHWAY, POST MILE 8.50 TO 8.78 CITY OF CARSON, LOS ANGELES COUNTY, CALIFORNIA

PREPARED FOR:
CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 7
100 SOUTH MAIN STREET, 12.267
LOS ANGELES, CALIFORNIA

Caltrans

PREPARED BY:
GEOCON CONSULTANTS, INC.
3303 N. SAN FERNANDO BLVD., SUITE 100
BURBANK, CALIFORNIA

GEOCON
CONSULTANTS, INC.

CALTRANS CONTRACT 07A2729
TASK ORDER NO. 19
EA NO. 07-3X3901

GEOCON PROJECT NO. S9475-06-19

June 12, 2012

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S9475-06-19
June 12, 2012

VIA OVERNIGHT COURIER

Mr. Jack Liu
California Department of Transportation, District 7
Office of Environmental Engineering & Corridor Studies
100 South Main Street, Suite 12.267
Los Angeles, California 90012

Subject: SITE INVESTIGATION REPORT FOR NEW CRIB WALL
TESORO OIL COMPANY PROPERTY ADJACENT TO
PACIFIC COAST HIGHWAY, POST MILE 8.50 TO 8.78
CITY OF CARSON, LOS ANGELES COUNTY, CALIFORNIA
CONTRACT NO. 07A2729, TASK ORDER NO. 19
EA NO. 07-3X3901

Dear Mr. Liu:

In accordance with Caltrans Contract No. 07A2729 and Task Order No. 19 dated March 16, 2012, Geocon Consultants, Inc. has conducted an aerially deposited lead, petroleum hydrocarbons, and heavy metals soil investigation for a new crib wall on Tesoro Oil Company property adjacent to eastbound Pacific Coast Highway, between Post Mile 8.50 and 8.78, in the City of Carson, Los Angeles County, California. The accompanying report summarizes the services performed, including a subsurface utility survey, soil sampling, global positioning system data acquisition, laboratory analyses, and data evaluation.

The contents of this report reflect the views of the author, who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Please call us if you have questions.

Sincerely,

GEOCON CONSULTANTS, INC.

PROFESSIONAL GEOLOGIST · MICHAEL P. CONKLE · No. 7624 · Exp. 9/30/12 · STATE OF CALIFORNIA

Michael P. Conkle, PG
Contract Manager

PROFESSIONAL GEOLOGIST · JOHN JUHREND · No. 1538 · CERTIFIED ENGINEERING GEOLOGIST · STATE OF CALIFORNIA

John Juhrend, PE, CEG
Contract Principal

(5) Addressee

TABLE OF CONTENTS

SITE INVESTIGATION REPORT

EXECUTIVE SUMMARY

Geocon Consultants, Inc. performed an aerially deposited lead (ADL), petroleum hydrocarbon, and heavy metals soil investigation for a new crib wall on Tesoro Oil Company property adjacent to eastbound Pacific Coast Highway, between Post Mile 8.50 and 8.78, in the City of Carson, Los Angeles County, California. The objective of the investigation was to evaluate soil at the site for the potential presence of ADL and other metals, petroleum hydrocarbons, volatile organic compounds, and semi-volatile organic compounds. The California Department of Transportation (Caltrans) will use information from the investigation to determine soil disposal options and identify health and safety concerns during construction activities.

Lead Results

None of the soil samples collected during the investigation exhibited total lead concentrations above the Total Threshold Limit Concentration (TTLC) of 1,000 milligrams per kilogram (mg/kg). Eleven of the 14 soil samples collected from depths between the surface and 1.5 feet contained total lead concentrations greater than 50 mg/kg and were further analyzed using the Waste Extraction Test (WET). Nine of the eleven samples analyzed by the WET reported soluble lead concentrations above the Soluble Threshold Limit Concentration (STLC) of 5.0 milligrams per liter (mg/l). Based on the reported concentrations of total and soluble lead, the upper 2.5 feet of soil should be disposed of as a California-hazardous waste with respect to soluble lead content (Caltrans Type Z-2). Based on the reported Toxicity Characteristic Leaching Potential soluble lead concentrations the soil would not be considered a RCRA hazardous waste.

Soil samples were only collected from depths below 2.5 feet in three of the five borings due to the presence of a buried concrete structure beneath the approximate eastern third of the project limits. The soil samples collected from depths below 2.5 feet were not reported to contain total lead concentrations in excess of the TTLC or 10 times the STLC and thus could be managed as a non-hazardous waste with respect to lead content. However, due to the lack of soil data from beneath a depth of 2.5 feet in the eastern approximate one-third (~35 feet) of the project limits, we recommend that soil excavated from below a depth of 2.5 feet be stockpiled and characterized for lead content prior to transport offsite for disposal.

Title 22 Metals

The sample with the highest reported total lead concentration from each boring (five samples total) was analyzed for California Code of Regulations (CCR) Title 22 metals. With the exception of lead, Title 22 metals were not reported at or above their respective TTLC or ten times their respective STLCs. The concentrations of metals reported in the soil samples were below their respective residential and industrial California Human Health Screening Levels except for arsenic. The reported arsenic concentrations are consistent with published background levels in Los Angeles County.

Petroleum Hydrocarbons

Gasoline range petroleum hydrocarbons (C6-C12) was reported in 5 of the 20 samples analyzed at estimated concentrations ranging from 0.20 J mg/kg to 0.42 J mg/kg. These reported concentrations are considered estimated ("J-flagged") values because they fall between the analytical method detection limit and the laboratory practical quantitation limit. Total petroleum hydrocarbons (TPH) in the C8 to C40 range were reported in 18 of the 20 samples analyzed at concentrations ranging from 12 to 18,000 mg/kg. These results indicate that soil containing petroleum hydrocarbons will be excavated for the proposed improvements. The highest concentrations of TPH were reported in soil samples collected between the surface and 2.5 feet, however, as discussed above, the upper 2.5 feet of soil should be disposed of as a California-hazardous waste based on lead content. Due to the lack of soil data from beneath a depth of 2.5 feet in the eastern approximate one-third (~35 feet) of the project limits, we recommend that soil excavated from below a depth of 2.5 feet be stockpiled and characterized for the potential presence of petroleum hydrocarbon constituents prior to being transported offsite for disposal.

Volatile and Semi-volatile Organic Compounds

Six soil samples were analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). Two samples with highest TPH values were reported to contain methylene chloride, benzoic acid, and bis(2-ethylhexyl)phthalate at concentrations of 6.7 micrograms per kilogram (µg/kg), 56,000 µg/kg, and 5,400 µg/kg, respectively. VOCs and SVOCs at concentrations equal to or greater than the laboratory detection limit were not reported in the other samples. Based on the reported results the soil would not be classified as a hazardous waste based on VOC or SVOC content.

pH

Soil pH was reported to range between 7.2 and 8.4. Based on these results the soil would not be classified as a hazardous waste based on pH.

Worker Protection

Per Caltrans' requirements, contractor(s) should prepare a project-specific Health and Safety Plan (HSP) to prevent or minimize worker exposure to lead-impacted and petroleum hydrocarbon containing soil. The HSP should include a Lead Compliance Plan, and outline protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other appropriate health and safety protocols and procedures for the handling of lead-impacted and petroleum hydrocarbon-containing soil.

SITE INVESTIGATION REPORT

1. INTRODUCTION

Geocon Consultants, Inc. performed an aerially deposited lead (ADL), petroleum hydrocarbon, and heavy metals soil investigation for a new crib wall on Tesoro Oil Company property adjacent to eastbound Pacific Coast Highway (PCH), between Post Mile 8.50 and 8.78, in the City of Carson, Los Angeles County, California. The project location is shown on the Vicinity Map, Figure 1. The investigation was conducted under California Department of Transportation (Caltrans) Contract No. 07A2729 Task Order (TO) No. 19, and Expense Authorization 3X3901, dated March 16, 2012

1.1 Project Description

Caltrans proposes to construct a new crib wall system to replace approximately 100 feet of failed existing crib wall supporting the roadbed along PCH. The proposed improvements will involve soil excavation and other earthwork activities within an oil refinery operated by Tesoro Oil Company. It is our understanding that the soil excavated for construction will be removed from the site for disposal.

1.2 Investigation Objective

The objective of the investigation was to evaluate concentrations of metals, including ADL, petroleum hydrocarbons, volatile organic compounds, and semi-volatile organic compounds in soils that will potentially be disturbed during excavation for the proposed project improvements. Caltrans will use information obtained from the investigation to determine soil disposal options and identify health and safety concerns during proposed construction activities.

2. BACKGROUND

2.1 Aerially Deposited Lead in Soil

Testing by Caltrans throughout the State has shown that ADL exists in soil along major highway routes due to vehicle exhaust containing lead from the combustion of leaded gasoline. The concentration and distribution of ADL in soil is a function of many variables, but in general, highway age and traffic volume appear to be primary factors.

2.2 Petroleum Hydrocarbons

The potential presence of petroleum hydrocarbon-containing soil within the project limits were evaluated because the project is located within the confines of an operating oil refinery.

2.3 Hazardous Waste Classification Criteria

Regulatory criteria to classify a waste as "California hazardous" for handling and disposal purposes are contained in the California Code of regulations (CCR), Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as "Resource, Conservation and Recovery Act (RCRA) hazardous" are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), §261.

For waste containing metals, the waste is classified as "California hazardous" when: (1) the representative total metal content exceeds or equals the respective Total Threshold Limit Concentration (TTLC); or (2) the representative soluble metal content exceeds or equals the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET). A waste may have the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value, since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is typically performed. A material is classified as "RCRA hazardous" when the soluble metal content exceeds or equals the Federal Regulatory Level based on the Toxicity Characteristic Leaching Procedure (TCLP). The TTLC value for lead is 1,000 milligrams per kilogram (mg/kg). The STLC and TCLP values for lead are both 5.0 milligrams per liter (mg/l).

The above regulatory criteria are based on toxicity. Wastes may also be classified as hazardous based on other criteria such as ignitability, corrosivity, and reactivity. For the purposes of ADL investigations, toxicity and corrosivity (e.g., chemical concentrations and soil pH values, respectively) are the primary factors considered for waste classification. Waste that is classified as either "California hazardous" or "RCRA hazardous" requires management as a hazardous waste and disposal at an appropriately permitted disposal facility.

The Department of Toxic Substances Control (DTSC) regulates and interprets hazardous waste laws in California. DTSC generally considers excavated or transported materials that exhibit "hazardous waste" characteristics to be a "waste" requiring proper management, treatment and disposal. Soil that contains lead above hazardous waste thresholds and is left in-place would not be necessarily classified by DTSC as a "waste." The DTSC has provided site-specific determinations that "movement of wastes within an area of contamination does not constitute "land disposal" and, thus, does not trigger hazardous waste disposal requirements." Therefore, lead-impacted soil that is scarified in-place, moisture-conditioned, and re-compacted during roadway improvement activities might not be considered a "waste." DTSC should be consulted to confirm waste classification. It is noted that in addition to DTSC regulations, health and safety requirements and other local agency requirements may also apply to the handling and disposal of lead-impacted soil.

2.4 California Human Health Screening Levels

The California Environmental Protection Agency (Cal/EPA) has prepared technical reports entitled *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties* (Cal/EPA, January 2005) and *Revised California Human Health Screening Levels for Lead* (Cal/EPA, September 2009), which present CHHSLs for soil, shallow soil gas, and indoor air to assist in evaluating sites impacted by releases of hazardous chemicals.

The CHHSLs are concentrations of 44 hazardous chemicals that Cal/EPA considers to be below thresholds of concern for risks to human health. The CHHSLs were developed by the Office of Environmental Health Hazard Assessment (OEHHA) on behalf of Cal/EPA. The thresholds of concern used to develop the CHHSLs are an excess lifetime cancer risk of one in a million and a hazard quotient or 1.0 for non-cancer effects. Under most circumstances, the presence of a chemical at concentrations below its respective CHHSL can be assumed to not pose a significant risk. The presence of a chemical at concentrations above a CHHSL does not indicate that adverse impacts to human health are occurring or will occur, but suggests that further evaluation is warranted (Cal/EPA, January 2005).

The following CHHSLs were used for comparison: Table 1 of the *California Human Health Screening Levels for Soil and Comparison to Other Potential Environmental Concerns* (Cal/EPA, January 2005) and Table 3 of the *Comparison of 2005 CHHSLs to Revised CHHSLs* (Cal/EPA, September 2009). The respective CHHSLs are listed at the end of Table 3 for comparative purposes.

3. SCOPE OF SERVICES

We performed the scope of services summarized below as requested by Caltrans.

3.1 Pre-field Activities

- Prepared a *Health and Safety Plan* (HSP) dated March 2012, to provide guidelines on the use of personal protective equipment and the health and safety procedures to be implemented by Geocon personnel during field activities. The HSP specified the safety procedures for field work, summarized chemical hazard information, and identified site safety officers, emergency contacts, and the locations of emergency medical care facilities.

- Prepared a Workplan, dated March 26, 2012, outlining the methods to be employed during soil sampling activities.

- Retained the services of Advanced Technology Laboratories (ATL), a Caltrans-approved and California-certified analytical laboratory, to perform the chemical analyses of soil samples.

- Retained the services of Spectrum Geophysics (Spectrum) to provide utility and pipeline clearance for the proposed boring locations.

- Provided a minimum of 48-hours notice to the subscribing utilities via Underground Service Alert (USA) prior to job site mobilization. The USA ticket number issued for the project is A20900554.

- Coordinated with Tesoro Refinery personnel to schedule field work and secure an escort for field crews while on refinery property.

3.2 Utility Clearance

Prior to the start of soil sampling each of the proposed boring locations was evaluated for the potential presence of buried structures or utilities by Spectrum. Utility clearance for each of the proposed boring locations was performed using electromagnetic and ground penetrating radar geophysical methods.

3.3 Soil Sampling

The soil investigation was performed on April 16, 2012. The investigation consisted of collecting 20 soil samples from 5 hand-auger borings. Soil samples were collected from each of the hand-auger borings at the following depth intervals: surface to 0.5 foot, 0.5 to 1.0 foot, 1 to 1.5 feet, 2.5 to 3.0 feet, and 4.5 to 5.0 feet. As specified on in the TO, the borings were advanced at approximately 20-foot intervals, at the base of the existing wall, within the footprint of the proposed construction. The approximate boring locations are shown on Figures 2 and 3.

3.4 GPS Coordinates

The borings were located utilizing a global positioning system (GPS) receiver. Data was recorded in the field and downloaded in the office using surveying TerraSync™ or similar software, in State Plane 83 coordinates. Boring latitude and longitudes coordinates in decimal degrees are provided in Table 1.

3.5 Laboratory Analyses

Laboratory analyses were performed by ATL. Copies of the laboratory report and chain-of-custody (COC) documentation are in Appendix A. Based on the Caltrans TO and direction from Caltrans, the samples were analyzed for the following:

- Twenty soil samples were analyzed for total lead by EPA Test Method 6010B.

- Eleven samples with total lead concentrations greater than 50 mg/kg were analyzed for WET lead using EPA Test Method 7420 with citrate acid as the extractant.

- Nine soil samples with WET lead results greater than 5.0 mg/l were analyzed for soluble lead using the WET with de-ionized water as the extractant (DI-WET).

- The five samples with the highest reported total lead concentrations were analyzed for TCLP lead using EPA Test Method 1311/7420.

- The one sample with the highest reported total lead concentration from each boring (five samples total) was analyzed for California Code of Regulations (CCR) Title 22 metals following EPA Test Methods 6010B (metals) and 7471 (mercury).

- The one sample with the highest reported total lead concentration from each boring (five samples total) was analyzed for pH using EPA Test Method 9045C.

- Twenty samples were analyzed for total petroleum hydrocarbons (TPH) by modified EPA Test Method 8015B.

- Three soil samples collected from a depth of 4.5 to 5.0 feet, and the three soil samples with the highest reported TPH concentrations were analyzed for volatile organic compounds (VOCs) by EPA Test Method 8260B and semi-volatile organic compounds (SVOCs) by EPA Test Method 8270C.

- One equipment blank (EB) water sample was analyzed for total lead using EPA Test Method 6010B.

3.6 Report Preparation

This report was prepared to summarize the objectives, procedures, and results of the investigation activities requested by Caltrans.

4. INVESTIGATIVE METHODS

4.1 Soil Sampling

Soil samples were collected from the five borings using hand-auger sampling equipment. For samples that were to be analyzed for metals the soil, collected from designated sample intervals, was placed into new re-sealable plastic bags and homogenized in the field within the sample bag. Homogenized soil within the bag was then transferred into new 4-ounce laboratory-provided glass soil jars, capped, labeled with the sample date/time and a unique soil sample number, and placed in a chilled ice chest pending shipment to the analytical laboratory.

For samples that were to be analyzed for TPH, VOCs, and SVOCs, the soil collected from the designated sample intervals was transferred directly from the hand auger bucket to new 4-ounce laboratory-provided glass soil jars. The jars were capped, labeled, and placed in a chilled ice chest pending shipment to the analytical laboratory.

Caltrans assigned a unique ID number to this project (1173). This ID number was included in the database, figures, and in the boring soil sample names. Soil sample identification numbers were assigned (1173-101) based on the TO boring and sample naming convention. Soil sample numbers were designated by the boring number and the top of the 6-inch depth interval from which the sample was collected. For example, the soil sample designated 1173-101-0 was obtained from approximately 0 to 0.5 foot.

Quality Assurance/Quality Control (QA/QC) procedures conducted during field activities included sampling equipment decontamination prior to each boring, and use of new re-sealable plastic sample bags, laboratory supplied sample containers, and sample chain-of-custody documentation. Soil sampling equipment was cleaned between each sample by washing the equipment with an Alconox™ solution followed by a double rinse with de-ionized water. Sampling activities were conducted under supervision of Geocon's field manager.

The hand-auger borings were backfilled with surface soil from the immediate vicinity of the boring location. Decontamination water was discharged to the ground surface away from areas potentially associated with surface water bodies or storm drain inlets.

4.2 Equipment Blank Sampling

One equipment blank sample was collected to verify proper cleaning of the sampling equipment. The equipment blank sample was obtained by passing distilled water over the decontaminated sampling equipment and into unpreserved laboratory-provided container.

4.3 Deviations from Workplan

Geocon performed the scope of work as described in the Workplan dated March 26, 2012 with the following exception: borings 1173-104 and 1173-105 were not completed to the planned depth of five feet due to the presence of a buried concrete object beneath the approximate eastern one-third (~35 feet) of the project limits of the project limits.

5. FIELD OBSERVATIONS AND INVESTIGATIVE RESULTS

5.1 Soil Conditions

The soil conditions encountered in the hand-auger borings generally consisted of dark brown, slightly moist to moist, medium dense silty sand and gray-brown, moist, dense, fine sand. Stained and/or odorous soil was not observed in the samples collected during this investigation. Surface and groundwater were not encountered at the boring locations.

5.2 Analytical Results

Soil analytical results are summarized in Tables 1 through 3. Results were J-Flagged between the Practical Quantitation Limit (PQL) and the calculated Method Detection Limit (MDL). Results that are J-Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL. Copies of the laboratory report and chain-of-custody documentation are in Appendix A. Analytical results are summarized below:

- **Total lead** was reported for the twenty soil samples at concentrations ranging from 4.3 to 430 mg/kg.

- **WET lead** was reported for the eleven samples analyzed at concentrations ranging 1.2 to 27 mg/l.

- **WET-DI lead** was reported in the nine samples analyzed at concentrations ranging from 0.06 J to 0.41 J mg/l.

- **TCLP lead** was reported in two of the five samples analyzed at concentrations of 0.15 J and 0.78 mg/l.

- **Title 22 metals** antimony, selenium and thallium were not detected in the five samples analyzed at concentrations above their respective MDL's; beryllium and silver had "J" flagged concentrations. Concentrations of the Title 22 metals, with the exception of lead, were less than ten times their respective STLCs and therefore additional testing using the WET was not required.

- **pH** was reported to range between 7.2 and 8.4 in the five samples analyzed.

- **Total petroleum hydrocarbons** were reported in 18 of the 20 soil samples at total (C8 to C-40) concentrations ranging from 12 to 18,000 mg/kg.

- **VOCs** methylene chloride was reported in one of the six samples analyzed for VOCs at a concentration of 6.7 micrograms per kilogram (µg/kg). No other VOCs were reported in the samples at concentrations equal to or greater than the MDL.

- **SVOCs** benzoic acid and bis(2-ethylhexyl)phthalate were reported in one of the six samples analyzed for SVOCs at concentrations of 56,000 µg/kg and 5,400 µg/kg, respectively. No other SVOCs were reported in the samples at concentrations equal to or greater than the MDL.

- The equipment blank was reported to contain a lead concentration of 0.006 mg/l. The equipment blank result is not tabulated.

5.3 Data Validation

Geocon and ATL use QA/QC measures to minimize and control errors associated with field and laboratory methods. Field QA/QC measures consist of cleaning sampling equipment between each use with a detergent solution followed by tap and distilled/purified water rinses. Based on the equipment blank sample analytical result, which was several orders of magnitude less than the MDL of the total lead soil samples, it appears that the field investigation was free from potential cross-contamination resulting from inadequate equipment decontamination.

Laboratory QA/QC measures include the use of matrix spikes, duplicates, and method blanks, in addition to calculation of percent recovery and relative percentage difference (RPD). A review of the laboratory QA/QC results indicates satisfactory data reporting, and the data are of sufficient quality for the purposes of this report.

6. FINDINGS AND CONCLUSIONS

6.1 Lead Results

None of the soil samples collected during the investigation exhibited total lead concentrations above the TTLC of 1,000 mg/kg. Eleven of the 14 soil samples collected from depths between the surface and 1.5 feet contained total lead concentrations greater than 50 mg/kg and were further analyzed using the WET. Nine of the eleven samples analyzed by the WET reported soluble lead concentrations above the STLC of 5.0 mg/l. Based on the reported concentrations of total and soluble lead, the upper 2.5 feet of soil should be disposed of as a California-hazardous waste with respect to soluble lead content (Caltrans Type Z-2). Based on the reported TCLP concentrations the soil would not be considered a RCRA hazardous waste.

Soil samples were only collected from depths below 2.5 feet in three of the five borings due to the presence of a buried concrete structure beneath the approximate eastern third of the project limits. The soil samples collected from depths below 2.5 feet were not reported to contain total lead concentrations in excess of the TTLC or 10 times the STLC and thus could be managed as a non-hazardous waste with respect to lead content. However, due to the lack of data from soil beneath a depth of 2.5 feet in the eastern approximate one-third (~35 feet) of the project limits, we recommend that soil excavated from below a depth of 2.5 feet be stockpiled and characterized for lead content prior to transport offsite for disposal.

6.2 Title 22 Metals

Title 22 metals with the exception of lead were not reported at or above their respective TTLCs or ten times their respective STLCs. The reported concentrations of metals, with the exception of arsenic, were below their respective CHHSLs for residential and industrial land use.

Arsenic was detected in the five soil samples analyzed for Title 22 metals at concentrations ranging from 2.7 to 4.4 mg/kg. This result is greater than the residential and industrial CHHSLs for arsenic of 0.07 mg/kg and 0.24 mg/kg, respectively. Arsenic is a naturally occurring element; therefore, the concentration was compared to regional background concentrations. The March 2008 DTSC publication *Determination of a Southern California Regional Background Arsenic Concentration in Soil* establishes a regional background for arsenic within Southern California including Los Angeles County using naturally occurring and anthropogenic concentrations of arsenic. The report finds that the upper-bound background concentration for arsenic within Los Angeles County is 12 mg/kg. None of the detected arsenic concentrations exceeded 12 mg/kg, and therefore, the arsenic concentration is considered to be consistent with background concentrations of arsenic.

6.3 Petroleum Hydrocarbons

Gasoline range petroleum hydrocarbons (C6-C12) was reported in 5 of the 20 samples analyzed at estimated concentrations ranging from 0.20 J mg/kg to 0.42 J mg/kg. Total petroleum hydrocarbons in the C8 to C40 range were reported in 18 of the 20 samples analyzed at concentrations ranging from 12 to 18,000 mg/kg. These results indicate that soil containing petroleum hydrocarbons will be excavated for the proposed improvements. The highest concentrations of TPH were reported in soil samples collected between the surface and 2.5 feet, however, as discussed above, the upper 2.5 feet of soil should be disposed of as a California-hazardous waste based on lead content. Due to the lack of soil data from beneath a depth of 2.5 feet in the eastern approximate one-third (~35 feet) of the project limits, we recommend that soil excavated from below a depth of 2.5 feet be stockpiled and characterized for the potential presence of petroleum hydrocarbon constituents prior to being transported offsite for disposal.

6.4 Volatile and Semi-volatile Organic Compounds

Six select soil samples were analyzed for VOCs and SVOCs. Two samples with the highest TPH concentrations were reported to contain methylene chloride, benzoic acid, and bis(2-ethylhexyl)phthalate at concentrations of 6.7 micrograms per kilogram (µg/kg), 56,000 µg/kg, and 5,400 µg/kg, respectively. VOCs and SVOCs at concentrations equal to or greater than the laboratory detection limit were not reported in the other samples. Based on the reported results the soil would not be classified as a hazardous waste based on VOC or SVOC content.

6.5 pH

Soil pH was reported to range between 7.2 and 8.4. Based on these results the soil would not be classified as a hazardous waste based on pH.

6.6 Worker Protection

Per Caltrans' requirements, contractor(s) should prepare a project-specific Health and Safety Plan (HSP) to prevent or minimize worker exposure to lead-impacted and petroleum hydrocarbon containing soil. The HSP should include a Lead Compliance Plan outlining protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other appropriate health and safety protocols and procedures for the handling of lead-impacted soil and petroleum-containing soil.

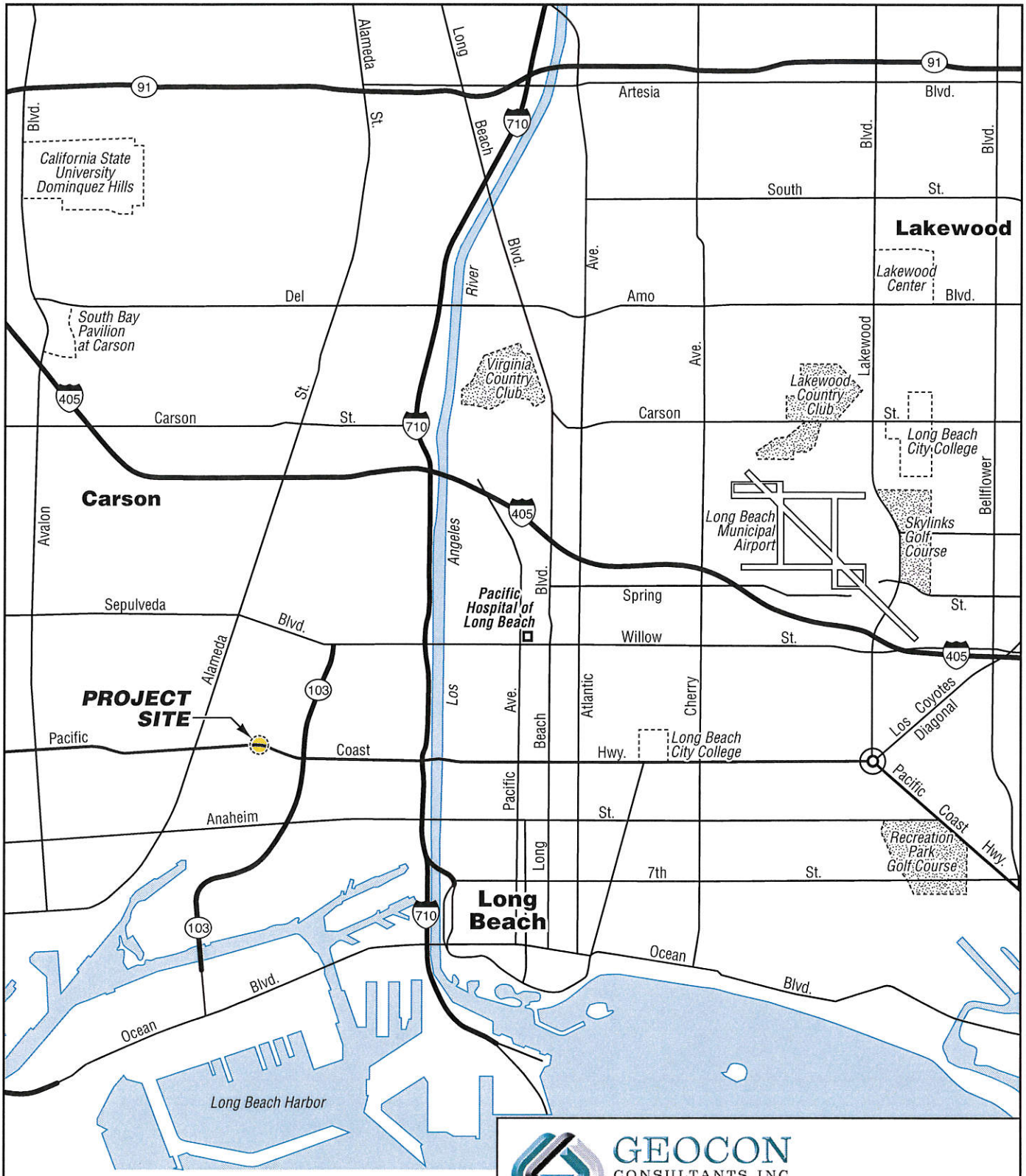
7. REPORT LIMITATIONS

This report has been prepared exclusively for Caltrans. The information obtained is only relevant as of the date of the latest site visit and will require an update to reflect additional information obtained.

The conclusions and recommendations presented herein are based on a limited number of samples collected from in-place soil location according to Caltrans-prescribed protocol. The purpose of these sampling and characterization activities was to reasonably predict the character of soil to be disturbed for planned construction activities within the described limits of the Caltrans right-of-way.

The Client should recognize that this report is not a comprehensive site characterization and should not be construed as such. The appropriate regulatory agency may require additional investigations. The findings and conclusions as presented in this report are predicated on the results of the limited soil sampling and laboratory analyses performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein.

Therefore, the report should only be deemed conclusive with respect to the information obtained. No guarantee or warranty of the results of the report is implied within the intent of this report or any subsequent reports, correspondence, or consultation, either express or implied. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.



GEOCON
CONSULTANTS, INC.
3303 N. SAN FERNANDO BLVD. – SUITE 100 – BURBANK, CA. 91504
PHONE 818.841.8388 – FAX 818.841.1704

Route 1 Pacific Coast Highway		
Post Mile 8.50 to 8.78 Los Angeles County, California	**VICINITY MAP**	
GEOCON Proj. No. S9475-06-19		
Task Order No. 19	June 2012	Figure 1

1173-103

Depth	Total Lead	WET	DI-WET	TCLP	pH
0.0	140	11	0.27J	---	8.2
0.5	79	1.2	---	---	---
1.5	13	---	---	---	---
2.5	5.2	---	---	---	---
4.5	4.4	---	---	---	---

1173-101

Depth	Total Lead	WET	DI-WET	TCLP	pH
0.0	130	5.9	0.17J	---	8.4
0.5	35	---	---	---	---
1.5	33	---	---	---	---
2.5	4.3	---	---	---	---
4.5	6.3	---	---	---	---

1173-105

Depth	Total Lead	WET	DI-WET	TCLP	pH
0.0	210	6.2	0.19J	< 0.06	---
0.5	280	8.0	0.30J	0.15J	8.0
1.5	190	8.3	0.27J	< 0.06	---

1173-102

Depth	Total Lead	WET	DI-WET	TCLP	pH
0.0	430	27	0.41J	0.78	7.2
0.5	120	6.8	0.14J	---	---
1.5	250	1.5	---	< 0.06	---
2.5	33	---	---	---	---
4.5	14	---	---	---	---

1173-104

Depth	Total Lead	WET	DI-WET	TCLP	pH
0.0	150	8.3	0.06J	---	---
0.5	160	6.8	0.11J	---	7.9

LEGEND:

⊗ Approximate Boring Location

Total Lead Results in mg/kg
WET, DI-WET, TCLP Results in mg/l
Depth in Feet
< = Less than the indicated laboratory detection limit
--- = Not analyzed
J = Analyte detected below the Practical Quantitation Limit but above or equal to the Method Detection Limit. Result is an estimated concentration
mg/kg = Milligrams per kilogram
mg/l = Milligrams per liter

0 30
Scale in Feet

GEOCON
CONSULTANTS, INC.
3303 N. SAN FERNANDO BLVD. – SUITE 100 – BURBANK, CA. 91504
PHONE 818.841.8388 – FAX 818.841.1704

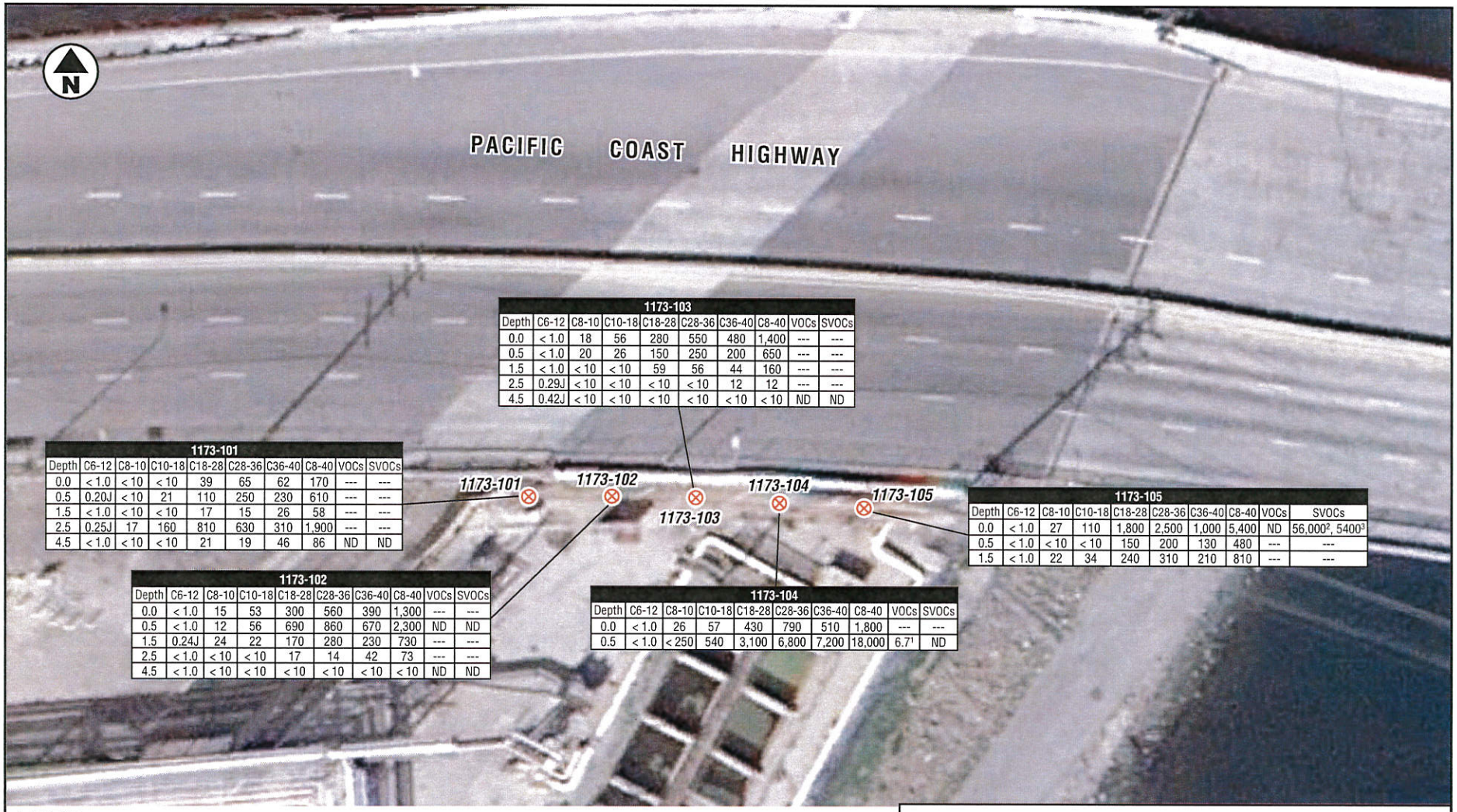
Route 1 Pacific Coast Highway

Post Mile 8.50 to 8.78
Los Angeles County, California

LEAD RESULTS

GEOCON Proj. No. S9475-06-19

Task Order No. 19 | June 2012 | Figure 2



1173-103

Depth	C6-12	C8-10	C10-18	C18-28	C28-36	C36-40	C8-40	VOCs	SVOCs
0.0	< 1.0	18	56	280	550	480	1,400	---	---
0.5	< 1.0	20	26	150	250	200	650	---	---
1.5	< 1.0	< 10	< 10	59	56	44	160	---	---
2.5	0.29J	< 10	< 10	< 10	< 10	12	12	---	---
4.5	0.42J	< 10	< 10	< 10	< 10	< 10	< 10	ND	ND

1173-101

Depth	C6-12	C8-10	C10-18	C18-28	C28-36	C36-40	C8-40	VOCs	SVOCs
0.0	< 1.0	< 10	< 10	39	65	62	170	---	---
0.5	0.20J	< 10	21	110	250	230	610	---	---
1.5	< 1.0	< 10	< 10	17	15	26	58	---	---
2.5	0.25J	17	160	810	630	310	1,900	---	---
4.5	< 1.0	< 10	< 10	21	19	46	86	ND	ND

1173-102

Depth	C6-12	C8-10	C10-18	C18-28	C28-36	C36-40	C8-40	VOCs	SVOCs
0.0	< 1.0	15	53	300	560	390	1,300	---	---
0.5	< 1.0	12	56	690	860	670	2,300	ND	ND
1.5	0.24J	24	22	170	280	230	730	---	---
2.5	< 1.0	< 10	< 10	17	14	42	73	---	---
4.5	< 1.0	< 10	< 10	< 10	< 10	< 10	< 10	ND	ND

1173-104

Depth	C6-12	C8-10	C10-18	C18-28	C28-36	C36-40	C8-40	VOCs	SVOCs
0.0	< 1.0	26	57	430	790	510	1,800	---	---
0.5	< 1.0	< 250	540	3,100	6,800	7,200	18,000	6.7[1]	ND

1173-105

Depth	C6-12	C8-10	C10-18	C18-28	C28-36	C36-40	C8-40	VOCs	SVOCs
0.0	< 1.0	27	110	1,800	2,500	1,000	5,400	ND	56,000[2], 5400[3]
0.5	< 1.0	< 10	< 10	150	200	130	480	---	---
1.5	< 1.0	22	34	240	310	210	810	---	---

LEGEND: ⊗ Approximate Boring Location

Results in milligrams per kilogram unless otherwise noted

C8-C40 = Total petroleum hydrocarbons in carbon chain range specified
VOCs = Volatile organic compounds
SVOCs = Semi-volatile organic compounds
< = Less than the indicated laboratory detection limit
--- = Not analyzed
ND = No analytes detected
J = Analyte detected below the Practical Quantitation Limit but above or equal to the Method Detection Limit. Result is an estimated concentration
1 = methylene chloride reported in micrograms per kilogram
2 = benzoic acid reported in micrograms per kilogram
3 = bis(2-ethylhexyl)phthalate reported in micrograms per kilogram

0 30
Scale in Feet

GEOCON
CONSULTANTS, INC.
3303 N. SAN FERNANDO BLVD. – SUITE 100 – BURBANK, CA. 91504
PHONE 818.841.8388 – FAX 818.841.1704

Route 1 Pacific Coast Highway

Post Mile 8.50 to 8.78
Los Angeles County, California

GEOCON Proj. No. S9475-06-19

Task Order No. 19

TPH, VOC and SVOC RESULTS

June 2012

Figure 3

TABLE 1

BORING COORDINATES AND SUMMARY OF SOIL ANALYTICAL RESULTS - LEAD AND pH

PCH CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

SAMPLE ID	LATITUDE	LONGITUDE	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	WET-DI LEAD (mg/l)	TCLP LEAD (mg/l)	pH (pH units)
1173-101-0	33.79167508	-118.2315282	4/16/2012	130	5.9	0.17 J	---	8.4
1173-101-0.5			4/16/2012	35	---	---	---	---
1173-101-1.5			4/16/2012	33	---	---	---	---
1173-101-2.5			4/16/2012	4.3	---	---	---	---
1173-101-4.5			4/16/2012	6.3	---	---	---	---
1173-102-0	33.79166472	-118.2314836	4/16/2012	430	27	0.41 J	0.78	7.2
1173-102-0.5			4/16/2012	120	6.8	0.14 J	---	---
1173-102-1.5			4/16/2012	250	1.5	---	<0.06	---
1173-102-2.5			4/16/2012	33	---	---	---	---
1173-102-4.5			4/16/2012	14	---	---	---	---
1173-103-0	33.7916664	-118.2314516	4/16/2012	140	11	0.27 J	---	8.2
1173-103-0.5			4/16/2012	79	1.2	---	---	---
1173-103-1.5			4/16/2012	13	---	---	---	---
1173-103-2.5			4/16/2012	5.2	---	---	---	---
1173-103-4.5			4/16/2012	4.4	---	---	---	---
1173-104-0	33.79168946	-118.2313783	4/16/2012	150	8.3	0.06 J	---	---
1173-104-0.5			4/16/2012	160	6.8	0.11 J	---	7.9
1173-105-0	33.79169416	-118.2313154	4/16/2012	210	6.2	0.19 J	<0.06	---
1173-105-0.5			4/16/2012	280	8.0	0.30 J	0.15 J	8.0
1173-105-1.5			4/16/2012	190	8.3	0.27 J	<0.06	---

Notes:

WET = waste extraction test

WET-DI = waste extraction test using de-ionized water as the extractant

TCLP = Toxicity Characteristic Leaching Procedure

< = Not detected above the laboratory reporting limit specified

--- = Not analyzed

J = Analyte detected below the Practical Quantitation Limit but above or equal to the Method Detection Limit. Result is an estimated concentration.

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

TABLE 2

SUMMARY OF SOIL ANALYTICAL RESULTS - TPH, VOCs, AND SVOCs

PCH CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TPH CHAIN C6-C12	TPH CHAIN C8-C10	TPH CHAIN C10-C18	TPH CHAIN C18-C28	TPH CHAIN C28-C36	TPH CHAIN C36-C40	TPH CHAIN C8-C40 TOTAL	VOCs	SVOCs
		Results in milligrams per kilogram unless otherwise noted								
1173-101-0	4/16/2012	<1.0	<10	<10	39	65	62	170	---	---
1173-101-0.5	4/16/2012	0.20 J	<10	21	110	250	230	610	---	---
1173-101-1.5	4/16/2012	<1.0	<10	<10	17	15	26	58	---	---
1173-101-2.5	4/16/2012	0.25 J	17	160	810	630	310	1,900	---	---
1173-101-4.5	4/16/2012	<1.0	<10	<10	21	19	46	86	ND	ND
1173-102-0	4/16/2012	<1.0	15	53	300	560	390	1,300	---	---
1173-102-0.5	4/16/2012	<1.0	12	56	690	860	670	2,300	ND	ND
1173-102-1.5	4/16/2012	0.24 J	24	22	170	280	230	730	---	---
1173-102-2.5	4/16/2012	<1.0	<10	<10	17	14	42	73	---	---
1173-102-4.5	4/16/2012	<1.0	<10	<10	<10	<10	<10	<10	ND	ND
1173-103-0	4/16/2012	<1.0	18	56	280	550	480	1,400	---	---
1173-103-0.5	4/16/2012	<1.0	20	26	150	250	200	650	---	---
1173-103-1.5	4/16/2012	<1.0	<10	<10	59	56	44	160	---	---
1173-103-2.5	4/16/2012	0.29 J	<10	<10	<10	<10	12	12	---	---
1173-103-4.5	4/16/2012	0.42 J	<10	<10	<10	<10	<10	<10	ND	ND
1173-104-0	4/16/2012	<1.0	26	57	430	790	510	1,800	---	---
1173-104-0.5	4/16/2012	<1.0	<250	540	3,100	6,800	7,200	18,000	6.7 [1]	ND
1173-105-0	4/16/2012	<1.0	27	110	1,800	2,500	1,000	5,400	ND	56,000 [2], 5,400 [3]
1173-105-0.5	4/16/2012	<1.0	<10	<10	150	200	130	480	---	---
1173-105-1.5	4/16/2012	<1.0	22	34	240	310	210	810	---	---

Notes:

TPH = Total petroluem hydrocarbons in carbon chain range specified

VOCs = volatile organic compounds

SVOCs = semi-volatile organic compounds

< = Not detected above the laboratory reporting limit specified

--- = Not analyzed

J = Analyte detected below the Practical Quantitation Limit but above or equal to the Method Detection Limit. Result is an estimated concentration.

1 = methylene chloride reported in micrograms per kilogram

2 = benzoic acid reported in micrograms per kilogram

3 = bis(2-ethylhexyl)phthalate reported in micrograms per kilogram

TABLE 3

SUMMARY OF SOIL ANALYTICAL RESULTS - TITLE 22 METALS

PCH CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
1173-101-0.0	<2.0	2.7	74	0.29 J	0.77 J	13	5.1	40	130	0.11	0.45 J	16	<1.0	0.27 J	<1.0	21	1,300
1173-102-0	<2.0	4.4	150	0.31 J	2.0	38	5.6	230	430	0.32	4.9	54	<1.0	1.1	<1.0	49	2,100
1173-103-0	<2.0	3.1	110	0.50 J	1.0	20	5.5	58	140	0.59	1.4	23	<1.0	0.40 J	<1.0	33	590
1173-104-0.5	<2.0	2.4	70	0.44 J	0.99 J	13	4.8	29	150	0.19	0.33 J	12	<1.0	0.20 J	<1.0	21	680
1173-105-0.5	<2.0	3.1	93	0.49 J	0.31 J	15	6.7	40	210	0.52	0.07 J	110	<1.0	0.14 J	<1.0	25	320
TTLC	500	500	10,000	75	100	2,500	8,000	2,500	1,000	20	3,500	2,000	100	500	700	2,400	5,000
10 X STLC	150	50	1,000	7.5	10	50	800	250	50	2.0	3,500	200	10	50	70	240	2,500
CHHSLs Ind	380	0.24	6,300	190	7.5	10,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000
Res	30	0.07	5,200	16	1.7	10,000	600	3,000	80	18	380	1,600	380	380	5.0	530	23,000
Background Concentrations [1]																	
Minimum	0.15	0.6	133	0.25	0.05	23	2.7	9.1	12.4	0.05	0.10	9.0	0.015	0.1	5.3	39	88
Maximum	1.95	12	1,400	2.70	1.7	1,579	46.9	96.4	97.1	0.90	9.6	509	0.43	8.3	36.2	288	236
Mean	0.60	3.5	509	1.28	0.36	122	14.9	28.7	23.9	0.26	1.3	57	0.058	0.8	15.7	112	149

Notes:

Units shown in milligrams per kilogram (mg/kg)

< = Not detected above the laboratory reporting limit specified

J = Estimated value - concentration is between the method detection limit and the laboratory practical quantitation limit

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

CHHSLs = California Environmental Protection Agency, California Human Health Screening Levels for industrial (Ind) and residential (Res) use

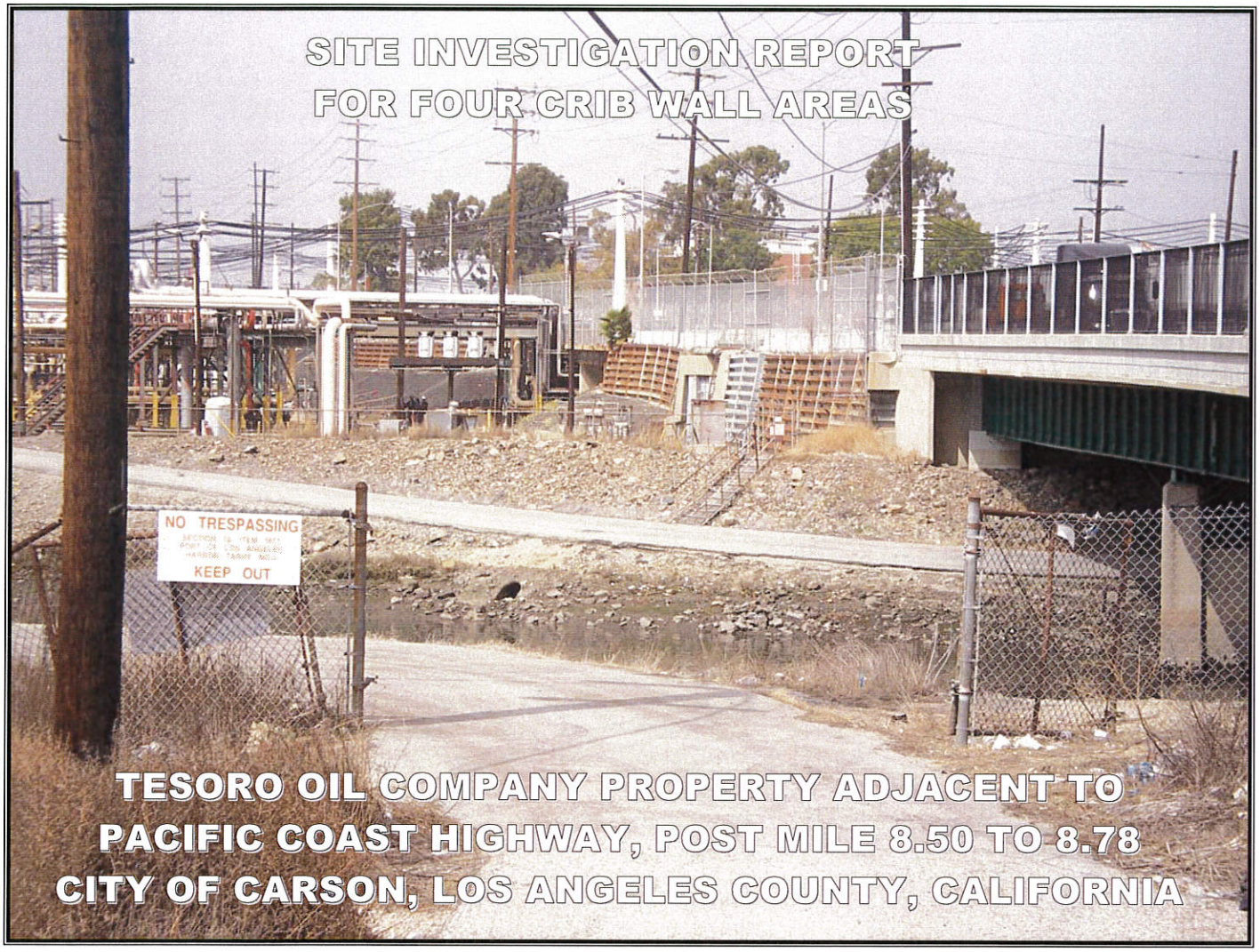
TTLC, STLC, and CHHSLs shown for chromium are for chromium III.

[1] *Background Concentrations of Trace and Major Elements in California Soils*

(Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996)

Maximum arsenic background concentration source - *Determination of a Southern California Regional Background Arsenic Concentration in Soil,* DTSC March 2008

SITE INVESTIGATION REPORT FOR FOUR CRIB WALL AREAS



TESORO OIL COMPANY PROPERTY ADJACENT TO PACIFIC COAST HIGHWAY, POST MILE 8.50 TO 8.78 CITY OF CARSON, LOS ANGELES COUNTY, CALIFORNIA

PREPARED FOR:
CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 7
100 SOUTH MAIN STREET, 12.267
LOS ANGELES, CALIFORNIA

Caltrans

PREPARED BY:
GEOCON CONSULTANTS, INC.
3303 N. SAN FERNANDO BLVD., SUITE 100
BURBANK, CALIFORNIA

GEOCON
CONSULTANTS, INC.

CALTRANS CONTRACT 07A2729
TASK ORDER NO. 19
EA NO. 07-3X3901

GEOCON PROJECT NO. S9475-06-19

September 30, 2012

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S9475-06-19
September 30, 2012

Mr. Jack Liu
California Department of Transportation, District 7
Office of Environmental Engineering & Corridor Studies
100 South Main Street, Suite 12.267
Los Angeles, California 90012

Subject: SITE INVESTIGATION REPORT FOR FOUR CRIB WALL AREAS
TESORO OIL COMPANY PROPERTY ADJACENT TO
PACIFIC COAST HIGHWAY, POST MILE 8.50 TO 8.78
CITY OF CARSON, LOS ANGELES COUNTY, CALIFORNIA
CONTRACT NO. 07A2729, TASK ORDER NO. 19
EA NO. 07-3X3901

Dear Mr. Liu:

In accordance with Caltrans Contract No. 07A2729 and Task Order No. 19 Amendment No. 1 dated July 11, 2012, Geocon Consultants, Inc. has performed an aerially deposited lead and petroleum hydrocarbons soil investigation for four crib wall areas on Tesoro Oil Company property adjacent to Pacific Coast Highway, between Post Mile 8.50 and 8.78, in the City of Carson, Los Angeles County, California. The accompanying report summarizes the services performed, including a subsurface utility survey, soil sampling, global positioning system data acquisition, laboratory analyses, and data evaluation.

The contents of this report reflect the views of the author, who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Please call us if you have questions.

Sincerely,

GEOCON CONSULTANTS, INC.

Gemma Reblando
Staff Geologist

Michael P. Conkle, PG
Contract Manager

PROFESSIONAL GEOLOGIST
MICHAEL P. CONKLE
No. 7624
STATE OF CALIFORNIA

(5/1CD) Addressee

TABLE OF CONTENTS

SITE INVESTIGATION REPORT

Figures:

Tables:

Appendix:

EXECUTIVE SUMMARY

Geocon Consultants, Inc. performed an aerially deposited lead (ADL) and petroleum hydrocarbons soil investigation for four crib wall areas on Tesoro Oil Company property adjacent to Pacific Coast Highway, between Post Mile 8.50 and 8.78 (the Site), in the City of Carson, Los Angeles County, California. The objective of the investigation was to evaluate soil at the site for the potential presence of ADL, petroleum hydrocarbons, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and soil pH. The California Department of Transportation (Caltrans) does not intend to reuse excavated soil at the Site. Caltrans will use the information from the investigation to determine soil disposal options and identify health and safety concerns during construction activities.

Lead

Soil samples collected from the surface and depths up to 5 feet were analyzed for total lead. Selected samples were further analyzed for soluble lead using the Waste Extraction Test (WET) method using citric acid as the extractant, soluble lead using a modified WET method using de-ionized water (DI-WET) as the extractant, soluble lead using the Toxicity Characteristic Leaching Procedure (TCLP), and/or pH.

Laboratory analytical results and statistical analysis using non-parametric bootstrap techniques to calculate the 95% upper confidence limits (UCLs) were used to evaluate soil disposal options.

Offsite disposal conclusions were based upon comparison of the total lead 95% UCLs to the California Code of Regulations (CCR) Title 22 total threshold limit concentration (TTLC) of 1,000 milligrams per kilogram (mg/kg) and predicted WET results to the CCR Title 22 soluble threshold limit concentration (STLC) of 5.0 milligrams per liter (mg/l). Disposal options for crib wall areas by sampling groups are summarized below.

Based on the TCLP soluble lead results, soil generated at the Site is not considered a RCRA hazardous waste.

Caltrans should notify the contractors performing the construction activities that elevated concentrations of lead are present in onsite soil and that appropriate health and safety measures should be taken to minimize the exposure of construction workers to lead.

Area #1 (Borings 1173-106 through 1173-108)

Based upon the total lead and WET lead concentrations, excavated soil from the surface to a depth of 5.0 feet or shallower would be classified as non-hazardous with respect to lead content since the total lead concentrations are less than 50 mg/kg (i.e., ten times the STLC for lead of 5.0 mg/l) or the WET soluble

lead concentrations are less than the STLC for lead of 5.0 mg/l. Accordingly, the soil is suitable for disposal as non-hazardous soil (Caltrans Type X) with respect to lead content.

Area #2 (Borings 1173-109 through 1173-113)

If excavations are 2.0 feet or deeper and soil is managed as a whole, the excavated soil can be disposed of as non-hazardous soil (Caltrans Type X) with respect to lead content.

Based upon the predicted WET lead concentrations, excavated soil from the surface to a depth of 0.5 foot, if excavated separately, should be disposed of as a hazardous waste since the 95% UCL-predicted WET lead concentration is greater than the STLC for lead of 5.0 mg/l.

Underlying soil from depths between 0.5 and 5.0 feet can be disposed of as non-hazardous soil (Caltrans Type X) with respect to lead content.

Area #3 (Borings 1173-114 through 1173-118)

Based upon the total lead and WET lead concentrations, excavated soil from the surface to a depth of 5.0 feet or shallower would be classified as non-hazardous with respect to lead content since the total lead concentrations are less than 50 mg/kg (i.e., ten times the STLC for lead of 5.0 mg/l) or the WET soluble lead concentrations are less than the STLC for lead of 5.0 mg/l. Accordingly, the soil is disposal as non-hazardous soil (Caltrans Type X) with respect to lead content.

Area #4 (Borings 1173-119 through 1173-123)

If soil from the surface to 3.0 feet or deeper is excavated and managed as a whole, the excavated soil can be disposed of as non-hazardous soil (Caltrans Type X) with respect to lead content.

Based upon the predicted WET lead concentrations, excavated soil from the surface to a depth of 1.5 feet or shallower, if excavated separately, should be disposed of as a hazardous waste since the 95% UCL-predicted WET lead concentrations are greater than the STLC for lead of 5.0 mg/l.

Underlying soil from depths between 1.5 and 5.0 feet can be disposed of as non-hazardous soil (Caltrans Type X) with respect to lead content.

Petroleum Hydrocarbons

Gasoline range petroleum hydrocarbons (C6-C12) was reported in 25 of the 90 samples analyzed at estimated concentrations ranging from 0.18 J mg/kg to 0.25 J mg/kg. These reported concentrations are considered estimated ("J-flagged") values because they fall between the analytical method detection limit and the laboratory practical quantitation limit. Petroleum hydrocarbons in the C8 to C40 range

were reported in 70 of the 90 samples analyzed at concentrations ranging from 17 to 20,000 mg/kg. These results indicate that soil containing petroleum hydrocarbons will be excavated for the proposed improvements in each crib wall area requiring special handling and disposal. Currently, regulatory criteria for the classification of wastes based solely on the concentrations of petroleum hydrocarbons have not yet been promulgated. The soil would be classified as a non-hazardous waste based on TPH content. However, disposal of petroleum hydrocarbon-impacted soil is generally regulated by disposal facility permit and acceptance criteria.

Volatile and Semi-volatile Organic Compounds

Twenty soil samples were analyzed for VOCs and SVOCs. An estimated concentration of 2.4 J micrograms per kilogram (µg/kg) of the VOC naphthalene was reported for one of the samples. VOCs and SVOCs at concentrations equal to or greater than the laboratory detection limit were not reported in the other samples. Based on the reported results the soil would not be classified as a hazardous waste based on VOC or SVOC content.

Title 22 Metals

The nine samples with the highest reported total lead concentrations were analyzed for California Code of Regulations (CCR) Title 22 metals. With the exception of lead, Title 22 metals were not reported at or above their respective TTLC or ten times their respective STLCs. The concentrations of metals reported in the soil samples were below their respective residential and/or industrial California Human Health Screening Levels except for arsenic and lead. The reported arsenic concentrations are consistent with published background levels in Los Angeles County.

pH

Soil pH was reported to range between 6.8 and 8.4.

Worker Protection

Per Caltrans' requirements, contractor(s) should prepare a project-specific Health and Safety Plan (HSP) to prevent or minimize worker exposure to lead-impacted and petroleum hydrocarbon-containing soil. The HSP should include a Lead Compliance Plan, and outline protocols for environmental and personnel monitoring, requirements for personal protective equipment and other appropriate health and safety protocols and procedures for the handling of lead-impacted and petroleum hydrocarbon-containing soil.

SITE INVESTIGATION REPORT

1. INTRODUCTION

Geocon Consultants, Inc. performed an aerially deposited lead (ADL) and petroleum hydrocarbons soil investigation for four crib wall areas on Tesoro Oil Company property adjacent to Pacific Coast Highway (PCH), between Post Mile 8.50 and 8.78 (the Site), in the City of Carson, Los Angeles County, California. The project location is shown on the Vicinity Map, Figure 1. The investigation was conducted under California Department of Transportation (Caltrans) Contract No. 07A2729, Task Order (TO) No. 19 Amendment 1, and Expense Authorization 3X3901, dated July 11, 2012.

1.1 Project Description

Caltrans proposes to construct four new crib wall systems to replace the failed existing crib walls supporting the roadbed along PCH. The proposed improvements will involve soil excavation and other earthwork activities within an oil refinery operated by Tesoro Oil Company. It is our understanding that the soil excavated for construction will be removed from the Site for disposal.

1.2 Investigation Objective

The objective of the investigation was to evaluate concentrations of ADL, petroleum hydrocarbons, volatile organic compounds (VOCs), and semi-volatile organic compounds (VOCs) in soils that will potentially be disturbed during excavation for the proposed project improvements. Caltrans will use information obtained from the investigation to determine soil disposal options and identify health and safety concerns during proposed construction activities.

2. BACKGROUND

2.1 Hazardous Waste Classification Criteria

Regulatory criteria to classify a waste as "California hazardous" for handling and disposal purposes are contained in the California Code of regulations (CCR), Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as "Resource, Conservation and Recovery Act (RCRA) hazardous" are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), §261.

For waste containing metals, the waste is classified as "California hazardous" when: (1) the representative total metal content exceeds or equals the respective Total Threshold Limit Concentration (TTLC); or (2) the representative soluble metal content exceeds or equals the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET). A waste may have the potential of exceeding the STLC when the waste's total metal content is greater than or

equal to ten times the respective STLC value, since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is typically performed. A material is classified as "RCRA hazardous" when the soluble metal content exceeds or equals the Federal Regulatory Level based on the Toxicity Characteristic Leaching Procedure (TCLP). The TTLC value for lead is 1,000 milligrams per kilogram (mg/kg). The STLC and TCLP values for lead are both 5.0 milligrams per liter (mg/l).

The above regulatory criteria are based on toxicity. Wastes may also be classified as hazardous based on other criteria such as ignitability, corrosivity, and reactivity. For the purposes of ADL investigations, toxicity and corrosivity (e.g., chemical concentrations and soil pH values, respectively) are the primary factors considered for waste classification. Waste that is classified as either "California hazardous" or "RCRA hazardous" requires management as a hazardous waste and disposal at an appropriately permitted disposal facility.

The Department of Toxic Substances Control (DTSC) regulates and interprets hazardous waste laws in California. DTSC generally considers excavated or transported materials that exhibit "hazardous waste" characteristics to be a "waste" requiring proper management, treatment and disposal. Soil that contains lead above hazardous waste thresholds and is left in-place would not be necessarily classified by DTSC as a "waste." The DTSC has provided site-specific determinations that "movement of wastes within an area of contamination does not constitute "land disposal" and, thus, does not trigger hazardous waste disposal requirements." Therefore, lead-impacted soil that is scarified in-place, moisture-conditioned, and re-compacted during roadway improvement activities might not be considered a "waste." DTSC should be consulted to confirm waste classification. It is noted that in addition to DTSC regulations, health and safety requirements and other local agency requirements may also apply to the handling and disposal of lead-impacted soil.

Currently, regulatory criteria for the classification of wastes based solely on the concentrations of total petroleum hydrocarbons (TPH) such as gasoline, diesel, and motor oil have not yet been promulgated. Disposal of TPH-impacted soil is generally regulated by disposal facility permit and acceptance criteria.

2.2 California Human Health Screening Levels

The California Environmental Protection Agency (Cal/EPA) has prepared technical reports entitled *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties* (Cal/EPA, January 2005) and *Revised California Human Health Screening Levels for Lead* (Cal/EPA, September 2009), which present CHHSLs for soil, shallow soil gas, and indoor air to assist in evaluating sites impacted by releases of hazardous chemicals.

The CHHSLs are concentrations of 44 hazardous chemicals that Cal/EPA considers to be below thresholds of concern for risks to human health. The CHHSLs were developed by the Office of Environmental Health Hazard Assessment (OEHHA) on behalf of Cal/EPA. The thresholds of concern used to develop the CHHSLs are an excess lifetime cancer risk of one in a million and a hazard quotient or 1.0 for non-cancer effects. Under most circumstances, the presence of a chemical at concentrations below its respective CHHSL can be assumed to not pose a significant risk. The presence of a chemical at concentrations above a CHHSL does not indicate that adverse impacts to human health are occurring or will occur, but suggests that further evaluation is warranted (Cal/EPA, January 2005).

The following CHHSLs were used for comparison: Table 1 of the *California Human Health Screening Levels for Soil and Comparison to Other Potential Environmental Concerns* (Cal/EPA, January 2005), Revised California Human Health Screening Levels for Beryllium (Cal/EPA, March 2009), and Revised California Human Health Screening Levels for Lead (Cal/EPA, September 2009). The respective CHHSLs are listed at the end of Table 3 for comparative purposes. Copies of the referenced CHHSLs are in Appendix A.

3. SCOPE OF SERVICES

We performed the scope of services summarized below as requested by Caltrans.

3.1 Pre-field Activities

- Prepared a *Health and Safety Plan* (HSP) dated March 2012, to provide guidelines on the use of personal protective equipment and the health and safety procedures to be implemented by Geocon personnel during field activities. The HSP specified the safety procedures for field work, summarized chemical hazard information, and identified site safety officers, emergency contacts, and the locations of emergency medical care facilities.

- Prepared a Workplan, dated July 16, 2012, outlining the methods to be employed during soil sampling activities.

- Retained the services of Advanced Technology Laboratories (ATL), a Caltrans-approved and California-certified analytical laboratory, to perform the chemical analyses of soil and equipment blank samples.

- Retained the services of Spectrum Geophysics (Spectrum) to provide utility and pipeline clearance for the proposed boring locations.

- Provided a minimum of 48-hours' notice to the subscribing utilities via Underground Service Alert (Ticket Number A22050197) prior to job site mobilization.

- Coordinated with Tesoro Refinery personnel to schedule field work and secure an escort for field crews while on refinery property.

3.2 Utility Clearance

Prior to the start of soil sampling each of the proposed boring locations was evaluated for the potential presence of buried structures or utilities by Spectrum. Utility clearance for each of the proposed boring locations was performed using electromagnetic and ground penetrating radar geophysical methods.

3.3 Soil Sampling

The soil investigation was performed on July 26 and 30, 2012. The investigation consisted of collecting 90 soil samples from 18 hand-auger borings (1173-106 through 1173-123). Soil samples were collected from each of the hand-auger borings at the following depth intervals: surface to 0.5 foot, 0.5 to 1.0 foot, 1.5 to 2.0 feet, 2.5 to 3.0 feet, and 4.5 to 5.0 feet. As specified in the TO, the borings were advanced at approximately 60-foot intervals, at the base of the existing wall, within the footprint of the proposed construction. The approximate boring locations are shown on Figure 2.

3.4 GPS Coordinates

The borings were located utilizing a global positioning system (GPS) receiver. Data was recorded in the field and downloaded in the office using surveying TerraSync™ or similar software, in State Plane 83 coordinates. Boring latitude and longitude coordinates in decimal degrees are provided in Table 1.

3.5 Laboratory Analyses

Laboratory analyses were performed by ATL. Copies of the laboratory report and chain-of-custody (COC) documentation are in Appendix B. Based on the Caltrans TO and direction from Caltrans, the samples were analyzed for the following:

- Ninety soil samples were analyzed for total lead by EPA Test Method 6010B.
- Thirteen soil samples with total lead concentrations greater than 50 mg/kg were analyzed for WET soluble lead using EPA Test Method 7420 with citrate acid as the extractant.
- Eight soil samples with WET lead results greater than 5.0 mg/l were analyzed for soluble lead using the WET with de-ionized water as the extractant (DI-WET) by EPA Test Method 7420.
- Nine soil samples with the highest reported total lead concentrations were analyzed for TCLP lead using EPA Test Method 7420.
- Nine soil samples with the highest reported total lead concentrations were analyzed for California Code of Regulations (CCR) Title 22 metals following EPA Test Methods 6010B (metals) and 7471 (mercury).
- Nine soil samples were analyzed for pH using EPA Test Method 9045C.
- Ninety soil samples were analyzed for total petroleum hydrocarbons (TPH) C6-C40 by EPA Test Method 8015B.

- Twenty soil samples were analyzed for VOCs by EPA Test Method 8260 and SVOCs by EPA Test Method 8270C.

- Five equipment blank (EB) water samples were analyzed for total lead using EPA Test Method 6010B.

3.6 Report Preparation

This report was prepared to summarize the objectives, procedures, and results of the investigation activities requested by Caltrans.

4. INVESTIGATIVE METHODS

4.1 Soil Sampling

Soil samples were collected from the 18 borings using hand-auger sampling equipment. Samples that were analyzed for metals were collected from designated sample intervals, placed into new re-sealable plastic bags and homogenized in the field within the sample bag. Homogenized soil within the bag was then transferred into new 4-ounce laboratory-provided glass soil jars, capped, labeled with the sample date/time and a unique soil sample number, and placed in a chilled ice chest pending shipment to the analytical laboratory.

Samples that were analyzed for TPH were collected from the designated sample intervals and transferred directly from the hand-auger bucket to new 4-ounce laboratory-provided glass soil jars. The jars were capped, labeled, and placed in a chilled ice chest pending shipment to the analytical laboratory.

Caltrans assigned a unique ID number to this project (1173). This ID number was included in the database, figures, and in the boring soil sample names. Soil sample identification numbers were assigned (1173-106) based on the TO boring and sample naming convention. Soil sample numbers were designated by the boring number and the bottom of the 6-inch depth interval from which the sample was collected. For example, the soil sample designated 1173-106-0.5 was obtained from approximately 0 to 0.5 foot.

Quality Assurance/Quality Control (QA/QC) procedures conducted during field activities included sampling equipment decontamination prior to each boring, and use of new re-sealable plastic sample bags, laboratory supplied sample containers, and sample chain-of-custody documentation. Soil sampling equipment was cleaned between each sample by washing the equipment with an Alconox™ solution followed by a double rinse with de-ionized water. Sampling activities were conducted under supervision of Geocon's field manager.

The hand-auger borings were backfilled with surface soil from the immediate vicinity of the boring locations. Decontamination water was discharged to the ground surface away from areas potentially associated with surface water bodies or storm drain inlets.

4.2 Equipment Blank Sampling

Five equipment blank samples were collected to verify proper cleaning of the sampling equipment. The equipment blank samples were obtained by passing distilled water over the decontaminated sampling equipment into unpreserved laboratory-provided containers.

4.3 Deviations from Workplan

Geocon performed the scope of work as described in the Workplan dated July 16, 2012 with the following exception. The workplan indicated that one sample from each boring would be analyzed for pH. With approval from Caltrans the nine soil samples with the highest total lead concentrations were analyzed for pH.

5. FIELD OBSERVATIONS AND INVESTIGATIVE RESULTS

5.1 Soil Conditions

The soil conditions encountered in the hand-auger borings generally consisted of dark brown, slightly moist to moist, medium dense silty sand and gray-brown, moist, dense, fine sand. TPH stained soil was observed in the upper two feet of soil throughout the investigated areas. A photo-ionization detector (PID) was used to field screen the soil samples for the presence of VOCs. A reading of 200 parts per million (ppm) was recorded for the soil sample collected at a depth of 5-feet in boring 1173-114. PID readings for the other soil samples ranged from 3.2 to 44.2 ppm. Surface and groundwater were not encountered at the boring locations.

5.2 Analytical Results

Soil analytical results are summarized in Tables 1 through 3. Results were J-Flagged between the Practical Quantitation Limit (PQL) and the calculated Method Detection Limit (MDL). Results that are J-Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL. Copies of the laboratory report and chain-of-custody documentation are in Appendix B. Analytical results are summarized below:

- **Total lead** was reported for the 90 soil samples at concentrations ranging from 2.2 to 230 mg/kg.
- **WET lead** was reported for the 13 samples analyzed at concentrations ranging from 2.9 to 15 mg/l.

- **WET-DI lead** was only reported for one of the eight samples analyzed at 0.27 J mg/l.

- **TCLP lead** was reported for each of the nine samples analyzed at concentrations ranging from 0.06 to 0.80 mg/l.

- **Title 22 metals** antimony, selenium, silver and thallium were not detected at concentrations above their respective MDLs in the nine samples analyzed; beryllium, cadmium, mercury and molybdenum had "J" flagged concentrations. Concentrations of the Title 22 metals, with the exception of lead, were less than ten times their respective STLCs and therefore additional testing using the WET method was not required.

- **pH** was reported to range between 6.8 and 8.4 for the nine samples analyzed.

- **Total petroleum hydrocarbons** were reported in 70 of the 90 soil samples at total (C8 to C-40) concentrations ranging from 17 to 20,000 mg/kg.

- **VOC naphthalene** was reported in one of the 20 samples analyzed at an estimated concentration of 2.4 J micrograms per kilogram (µg/kg). No other VOCs were reported for the samples at concentrations equal to or greater than the MDL.

- **SVOCs** were not reported for the samples at concentrations equal to or greater than the MDL.

- Total lead was not reported for the equipment blank samples (1173-EB-1 through 1173-EB-5). The equipment blank results are not tabulated.

5.3 Data Validation

Geocon and ATL use QA/QC measures to minimize and control errors associated with field and laboratory methods. Field QA/QC measures consist of cleaning sampling equipment between each use with a detergent solution followed by tap and distilled/purified water rinses. Based on the equipment blank sample analytical results, which were several orders of magnitude less than the MDL of the total lead soil samples, it appears that the decontamination procedures minimized the potential for cross-contamination resulting from inadequate equipment decontamination.

Laboratory QA/QC measures include the use of matrix spikes, duplicates, and method blanks, in addition to calculation of percent recovery and relative percentage difference (RPD). A review of the laboratory QA/QC results indicates satisfactory data reporting, and the data are of sufficient quality for the purposes of this report.

With approval from Caltrans, the samples analyzed for VOCs, SVOCs, mercury, and pH were analyzed past the holding time, however the data is considered of sufficient quality for the purposes of this report.

6. DATA EVALUATION

6.1 Lead

The lead data for the Site were treated as four separate sample populations for statistical evaluation based on location of the following sampling groups:

Data Population	Soil Samples Collected from Borings	No. of Borings
Area #1	1173-106 through 1173-108	3
Area #2	1173-109 through 1173-113	5
Area #3	1173-114 through 1173-118	5
Area #4	1173-119 through 1173-123	5

Statistical methods were applied to the total lead data to evaluate: 1) the upper confidence limits (UCLs) of the arithmetic means of the total lead concentrations for each sampling depth; and 2) if an acceptable correlation between total and soluble lead concentrations exists that would allow the prediction of soluble lead concentrations based on calculated UCLs.

Statistical analysis was not performed on samples collected from data populations Area #1 and Area #3 because the samples collected from this data set had total lead concentrations less than 50 mg/kg (i.e., ten times the STLC value for lead of 5.0 mg/l) or the WET soluble lead concentrations are less than the STLC value for lead of 5.0 mg/l.

6.1.1 Calculating the UCLs for the Arithmetic Mean

The upper one-sided 90% and 95% UCLs of the arithmetic mean are defined as the values that, when calculated repeatedly for randomly drawn subsets of site data, equal or exceed the true mean 90% and 95% of the time, respectively. Statistical confidence limits are the classical tool for addressing uncertainties of a distribution mean. The UCLs of the arithmetic mean concentration are used as the mean concentrations because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from a site. The UCLs therefore account for uncertainties due to limited sampling data. As data become less limited at a site, uncertainties decrease, and the UCLs move closer to the true mean.

Non-parametric bootstrap techniques were used to calculate the UCLs. The bootstrap results are included in Appendix C. The calculated UCLs and statistical results are summarized in the following tables:

Area #2
(Borings 1173-109 through 1173-113)

SAMPLE INTERVAL (feet)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	122.6	72.1	8.7	190
0.5 to 1.0	95.3	50.7	8.4	170
1.5 to 2.0	11.6	7.8	2.2	17
2.5 to 3.0	3.1	2.8	2.5	3.3
4.5 to 5.0	10.1	6.2	3.2	17

Area #4
(Borings 1173-119 through 1173-123)

SAMPLE INTERVAL (feet)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	174.7	111.6	8.9	230
0.5 to 1.0	147.9	101.2	12	210
1.5 to 2.0	38.6	28.1	7.7	46
2.5 to 3.0	16.4	11.3	3.5	20
4.5 to 5.0	11.9	7.5	3.4	19

6.1.2 Correlation of Total and Soluble Lead

Total and corresponding WET soluble lead concentrations are bivariate data with a linear structure. This linear structure should allow for the prediction of WET soluble lead concentrations based on the UCLs calculated above in Section 6.1.1.

To estimate the degree of interrelation between total and corresponding WET soluble lead values (x and y, respectively), the *correlation coefficient [r]* is used. The correlation coefficient is a ratio that ranges from +1 to –1. A *correlation coefficient* of +1 indicates a perfect direct relationship between two variables; a *correlation coefficient* of –1 indicates that one variable changes inversely with relation to the other. Between the two extremes is a spectrum of less-than-perfect relationships, including zero, which indicates the lack of any sort of linear relationship at all.

The *correlation coefficient* for the 13 (x, y) data points (i.e., soil samples analyzed for both total lead [x] and WET soluble lead [y]) was 0.8787. A *correlation coefficient* greater than or equal to 0.8 is an acceptable indicator that a correlation exists. Consequently, an acceptable *correlation coefficient* was achieved for the lead data.

For the *correlation coefficient* that indicates a linear relationship between total and WET soluble lead concentrations, it is possible to compute the line of dependence or a best-fit line between the two variables. A least squares method was used to find the equation of a best-fit line (regression line) by forcing the y-intercept equal to zero since that is a known point. The equation of the regression line was determined to be $y = 0.0494(x)$ for the data sets, where x represents total lead concentrations and y represents predicted WET soluble lead concentrations. This equation was used to estimate the expected WET soluble lead concentrations for the UCLs calculated in Section 6.1.1. Regression analysis results and a scatter plot depicting the (x, y) data points along with the regression line are in Appendix C. The 95% UCL-predicted WET soluble lead concentrations for various excavation depths are presented in Section 6.0. The 95% UCL-predicted WET soluble lead concentrations for each sampling interval are presented in Appendix C.

7. FINDINGS AND CONCLUSIONS

7.1 ADL Soil Waste Classification/Disposal

Hazardous waste classification based on the 90% UCL is considered sufficient to satisfy a good faith effort as discussed in SW-846. Risk assessment characterization is typically based on the 95% UCL in accordance with the Risk Assessment Guidance for Superfund (RAGS) Volume 1 Documentation for Exposure Assessment. Per Caltrans, 90% UCLs are to be used to evaluate onsite reuse, and 95% UCLs are to be used to evaluate offsite reuse or disposal. Because Caltrans does not intend to reuse the soil only the 95% UCLs were calculated. Excavation scenarios were evaluated based on the calculated total lead UCLs for each sample interval and weighted averages for various excavation depths. Weighted averages are calculated by using the respective total lead UCLs based on various excavation scenarios. For depth intervals where no sample was collected, the calculated total lead UCL for the sampling interval above is used as representative value.

Based on the TCLP soluble lead results, soil generated at the Site will not require disposal as a RCRA hazardous waste.

7.1.1 Area #1 (Borings 1173-106 through 1173-108)

None of the samples collected from borings 1173-106 through 1173-108 exhibited total lead concentrations greater than 50 mg/kg (i.e., ten times the STLC for lead of 5.0 mg/l) or WET soluble lead concentrations greater than the STLC for lead of 5.0 mg/l. Based upon the reported total lead and WET soluble lead concentrations, excavated soil from a depth of 5.0 feet or shallower would be classified as non-hazardous with respect to lead content. Accordingly, the excavated soil is suitable for disposal as non-hazardous waste (Caltrans Type X).

7.1.2 Area #2 (Borings 1173-109 through 1173-113)

The table below summarizes the excavation scenarios, the predicted WET soluble lead concentrations and the waste classification for excavated soil within this area as represented by borings 1173-109 through 1173-113 based on the calculated total lead 95% UCLs and the relationship between total and WET soluble lead.

Excavation Depth	95% UCL		SOIL TYPE
	Total Lead (mg/kg)	Predicted WET (mg/kg)	Surplus Soil
0 to 0.5 foot	122.6	6.1	Type Z2
0.5 to 5.0 feet	*26.3*	*1.3*	*Type X*
0 to 1.0 foot	109.0	5.4	Type Z2
1.0 to 5.0 feet	*17.6*	*0.9*	*Type X*
0 to 1.5 feet	104.4	5.2	Type Z2
1.5 to 5.0 feet	*6.5*	*0.3*	*Type X*
0 to 2.0 feet	81.2	4.0	Type X
2.0 to 5.0 feet	*5.7*	*0.3*	*Type X*
0 to 3.0 feet	56.6	2.8	Type X
3.0 to 5.0 feet	*4.9*	*0.2*	*Type X*
0 to 4.0 feet	43.2	2.1	Type X
4.0 to 5.0 feet	*6.6*	*0.3*	*Type X*
0 to 5.0 feet	35.9	1.8	Type X

If excavations are 2.0 feet or deeper and soil is managed as a whole, the excavated soil can be disposed of as non-hazardous soil (Caltrans Type X) with respect to lead content.

Based upon the predicted WET lead concentrations, excavated soil from the surface to a depth of 0.5 foot, if excavated separately, should be disposed of as a hazardous waste since the 95% UCL-predicted WET lead concentration is greater than the STLC for lead of 5.0 mg/l. The excavated soil from the top 0.5 foot should be either (1) managed and disposed of as a California hazardous waste or (2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable.

Underlying soil from depths between 0.5 and 5.0 feet can be disposed of as non-hazardous soil (Caltrans Type X) with respect to lead content.

7.1.3 Area #3 (Borings 1173-114 through 1173-118)

None of the samples collected from borings 1173-114 through 1173-118 exhibited total lead concentrations greater than 50 mg/kg (i.e., ten times the STLC for lead of 5.0 mg/l) or WET soluble lead concentrations greater than the STLC for lead of 5.0 mg/l. Based upon the reported total lead and WET soluble lead concentrations, excavated soil from a depth of 5.0 feet or shallower would be classified as non-hazardous with respect to lead content. Accordingly, the excavated soil is suitable for disposal as non-hazardous waste (Caltrans Type X).

7.1.4 Area #4 (Borings 1173-119 through 1173-123)

The table below summarizes the excavation scenarios, the predicted WET soluble lead concentrations and the waste classification for excavated soil within this area as represented by borings 1173-119 through 1173-123 based on the calculated total lead UCLs and the relationship between total and WET soluble lead.

Excavation Depth	95% UCL		SOIL TYPE
	Total Lead (mg/kg)	Predicted WET (mg/kg)	Surplus Soil
0 to 0.5 foot	174.7	8.6	Type Z2
0.5 to 5.0 feet	*50.1*	*2.5*	*Type X*
0 to 1.0 foot	161.3	8.0	Type Z2
1.0 to 5.0 feet	*37.8*	*1.9*	*Type X*
0 to 1.5 feet	156.8	7.7	Type Z2
1.5 to 5.0 feet	22.1	1.1	*Type X*
0 to 2.0 feet	127.3	6.3	Type Z2
2.0 to 5.0 feet	*19.4*	*1.0*	*Type X*
0 to 2.5 feet	109.5	5.4	Type Z2
2.5 to 5.0 feet	*15.5*	*0.8*	*Type X*
0 to 3.0 feet	94.0	4.6	Type X
3.0 to 5.0 feet	*15.3*	*0.8*	*Type X*
0 to 4.0 feet	74.6	3.7	Type X
4.0 to 5.0 feet	*14.2*	*0.7*	*Type X*
0 to 5.0 feet	62.5	3.1	Type X

If soil from the surface to 3.0 feet or deeper is excavated and managed as a whole, the excavated soil can be disposed of as non-hazardous soil (Caltrans Type X) with respect to lead content.

Based upon the predicted WET lead concentrations, excavated soil from the surface to a depth of 1.5 feet or shallower, if excavated separately, should be disposed of as a hazardous waste since the 95% UCL-predicted WET lead concentrations are greater than the STLC for lead of 5.0 mg/l. The excavated soil from the top 1.5 feet or shallower should be either (1) managed and disposed of as a California hazardous waste or (2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable..

Underlying soil from depths between 1.5 and 5.0 feet can be disposed of as non-hazardous soil (Caltrans Type X) with respect to lead content.

7.2 Petroleum Hydrocarbons, VOCs, and SVOCs

Petroleum hydrocarbons in the C8 to C40 range were reported in 70 of the 90 samples analyzed at concentrations ranging from 17 to 20,000 mg/kg. These results indicate that soil containing petroleum hydrocarbons will be excavated for the proposed improvements. Currently, regulatory criteria for the classification of wastes based solely on the concentrations of TPH have not yet been promulgated. The soil would be classified as a non-hazardous waste based on TPH content. However, disposal of petroleum-impacted soil is generally regulated by disposal facility permit and acceptance criteria. Based on the reported results the soil would not be classified as a hazardous waste based on VOC or SVOC content. Petroleum hydrocarbon, VOC, and SVOC results are summarized by area below.

7.2.1 Area #1 (Borings 1173-106 through 1173-108)

Gasoline range petroleum hydrocarbons (C6-C12) was reported for six of the 15 samples collected from this area at estimated concentrations ranging from 0.21 J mg/kg to 0.24 J mg/kg. Total petroleum hydrocarbons in the C8 to C40 range were reported for each of the 15 samples at concentrations ranging from 36 to 12,000 mg/kg.

VOCs and SVOCs were not reported for the five samples analyzed at concentrations equal to or greater than the laboratory detection limit.

7.2.2 Area #2 (Borings 1173-109 through 1173-113)

Gasoline range petroleum hydrocarbons (C6-C12) was reported for five of the 25 samples collected from this area at estimated concentrations ranging from 0.20 J mg/kg to 0.22 J mg/kg. Total petroleum hydrocarbons in the C8 to C40 range were reported for 18 of the 25 samples analyzed at concentrations ranging from 29 to 20,000 mg/kg.

VOC naphthalene was detected in one of the five samples (sample 1173-109-0.5) analyzed for VOC and SVOC at an estimated concentration of 2.4 J µg/kg. Other VOCs and SVOCs were not reported for the remaining samples collected from this area at concentrations equal to or greater than the laboratory detection limit. Based on the reported results, soil would not be classified as a hazardous waste based on VOC or SVOC content.

7.2.3 Area #3 (Borings 1173-114 through 1173-118)

Gasoline range petroleum hydrocarbons (C6-C12) was reported for four of the 25 samples collected from this area at an estimated concentration of 0.22 J mg/kg. Total petroleum hydrocarbons in the C8 to C40 range were reported for 14 of the 25 samples analyzed at concentrations ranging from 81 to 990 mg/kg.

VOCs and SVOCs were not reported for the two samples analyzed for VOC and SVOC at concentrations equal to or greater than the laboratory detection limit.

7.2.4 Area #4 (Borings 1173-119 through 1173-123)

Gasoline range petroleum hydrocarbons (C6-C12) was reported for ten of the 25 samples collected from this area at estimated concentrations ranging from 0.18 J mg/kg to 0.25 J mg/kg. Total petroleum hydrocarbons in the C8 to C40 range were reported for 23 of the 25 samples analyzed at concentrations ranging from 17 to 6,000 mg/kg.

VOCs and SVOCs were not reported for the eight samples analyzed for VOC and SVOC at concentrations equal to or greater than the laboratory detection limit.

7.3 Title 22 Metals

Nine soil samples were analyzed for Title 22 metals. With the exception of lead, the reported concentrations of Title 22 metals were less than their respective TTLCs and ten times their respective STLCs.

The Title 22 metals concentrations for the soil samples collected from the borings were compared with the CHHSLs and the published background levels typically present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996). Arsenic and lead were the only metals reported at concentrations greater than the residential and/or industrial CHHSLs and published background levels. Arsenic was detected in the soil samples collected from the borings at concentrations ranging from 1.3 to 4.1 mg/kg, greater than the CHHSL for residential land use of 0.07 mg/kg and commercial/industrial land use of 0.24 mg/kg. Arsenic is a naturally occurring element; therefore, the reported concentrations were compared to regional background concentrations. The March 2008 Department of Toxic Substances Control (DTSC) publication *Determination of a Southern California Regional Background Arsenic Concentration in Soil* establishes a regional background for arsenic within Southern California including Los Angeles County using naturally occurring and anthropogenic concentrations of arsenic. The report finds that the upper-bound background concentration for arsenic within Los Angeles County is 12 mg/kg. The reported arsenic concentrations are less than 12 mg/kg; therefore, the arsenic concentrations reported for the soil samples are considered to be consistent with background concentrations of arsenic in Los Angeles County.

7.4 pH

Soil pH was reported to range between 6.8 and 8.4.

7.5 Worker Protection

Per Caltrans' requirements, contractor(s) should prepare a project-specific Health and Safety Plan (HSP) to prevent or minimize worker exposure to lead-impacted and petroleum hydrocarbon containing-soil. The HSP should include a Lead Compliance Plan outlining protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other appropriate health and safety protocols and procedures for the handling of lead-impacted soil and petroleum-containing soil.

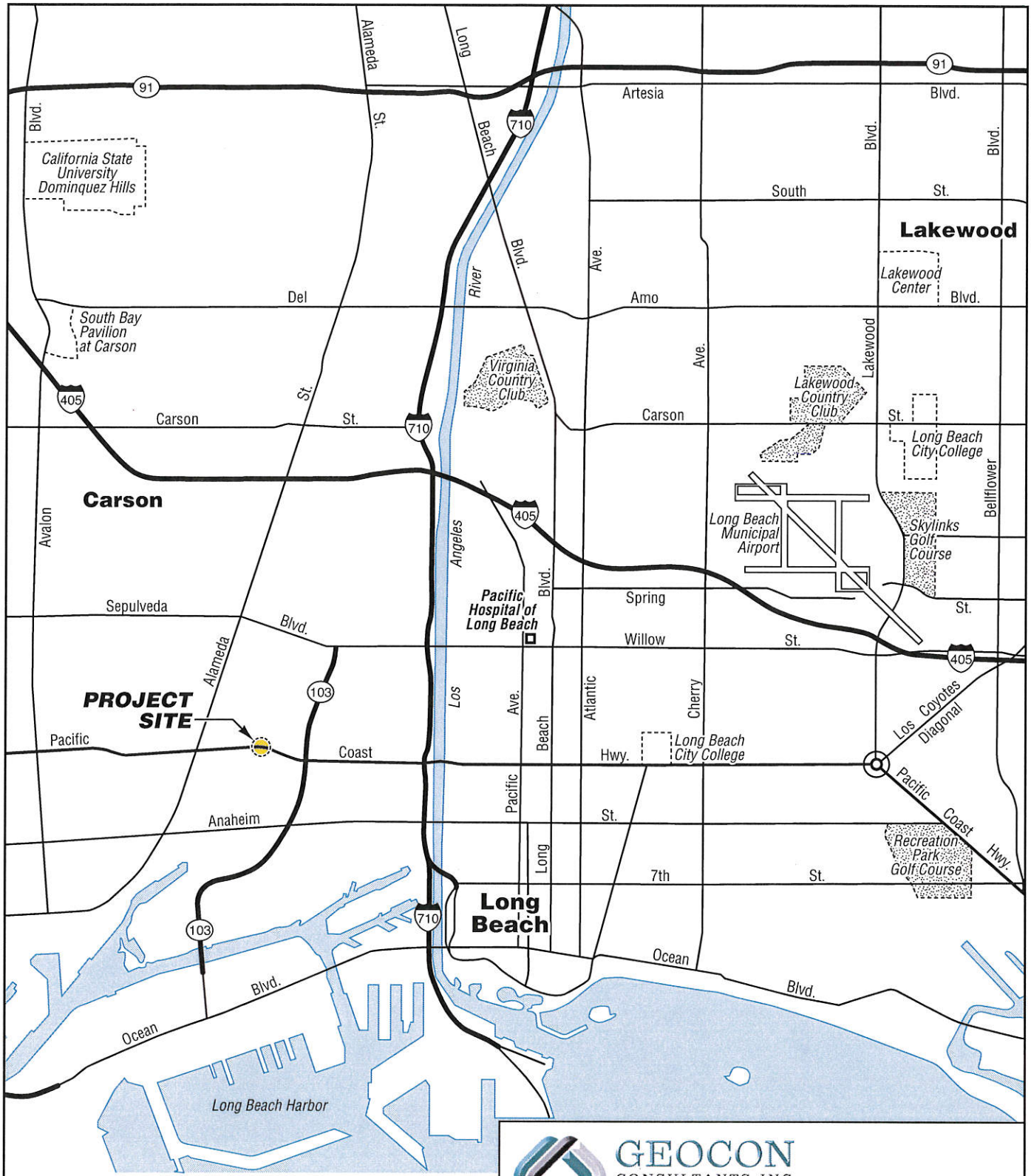
8. REPORT LIMITATIONS

This report has been prepared exclusively for Caltrans. The information obtained is only relevant as of the date of the latest site visit and will require an update to reflect additional information obtained.

The conclusions and recommendations presented herein are based on a limited number of samples collected from in-place soil location according to Caltrans-prescribed protocol. The purpose of these sampling and characterization activities was to reasonably predict the character of soil to be disturbed for planned construction activities within the described limits of the Caltrans right-of-way.

The Client should recognize that this report is not a comprehensive site characterization and should not be construed as such. The appropriate regulatory agency may require additional investigations. The findings and conclusions as presented in this report are predicated on the results of the limited soil sampling and laboratory analyses performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein.

Therefore, the report should only be deemed conclusive with respect to the information obtained. No guarantee or warranty of the results of the report is implied within the intent of this report or any subsequent reports, correspondence, or consultation, either express or implied. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.



GEOCON
CONSULTANTS, INC.
3303 N. SAN FERNANDO BLVD. – SUITE 100 – BURBANK, CA. 91504
PHONE 818.841.8388 – FAX 818.841.1704

Route 1 Pacific Coast Highway

Post Mile 8.50 to 8.78
Los Angeles County, California

GEOCON Proj. No. S9475-06-19

Task Order No. 19

VICINITY MAP

September 2012

Figure 1

TABLE 1

BORING COORDINATES AND SUMMARY OF SOIL ANALYTICAL RESULTS - LEAD AND pH

PACIFIC COAST HIGHWAY CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

SAMPLE ID	LATITUDE	LONGITUDE	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	WET-DI LEAD (mg/l)	TCLP LEAD (mg/l)	pH (pH units)
AREA 1								
1173-106-0.5	33.79160461	-118.2317213	7/26/2012	28	---	---	---	---
1173-106-1.0			7/26/2012	22	---	---	---	---
1173-106-2.0			7/26/2012	25	---	---	---	---
1173-106-3.0			7/26/2012	19	---	---	---	---
1173-106-5.0			7/26/2012	53	3.5	---	---	---
1173-107-0.5	33.79159956	-118.2318059	7/26/2012	17	---	---	---	---
1173-107-1.0			7/26/2012	63	3.6	---	---	7.4
1173-107-2.0			7/26/2012	29	---	---	---	---
1173-107-3.0			7/26/2012	8.6	---	---	---	---
1173-107-5.0			7/26/2012	3.2	---	---	---	---
1173-108-0.5	33.79160732	-118.2318679	7/26/2012	44	---	---	---	---
1173-108-1.0			7/26/2012	10	---	---	---	---
1173-108-2.0			7/26/2012	4.1	---	---	---	---
1173-108-3.0			7/26/2012	3.0	---	---	---	---
1173-108-5.0			7/26/2012	4.6	---	---	---	---
AREA 2								
1173-109-0.5	33.79159455	-118.2322931	7/26/2012	110	4.0	---	0.06	8.3
1173-109-1.0			7/26/2012	11	---	---	---	---
1173-109-2.0			7/26/2012	7.0	---	---	---	---
1173-109-3.0			7/26/2012	2.7	---	---	---	---
1173-109-5.0			7/26/2012	3.2	---	---	---	---
1173-110-0.5	33.79159457	-118.2324108	7/26/2012	8.7	---	---	---	---
1173-110-1.0			7/26/2012	45	---	---	---	---
1173-110-2.0			7/26/2012	2.2	---	---	---	---
1173-110-3.0			7/26/2012	2.6	---	---	---	---
1173-110-5.0			7/26/2012	3.4	---	---	---	---
1173-111-0.5	33.79156761	-118.2325843	7/26/2012	190	8.2	0.27 J	0.09	7.6
1173-111-1.0			7/26/2012	170	5.7	<0.26	0.16	---
1173-111-2.0			7/26/2012	9.2	---	---	---	---
1173-111-3.0			7/26/2012	2.5	---	---	---	---
1173-111-5.0			7/26/2012	17	---	---	---	---
1173-112-0.5	33.79156744	-118.2327235	7/26/2012	34	---	---	---	---
1173-112-1.0			7/26/2012	19	---	---	---	---
1173-112-2.0			7/26/2012	3.7	---	---	---	---
1173-112-3.0			7/26/2012	3.3	---	---	---	---
1173-112-5.0			7/26/2012	3.3	---	---	---	---
1173-113-0.5	33.79154307	-118.2328855	7/26/2012	18	---	---	---	---
1173-113-1.0			7/26/2012	8.4	---	---	---	---
1173-113-2.0			7/26/2012	17	---	---	---	---
1173-113-3.0			7/26/2012	3.1	---	---	---	---
1173-113-5.0			7/26/2012	3.9	---	---	---	---

TABLE 1

BORING COORDINATES AND SUMMARY OF SOIL ANALYTICAL RESULTS - LEAD AND pH

PACIFIC COAST HIGHWAY CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

SAMPLE ID	LATITUDE	LONGITUDE	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	WET-DI LEAD (mg/l)	TCLP LEAD (mg/l)	pH (pH units)
AREA 3								
1173-114-0.5	33.79190832	-118.2313063	7/30/2012	25	---	---	---	---
1173-114-1			7/30/2012	19	---	---	---	---
1173-114-2			7/30/2012	18	---	---	---	---
1173-114-3			7/30/2012	8.9	---	---	---	---
1173-114-5			7/30/2012	4.7	---	---	---	---
1173-115-0.5	33.79192028	-118.2314576	7/30/2012	30	---	---	---	---
1173-115-1			7/30/2012	78	2.9	---	---	8.4
1173-115-2			7/30/2012	12	---	---	---	---
1173-115-3			7/30/2012	3.8	---	---	---	---
1173-115-5			7/30/2012	3.6	---	---	---	---
1173-116-0.5	33.79191548	-118.2316236	7/30/2012	20	---	---	---	---
1173-116-1.0			7/30/2012	22	---	---	---	---
1173-116-2.0			7/30/2012	19	---	---	---	---
1173-116-3.0			7/30/2012	4.6	---	---	---	---
1173-116-5.0			7/30/2012	3.8	---	---	---	---
1173-117-0.5	33.7919013	-118.2317558	7/30/2012	11	---	---	---	---
1173-117-1			7/30/2012	11	---	---	---	---
1173-117-2			7/30/2012	4.8	---	---	---	---
1173-117-3			7/30/2012	2.7	---	---	---	---
1173-117-5			7/30/2012	3.9	---	---	---	---
1173-118-0.5	33.79189115	-118.2318775	7/30/2012	24	---	---	---	---
1173-118-1			7/30/2012	5.4	---	---	---	---
1173-118-2			7/30/2012	3.1	---	---	---	---
1173-118-3			7/30/2012	3.2	---	---	---	---
1173-118-5			7/30/2012	2.8	---	---	---	---
AREA 4								
1173-119-0.5	33.79186884	-118.2322992	7/26/2012	230	15	<0.26	0.80	7.1
1173-119-1.0			7/26/2012	100	5.2	<0.26	0.33	7.2
1173-119-2.0			7/26/2012	15	---	---	---	---
1173-119-3.0			7/26/2012	20	---	---	---	---
1173-119-5.0			7/26/2012	7.5	---	---	---	---
1173-120-0.5	33.79186308	-118.232396	7/26/2012	8.9	---	---	---	---
1173-120-1.0			7/26/2012	12	---	---	---	---
1173-120-2.0			7/26/2012	7.7	---	---	---	---
1173-120-3.0			7/26/2012	7.1	---	---	---	---
1173-120-5.0			7/26/2012	3.7	---	---	---	---
1173-121-0.5	33.79185999	-118.2325607	7/26/2012	39	---	---	---	---
1173-121-1.0			7/26/2012	110	6.3	<0.26	0.35	7.7
1173-121-2.0			7/26/2012	46	---	---	---	---
1173-121-3.0			7/26/2012	3.5	---	---	---	---
1173-121-5.0			7/26/2012	3.4	---	---	---	---

TABLE 1

BORING COORDINATES AND SUMMARY OF SOIL ANALYTICAL RESULTS - LEAD AND pH

PACIFIC COAST HIGHWAY CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

SAMPLE ID	LATITUDE	LONGITUDE	SAMPLE DATE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	WET-DI LEAD (mg/l)	TCLP LEAD (mg/l)	pH (pH units)
1173-122-0.5	33.791851	-118.2327058	7/26/2012	190	8.6	<0.26	0.34	6.8
1173-122-1.0			7/26/2012	210	9.7	<0.26	0.28	7.0
1173-122-2.0			7/26/2012	39	---	---	---	---
1173-122-3.0			7/26/2012	5.9	---	---	---	---
1173-122-5.0			7/26/2012	3.9	---	---	---	---
1173-123-0.5	33.79184633	-118.2328188	7/26/2012	90	5.6	<0.26	0.09	---
1173-123-1.0			7/26/2012	74	4.7	---	---	---
1173-123-2.0			7/26/2012	33	---	---	---	---
1173-123-3.0			7/26/2012	20	---	---	---	---
1173-123-5.0			7/26/2012	19	---	---	---	---

Notes:

WET = Waste extraction test

WET-DI = Waste extraction test using de-ionized water as the extractant

TCLP = Toxicity Characteristic Leaching Procedure

< = Not detected above the laboratory detection limit specified

--- = Not analyzed

mg/kg = milligrams per kilogram

mg/l = milligrams per liter

J = Results qualified as an estimated value due to analytical bias in precision or accuracy

TABLE 2

SUMMARY OF SOIL ANALYTICAL RESULTS - TPH, VOCs, AND SVOCs

PACIFIC COAST HIGHWAY CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TPH CHAIN C6-C12	TPH CHAIN C8-C10	TPH CHAIN C10-C18	TPH CHAIN C18-C28	TPH CHAIN C28-C36	TPH CHAIN C36-C40	TPH CHAIN C8-C40 TOTAL	VOCs	SVOCs
		Results in milligrams per kilogram unless otherwise noted								
AREA 1										
1173-106-0.5	7/26/2012	<0.20	<10	<10	57	120	94	290	---	---
1173-106-1.0	7/26/2012	<0.20	<100	<100	990	3,200	3,700	7,800	ND	ND
1173-106-2.0	7/26/2012	<0.20	<10	<10	240	420	320	990	---	---
1173-106-3.0	7/26/2012	<0.20	<10	<10	200	390	290	890	---	---
1173-106-5.0	7/26/2012	<0.20	<10	<10	93	190	160	460	---	---
1173-107-0.5	7/26/2012	<0.20	<10	<10	150	330	310	790	---	---
1173-107-1.0	7/26/2012	0.22 J	<100	190	2,100	5,000	4,900	12,000	ND	ND
1173-107-2.0	7/26/2012	0.21 J	<10	20	560	920	660	2,200	ND	ND
1173-107-3.0	7/26/2012	0.24 J	<10	<10	290	620	420	1,300	ND	ND
1173-107-5.0	7/26/2012	<0.20	<10	<10	110	300	210	630	---	---
1173-108-0.5	7/26/2012	0.22 J	<10	<10	44	92	70	210	---	---
1173-108-1.0	7/26/2012	0.22 J	<10	<10	10	<10	25	36	---	---
1173-108-2.0	7/26/2012	<0.20	<10	<10	95	110	85	290	---	---
1173-108-3.0	7/26/2012	<0.20	<10	<10	160	190	130	480	---	---
1173-108-5.0	7/26/2012	0.21 J	<10	54	930	1,300	790	3,000	ND	ND
AREA 2										
1173-109-0.5	7/26/2012	<0.20	160	510	3,900	5,700	4,900	15,000	2.4 [1]	ND
1173-109-1.0	7/26/2012	<0.20	<10	<10	160	200	140	510	---	---
1173-109-2.0	7/26/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-109-3.0	7/26/2012	0.20 J	<10	<10	<10	<10	<10	<10	---	---
1173-109-5.0	7/26/2012	<0.20	<10	<10	20	26	45	91	---	---
1173-110-0.5	7/26/2012	<0.20	<10	<10	210	360	240	810	---	---
1173-110-1.0	7/26/2012	0.21 J	110	200	1,700	2,700	2,300	7,000	ND	ND
1173-110-2.0	7/26/2012	<0.20	<10	<10	170	210	160	540	---	---
1173-110-3.0	7/26/2012	<0.20	<10	<10	38	38	46	120	---	---
1173-110-5.0	7/26/2012	<0.20	<10	<10	<10	<10	29	29	---	---

TABLE 2

SUMMARY OF SOIL ANALYTICAL RESULTS - TPH, VOCs, AND SVOCs

PACIFIC COAST HIGHWAY CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TPH CHAIN C6-C12	TPH CHAIN C8-C10	TPH CHAIN C10-C18	TPH CHAIN C18-C28	TPH CHAIN C28-C36	TPH CHAIN C36-C40	TPH CHAIN C8-C40 TOTAL	VOCs	SVOCs
		Results in milligrams per kilogram unless otherwise noted								
AREA 2 CONTINUED										
1173-111-0.5	7/26/2012	<0.20	170	700	4,700	7,500	5,100	18,000	ND	ND
1173-111-1.0	7/26/2012	<0.20	<100	790	5,300	8,400	5,600	20,000	ND	ND
1173-111-2.0	7/26/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-111-3.0	7/26/2012	0.21 J	<10	<10	<10	<10	<10	<10	---	---
1173-111-5.0	7/26/2012	<0.20	<10	<10	14	36	47	98	---	---
1173-112-0.5	7/26/2012	<0.20	<100	200	3,100	4,700	3,100	11,000	ND	ND
1173-112-1.0	7/26/2012	<0.20	<10	<10	<10	14	47	61	---	---
1173-112-2.0	7/26/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-112-3.0	7/26/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-112-5.0	7/26/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-113-0.5	7/26/2012	<0.20	<10	<10	87	190	130	410	---	---
1173-113-1.0	7/26/2012	<0.20	<10	<10	23	73	70	170	---	---
1173-113-2.0	7/26/2012	0.21 J	<10	<10	76	260	200	540	---	---
1173-113-3.0	7/26/2012	0.22 J	<10	<10	93	290	230	620	---	---
1173-113-5.0	7/26/2012	<0.18	<10	11	140	130	94	370	---	---
AREA 3										
1173-114-0.5	7/30/2012	<0.20	16	11	160	190	130	510	---	---
1173-114-1	7/30/2012	<0.20	15	10	180	260	180	640	---	---
1173-114-2	7/30/2012	0.22 J	<10	<10	77	120	89	290	---	---
1173-114-3	7/30/2012	<0.20	<10	<10	<10	28	42	81	---	---
1173-114-5	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-115-0.5	7/30/2012	<0.20	17	110	210	84	66	480	---	---
1173-115-1	7/30/2012	0.22 J	18	25	120	54	60	280	---	---
1173-115-2	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-115-3	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-115-5	7/30/2012	0.22 J	<10	<10	<10	<10	<10	<10	---	---

TABLE 2

SUMMARY OF SOIL ANALYTICAL RESULTS - TPH, VOCs, AND SVOCs

PACIFIC COAST HIGHWAY CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TPH CHAIN C6-C12	TPH CHAIN C8-C10	TPH CHAIN C10-C18	TPH CHAIN C18-C28	TPH CHAIN C28-C36	TPH CHAIN C36-C40	TPH CHAIN C8-C40 TOTAL	VOCs	SVOCs
		Results in milligrams per kilogram unless otherwise noted								
AREA 3 CONTINUED										
1173-116-0.5	7/30/2012	<0.20	<10	41	120	99	68	330	---	---
1173-116-1.0	7/30/2012	<0.20	18	86	370	310	200	990	ND	ND
1173-116-2.0	7/30/2012	<0.20	<10	13	83	79	70	240	---	---
1173-116-3.0	7/30/2012	0.22 J	13	41	170	150	110	490	---	---
1173-116-5.0	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-117-0.5	7/30/2012	<0.20	<10	110	160	68	41	380	---	---
1173-117-1	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-117-2	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-117-3	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-117-5	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-118-0.5	7/30/2012	<0.20	<10	58	310	280	200	850	ND	ND
1173-118-1	7/30/2012	<0.20	<10	100	270	160	120	660	---	---
1173-118-2	7/30/2012	<0.20	<10	14	140	130	95	380	---	---
1173-118-3	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-118-5	7/30/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
AREA 4										
1173-119-0.5	7/26/2012	0.18 J	<10	<10	420	1,500	1,200	3,100	ND	ND
1173-119-1.0	7/26/2012	<0.18	<10	24	460	1,000	710	2,200	ND	ND
1173-119-2.0	7/26/2012	<0.18	<10	<10	150	340	250	740	---	---
1173-119-3.0	7/26/2012	0.18 J	<10	<10	62	130	110	300	---	---
1173-119-5.0	7/26/2012	0.25 J	10	<10	96	160	140	410	---	---
1173-120-0.5	7/26/2012	<0.18	10	30	290	360	230	930	---	---
1173-120-1.0	7/26/2012	0.20 J	<10	14	190	160	100	460	---	---
1173-120-2.0	7/26/2012	<0.18	<10	16	150	180	130	480	---	---
1173-120-3.0	7/26/2012	<0.18	13	18	240	280	180	740	---	---
1173-120-5.0	7/26/2012	0.19 J	<10	<10	43	22	27	93	---	---

TABLE 2

SUMMARY OF SOIL ANALYTICAL RESULTS - TPH, VOCs, AND SVOCs

PACIFIC COAST HIGHWAY CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

SAMPLE ID	SAMPLE DATE	TPH CHAIN C6-C12	TPH CHAIN C8-C10	TPH CHAIN C10-C18	TPH CHAIN C18-C28	TPH CHAIN C28-C36	TPH CHAIN C36-C40	TPH CHAIN C8-C40 TOTAL	VOCs	SVOCs
		Results in milligrams per kilogram unless otherwise noted								
AREA 4 CONTINUED										
1173-121-0.5	7/26/2012	<0.18	<50	<50	830	2,100	1,900	4,800	ND	ND
1173-121-1.0	7/26/2012	<0.18	<50	<50	1,000	2,700	2,200	6,000	ND	ND
1173-121-2.0	7/26/2012	<0.18	<10	23	220	370	310	910	---	---
1173-121-3.0	7/26/2012	<0.18	21	36	340	560	450	1,400	ND	ND
1173-121-5.0	7/26/2012	<0.20	<10	<10	<10	<10	<10	<10	---	---
1173-122-0.5	7/26/2012	<0.18	<50	110	1,300	2,200	2,000	5,500	ND	ND
1173-122-1.0	7/26/2012	<0.18	<10	18	160	300	250	730	---	---
1173-122-2.0	7/26/2012	<0.18	<10	<10	<10	<10	<10	<10	---	---
1173-122-3.0	7/26/2012	<0.18	<10	<10	<10	<10	17	17	---	---
1173-122-5.0	7/26/2012	<0.18	<10	<10	20	12	23	55	---	---
1173-123-0.5	7/26/2012	0.19 J	14	13	160	500	550	1,200	ND	ND
1173-123-1.0	7/26/2012	0.20 J	11	16	280	830	760	1,900	ND	ND
1173-123-2.0	7/26/2012	0.20 J	<10	<10	40	140	130	310	---	---
1173-123-3.0	7/26/2012	0.20 J	<10	<10	<10	33	42	74	---	---
1173-123-5.0	7/26/2012	0.18 J	<10	<10	<10	13	30	43	---	---

Notes:

TPH = Total petroluem hydrocarbons in carbon chain range specified

VOCs = Volatile organic compounds

SVOCs = Semi-volatile organic compounds

< = Not detected above the laboratory detection limit specified

--- = Not analyzed

J = Results qualified as an estimated value due to analytical bias in precision or accuracy

ND = Not detected

[1] = naphthalene reported in micrograms per kilogram

TABLE 3

SUMMARY OF SOIL ANALYTICAL RESULTS - TITLE 22 METALS

PACIFIC COAST HIGHWAY CRIB WALL

LOS ANGELES COUNTY, CALIFORNIA

Sample ID	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
1173-109-0.5	<0.35	1.4	94	0.33 J	0.87 J	10	5.4	20	110	0.15	0.11 J	13	<0.38	<0.08	<0.30	20	410
1173-111-0.5	<0.35	2.2	79	0.33 J	1.0	13	5.4	41	190	0.31	1.2	18	<0.38	<0.08	<0.30	23	430
1173-111-1.0	<0.35	1.9	87	0.38 J	0.89 J	14	5.8	32	170	0.28	0.42 J	18	<0.38	<0.08	<0.30	25	330
1173-119-0.5	<0.35	1.8	100	0.31 J	0.91 J	13	5.5	30	230	0.12	0.54 J	19	<0.38	<0.08	<0.30	25	430
1173-119-1.0	<0.35	1.3	71	0.30 J	0.62 J	9.3	4.8	16	100	0.06 J	0.06 J	10	<0.38	<0.08	<0.30	17	250
1173-121-1.0	<0.35	1.8	91	0.35 J	1.0	12	5.7	19	110	0.17	0.29 J	13	<0.38	<0.08	<0.30	20	420
1173-122-0.5	<0.35	2.5	100	0.33 J	1.7	16	5.7	58	190	0.14	1.2	28	<0.38	<0.08	<0.30	29	990
1173-122-1.0	<0.35	4.1	94	0.39 J	1.3	14	6.1	35	210	0.17	0.52 J	23	<0.38	<0.08	<0.30	26	820
1173-123-0.5	<0.35	3.2	120	0.49 J	1.1	17	7.5	43	90	0.29	1.4	21	<0.38	<0.08	<0.30	30	200
TTLC	500	500	10,000	75	100	2,500	8,000	2,500	1,000	20	3,500	2,000	100	500	700	2,400	5,000
10 X STLC	150	50	1,000	7.5	10	50	800	250	50	2.0	3,500	200	10	50	70	240	2,500
CHHSLs																	
Industrial	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000
Residential	30	0.07	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000
Background Concentrations [1]																	
Minimum	0.15	0.6	133	0.25	0.05	23	2.7	9.1	12.4	0.10	0.1	9.0	0.015	0.10	0.17	39	88
Maximum	1.95	12	1,400	2.70	1.70	1,579	46.9	96.4	97.1	0.90	9.6	509	0.430	8.30	1.10	288	236
Mean	0.60	3.5	509	1.28	0.36	122	14.9	28.7	23.9	0.26	1.3	57	0.058	0.80	0.56	112	149

Notes:

Units shown in milligrams per kilogram (mg/kg)

< = Not detected above the laboratory detection limit specified

J = Results qualified as an estimated value due to analytical bias in precision or accuracy

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

CHHSLs = California Environmental Protection Agency, California Human Health Screening Levels for industrial and residential land use

TTLC, STLC, and CHHSLs shown for chromium are for chromium III

[1] *Background Concentrations of Trace and Major Elements in California Soils (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996)*

Maximum arsenic background concentration source - *Determination of a Southern California Regional Background Arsenic Concentration in Soil,* DTSC March 2008

State of California **Business, Transportation and Housing Agency**

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: Ms. TRACI MENARD, Branch Chief
Senior Bridge Engineer
Structure Design
Division of Engineering Services

Date: February 11, 2013

File: 07-LA-1, PM 8.5/8.78
EA: 07-3X3901
Tesoro Refinery
Retaining Wall Repair

Attn: Hogni Setberg

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design South 1
Branch C

Subject: Foundation Report For Retaining Wall Repair at Tesoro Refinery Site

Per your e-mail request dated January 9, 2013, a Foundation Report (FR) has been prepared for the proposed Retaining Wall repair along Pacific Coast Highway adjacent to the Tesoro Refinery Plant (see the Site Vicinity Map Figure 1). As part of the repair, this FR includes recommendations for a new retaining wall system which will be placed in front of the original metal crib walls situated along postmiles 8.5 to 8.78 (Approximately 516+66 to 521+74 per PCH Mainline stationing). The recommendations provided below are based on a review of the as-built plans for PCH Retaining Wall Construction (dated April, 21 1948), soil borings drilled for this project, soils laboratory results and the layout plans and cross sections of the site dated May 12-15, 2012.

1.1 Scope of Work

The following tasks were prepared for the preparation of this Report:

- Review of archive data and Preliminary Report
- Review of soil borings and laboratory test results obtained during the preliminary phase.
- Geotechnical Analysis
- Preparation of this FR

2.0 PROJECT DESCRIPTION

2.1 Existing Retaining Wall Structures and Background

The existing retaining walls along PCH between postmiles 8.5 and 8.78 are about 5 to 16 ft high metal crib walls set at 1:6 (Horizontal to Vertical) batter. This does not include the embedded portion of the walls. The crib walls are founded on embankment fill or native material. The walls are embedded about 2 to 4 feet below the finish grade. The alignment of the crib walls is shown on Figure 2. The elevation of the roadway within the Cribwall area varies from +27 to +29 feet above

Mean Sea Level (MSL). The wall sections are listed in the table below. Approximate wall heights are based on cross sections provided by District 7 Design.

Table 1 – Crib Wall Section Summary

Wall Section	Approximate Station	Approximate Height, ft
516	516+87 - 518+65 N/B	5 to 11
517	516+31 – 518+65 S/B	5 to 10
519	519+73 – 520+42 S/B	10 to 12
520	519+66 – 521+53 S/B	7 to 15
521	520+78 – 521+72 N/B	10 to 18

Note: These are based on the latest plans provided to our office, (May 2012)

Based on site observations, the conditions of the crib wall metal are somewhat to very corroded. Based on these observations, all the wall sections were in need of repair with the most severely corroded sections noted for Walls 517 and 521. A January 10, 2011 Memo addressed a 15 foot high section of the crib wall face that had collapsed from excessive corrosion allowing soil to flow down the exposed face. The section was subsequently repaired by replacing the failed metal face with a new one. This new face was attached to the metal spacers of the original crib wall. Walls 516, 517 and the shorter walls of 519 and 520 sit on approximately 1.2:1 finish slope grade. The slope is covered by a relatively thin layer of Asphalt.

2.0 GEOLOGY

2.1 Regional Geology

The subject site is located within the Peninsular Range Geomorphic Province. The Peninsular Ranges are characterized by northerly and northwesterly trending mountain ranges and associated valleys. The site is located within the Coastal Plain of Los Angeles County, which is comprised of shallow Pleistocene marine sediments overlain by Holocene alluvial deposits. The Coastal Plain is bounded by the Santa Monica Mountains, Elysian Hills, Repetto Hills, Merced Hills and Puente Hills on the north and bounded by the Palos Verdes Hills on the south. Northwest-southeast trending strike-slip faults are present within and bordering the Coastal Plain (Newport Inglewood fault and Palos Verdes fault). Reverse and thrust faults including the Compton-Los Alamitos blind thrust are present and associated with shortening or compression of the Coastal Plain. Faulting is discussed in Section 3.0, Seismicity, of this report.

2.2 Site Geology

The entire project (including existing retaining walls and fill embankments) is directly underlain by recent Holocene age alluvium. This alluvium was deposited primarily by floods emanating from the Los Angeles River and the San Gabriel River and from the mountains and hills to the north of the Coastal Plain. Depth to bedrock or bedrock like material should be estimated at greater than 400 feet for this project. The retaining walls along the northbound and southbound Pacific Coast Highway were founded either on fill section or partially on fill and the underlying alluvium

or may be founded entirely on the alluvium that underlies the fill. Fill ranges in thickness up to approximately 20 feet.

The closest fault to the site is the Compton-Los Alamitos Blind Thrust fault oriented in a northwest-southeast striking direction dipping 20 degrees toward the northeast directly under the site. The distance to the fault plane is approximately 1.6 to 3.6 miles below the proposed project (Caltrans ARS Online Version 2.1.5, 2012).

3.0 SUBSURFACE CONDITIONS

Six soil borings were drilled near the PCH Median. The borings were drilled on July 25th to August 2nd 2012 to a depth of 51.5 feet each. The borings were drilled by a consultant geotechnical firm due to the existence of contamination of soils and groundwater at the project site. A boring location plan is shown on Figure 2. Stationing, offsets and elevations of the soil borings were determined by a survey and the information will be provided on Log of Test Boring Sheets.

According to the boring data the embankment fill soils behind the existing crib walls are generally composed of medium dense sands and silty sands with gravels with some scattered loose areas. There is also a 10-inch thick asphalt-concrete pavement section located about 6 feet below the existing highway grade. This section was encountered in the area of borings A-12-101 and A-12-102. This is the median area of approximately Stations 520 to 521. The native soils underneath the embankment are composed of loose to very dense fine sands and silty sands and soft to stiff lean to fat clays or elastic silts to the full depth explored (51.5 feet).

Photo-Ionization Detector (ID) instruments showed readings in the range of 100 to up to 3000 ppm in the embankment fill and native soils. These readings measured levels of volatile organic compounds which at this site are primarily hydrocarbons (Gasoline). According to the State Department of Industrial Relations permissible exposure levels of Gasoline are 300 ppm with short term exposure limits at 500 ppm. Groundwater was encountered at approximately +4 foot elevation (above Mean Sea Level, MSL, about 25 feet below the PCH highway grade). Hence, +4 foot groundwater elevation was used for design purposes.

3.0 SEISMICITY

The sites are not located within an Alquist-Priolo Earthquake Fault Zone as established by the California Geological Survey. Based on the Caltrans ARS Online program, the controlling fault is the Compton-Los Alamitos Blind Thrust. The USGS Probabilistic ARS curve (5% in 50 years Hazard) is shown on the ARS Online (Figure 3). The average shear wave velocity of the upper 30 meters (Vs30) is approximately 200 m/sec (660 fps) based on SPT correlations. The Peak Ground Acceleration (PGA) calculated for this site is 0.57g. A brief summary of the contributing fault parameters is shown in Table 2 below.

Table 2 – Fault and Design Ground Motion Parameters.

Fault	Fault ID	M_{max}	Type	Dip°	Dip Direction	R_{rup} (mile-km)	R_{JB} (mile-km)	R_x (mile-km)
Compton-Los Alamitos Blind Thrust	367	6.9	R	20	NE	1.6-2.6	0.0-0.0	3.6-5.8
Newport Inglewood-Rose Canyon fault zone	366	7.2	RLSS	90	V	3.0-4.8	3.0-4.8	3.0-4.8
Palos Verdes fault zone	369	7.2	RLSS	90	V	3.4-5.5	3.4-5.5	3.4-5.5

4.0 LIQUEFACTION EVALUATION

Based on the soil borings drilled for this project, loose to medium dense sandy soils were encountered below the groundwater depth. Therefore there is the potential for liquefaction at the project site. Based on the Seismic Hazard Zone Maps, the site is within a Liquefaction Zone (Long Beach Quadrangle, Official Map March 1999). However, liquefaction occurrence and induced settlement is expected to have negligible effect on the overall performance of the proposed walls.

5.0 LABORATORY TESTING

Laboratory testing was performed by consultants on selected soil samples from the investigation program. The materials tested are representative of the embankment fill and the underlying native soils. Laboratory testing included Grain size analysis, Atterberg limits, direct shear strength, and corrosivity tests. Geotechnical testing was performed in accordance with California Test Methods and/or ASTM procedures as indicted by Table 3. As mentioned in Section 1.0, a summary of the laboratory results is included in Appendix A.

Table No. 3 – Laboratory Test Methods

Test	Standard
Grading Analysis	ASTM D 422
Atterberg Limits	AASHTO T 90 & 89
Direct shear	ASTM D 3080
Corrosion	CTM 643, CTM 422, CTM 417

6.0 CORROSIVITY

Composite bulk samples from Borings A-12-101 to A-12-106 were tested for corrosion potential at depths of 0-10 feet and 15-50 feet. The results show that the soils at the subject site at depths of up to 50 feet below highway grade are not corrosive to buried metal and concrete.

Even though the site is considered non corrosive we recommend that all steel for this project be treated with corrosion prevention measures due to the close proximity of the coast and the refinery operations at this location (see also Section 9.0 Construction Considerations).

Table No. 4 – Corrosion Test Results

Boring	Depth (ft)	Minimum Resistivity (Ohm-cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
A-12-101 to 106	0-10	3,500	7.71	135	30
A-12-101 to 106	15-50	590	7.78	490	50

Note: Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist: Chloride concentration is greater than or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less.

7.0 SOIL PARAMTERS

Native soil parameters summarized in the table below were derived from soil laboratory test results and/or in-situ field tests (mainly correlations with Standard Penetration Tests for granular samples). These parameters were used in analysis of soldier piles walls discussed in the next section (Section 8). For embankment fill parameters directly behind the proposed soldier piles walls a friction angle and cohesion of 35 degrees and 100 psf were used to simulate granular backfill with metal cribwall reinforcement.

Table No. 5 – Soil Parameters

Wall No.	Depth, ft (1)	Stationing (2)	Unit Weight, γ, pcf	Friction angle, ϕ, degrees	Cohesion, psf
516	9-15 (Fill)	516+87 - 518+65	120	31	0
	15+ (Native)		120	29	200
517	10-18 (Fill)	516+31 – 518+65	125	30	0
	18+ (Native)		120	30	0
519	12-16.5 (Fill)	519+73 – 520+42	120	31	0
	16.5+ (Native)		120	31	0
520	15+ (Native)	519+66 – 521+53	120	30	750
521	18+ (Native)	520+78 – 521+72	125	32	750

Note: (1) Depth below highway grade.
(2) Per the Route 1 Centerline Alignment (2/13 Plans).

8.0 FOUNDATION RECOMMENDATIONS

Per the August 31, 2012 Preliminary Foundation Report (PFR), Soldier Piles are a feasible foundation type. The details of the Soldier Pile design are summarized in this section. The pile design is based on the Load Resistance Factor (LRFD) Method. As such, guidelines from Section 3 of the 2007 AASHTO LRFD Bridge Design Specifications are followed in the Report. The design was further based on available topography, cross sections and field observations of the geometry of the existing cribwalls and slopes. The design was also based on soil parameters summarized in Section 7 and Table 5 of this Report.

8.1 Soldier Pile Walls

Soldier Piles in 30-inch diameter drilled holes are recommended as foundation support. Soldier Pile walls may be built as cantilever types with heights of 5 to 16 feet. The soldier pile wall should be placed in front of the existing crib wall without a batter. The distance of the centerline of soldier pile wall to the existing crib wall facing should be about 1.5 feet near the base of the crib walls. The distance from the centerline of the soldier pile wall to the top of the crib walls varies as the soldier pile walls are constructed plumb and will have no batter. The pile spacing would be 8 feet on centers. The lagging may be composed of reinforced concrete. The depth of embedment will vary with the height of the walls. The Pile Summary Table 6A provides Active, Live and Passive earth pressure loads with coefficients based on the three limits states. Table 6B provides a summary of the embedment depths based on these three states along with the final design load. Design embedment is based on maximum wall heights for each wall location. The active load is in two parts, the first active load should be located 1/3 from the bottom of the wall height. The second active load should be located 1/3 from the bottom of the pile embedment on the active side. For live loads the traffic load should be located ½ the distance from the top of the wall height and

the seismic load 1/3 the distance from the top of the wall height. The passive pressure load should be located 1/3 from the bottom of the pile embedment on the passive side.

Table 6A – Soldier Pile Wall Foundation Design Loads

Wall Location	Max Wall Height, ft	Service Limit State I			Strength Limit State			Extreme Event State		
		Total Active Pressure Load, plf (1.0)	Live Limit, plf (1.0)	Passive Pressure Load, plf (1.0)	Total Active Pressure Load, plf (1.5)	Live Limit, plf (1.75)	Passive Pressure Load, plf (1.0)	Total Active Pressure Load, plf (1.5)	Live Limit, plf (0.5EQ)	Passive Pressure Load, plf (1.0)
516	11	36335	5702	522000	71377.5	9978.5	815625	71377.5	3339.5	675000
517	10	25110	5184	163350	68625	9072	595350	68625	2760	476280
519	12	39440	6220.8	558000	59160	10886	558000	59160	3974	468000
520	15	50975	7776	540000	93812.5	13608	843750	93812.5	6468	69687.5
521	18(1)	63100	9331	584800	110535	16330	913750	97215	7360	761875

Note: (1) Active earth pressures based on a free-standing wall height of 16 feet.

Table 6B – Soldier Pile Wall Foundation Design Pile Data Summary

Wall Location	Max Wall Height, ft	Stationing (1)	Pile Type (2)	Pile Embedment Depth, ft			Design Pile Embedment, ft
				Service Limit State I	Strength Limit State	Extreme Event State	
516	11	516+87 - 518+65	30” DH	20	25	25	25
517	10	516+31 – 518+65	30” DH	15	25	25	25
519	12	519+73 – 520+42	30” DH	20	20	20	20
520	15	519+66 – 521+53	30” DH	20	20	25	25
521	18	520+78 – 521+72	30” DH	20	25	25	25

Notes: (1) Stations are per the latest plans showing the Route 1 Centerline Alignment.
(2) Pile Type is 30” Drilled Hole (DH).

Earth pressure loads summarized in Table 6A are based on the Unfactored Simplified Earth Pressure Distributions for Permanent Cantilevered Walls with discrete vertical wall elements embedded in granular soil per Figure 3.11.5.6-1 of the 2007 AASHTO LRFD Bridge Design Specifications Manual. However, it should be noted that the Strength and Extreme State Loads summarized in the table above are factored. An added safety factor of 1.2 was added to the pile embedment depths to account for possible variations in subsurface conditions. For seismic

conditions an inverted triangular earth pressure diagram may be used acting on the wall portion of the soldier pile system.

Finally the portion of the pile embedment in the slope material for Walls 516, and 519 were not accounted for giving shear resistance. For Wall 517, the upper 4 feet of the slope was not accounted for. The soldier pile wall should be covered by a finished grade slope. The slope should be at a 1.2:1 (Horizontal to Vertical) grade to match the original finish grade with a 2 foot cover over the top of the pile embedment and a 2-3 foot wide bench in front of the wall. Geogrid reinforcement should be placed at 2.5 foot vertical spacing within the rebuilt slope. The geogrid should also have a minimum reinforcement length of 5 feet and a minimum Long Term Design Strength (LTDS) of 1733 plf (Machine direction). The backfill for the geogrid be a predominantly granular material with a shear strength having a minimum 32 degree friction angle. Gravel or larger particles are not recommended in the backfill. The slope should be compacted to 90 percent relative density per the Latest Standard Specifications.

8.2 Special Design Considerations for Specific Locations

Certain existing crib wall locations need specific design recommendations due to their position on along the Crib wall alignment. These are the east end of Wall 519 at station 520+46, corner sections of Cribwalls (see Photograph 2) and end of Retaining Wall 521 at station 521+74.

The east end of Wall 519, see Photograph No. 1, lies adjacent to a Railroad Corridor lined with sheet piling. A 30-inch drilled hole with H-beam should be placed on the left side of the Cribwall with concrete lagging (or a metal facing system) doweled into the concrete on right side of the Cribwall and supported by a metal beam placed over the existing sheet piles at the bottom. Any opening on the right side of this wall could be closed by a concrete formed section. Any sides of existing metal Cribwall section, as shown on Photograph 2, should be closed by a concrete formed wall.

Photographs 3 and 4 show an existing Cribwall (Wall No. 521) resting on a concrete covered steel pipe. This section is located at station 521+74. The soldier pile should be designed with a drilled hole installed on the left side of the Cribwall and doweled into concrete on the right side. Concrete lagging would extend across the Cribwall. A metal or concrete beam should support the lagging just above the top of the concrete cover. Any opening on the side of the cribwall should be closed by a concrete formed section. Any utilities projected to be in conflict with this design should be relocated prior to construction.

9.0 CONSTRUCTION ISSUES

- Drilling for the Soldier Piles may penetrate any existing crib wall footing.

- A granular self-compacting free draining backfill material such as pea gravel may be used for any gap between the soldier pile wall and crib wall face. Due to the batter of the

Cribwalls and the vertical alignment of the proposed soldier pile walls as much as 3-4 feet width of backfill will be placed near the top of the soldier pile wall.

- Caving and groundwater are anticipated during drilling for soldier piles therefore the contractor should be prepared to use a method to control caving and be prepared to use casings or other alternative methods of construction.

- Contaminated soil and groundwater should also be expected to be encountered during the Soldier Pile drilling process.

- For construction temporary access through the Tesoro Refinery Plant will be required. Drilling the soldier piles can be performed from the highway or in locations where it is allowed from the base of the existing crib walls. In areas where there is an existing slope in front of the crib wall, drilling piles from the highway may be preferable. However, the presence of overhead power-lines at some locations may require drilling from the bottom of the embankment or temporarily relocating the power-lines or shutting off power during construction.

- As another option, temporary access ramps may be constructed in front of the crib walls to drill the Soldier Piles. However, the added weight and possible settlement of the ramps on existing underground utilities will need to be evaluated.

- A 12 3/4 –inch LA DWP Water line crosses near Station 519+70 on the south side of the embankment, to the left of Cribwall No. 519. The line should be clearly marked in the field during construction in order to avoid conflict with Soldier Pile Drilling operations.

- All utilities should be clearly marked in the field during construction to avoid conflict with Soldier Pile Drilling operations. Utilities should be relocated to avoid conflict with soldier pile wall alignment If any utilities (such as previously unknown utilities) are in conflict with Soldier Pile locations they should first be relocated. If relocation is not possible our office should be contacted immediately. A reinforced concrete cover structural system will need to be placed with the soldier pile lagging placed above the structure. We recommend a general plan be developed to be used in case a situation such as this arises.

- Even though the site is considered non corrosive we recommend that all steel for this project be treated with corrosion prevention measures due to the close proximity of the coast and the refinery operations at this location.

Please provide the draft plans and specifications to our office for review and comment prior to finalizing the design for this project.

If you have any questions, please contact Sam Sukiasian at (213) 620-2135 or Christopher Harris at (213) 620-2147.

Prepared by:

SAM SUKIASIAN, G.E.
Senior Transportation Engineer
Office of Geotechnical Design South 1
Branch C

Reviewed by:

CHI-TSENG LIU, Phd, G.E.
Senior Transportation Engineer
Office of Geotechnical Design South 1
Branch C

CHRISTOPHER HARRIS, C.E.G.
Engineering Geologist
Office of Geotechnical Design South 1
Branch C

cc. Oji Kailu, District 7 Design
Lawrence Okoye, Structure Construction
Jose Higareda Structure Design
GS Fileroom
GS Corporate
District 7 Material Engineer

Attachments:

Figures 1-2
Appendix A – ARS Curve/Data
Appendix B – Laboratory Results
Appendix C – Photos

Figures

Figure 1 - Site Vicinity Map

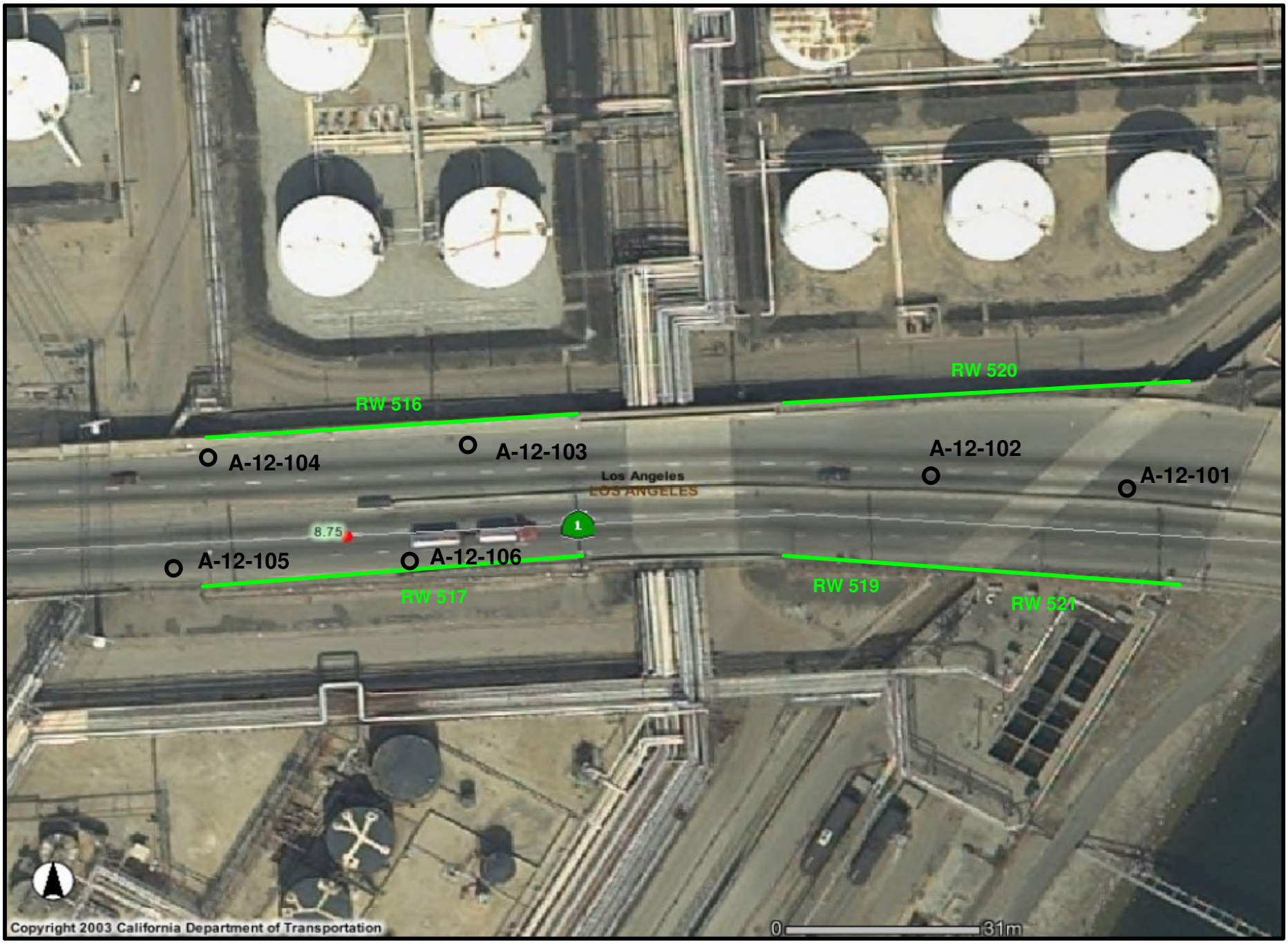
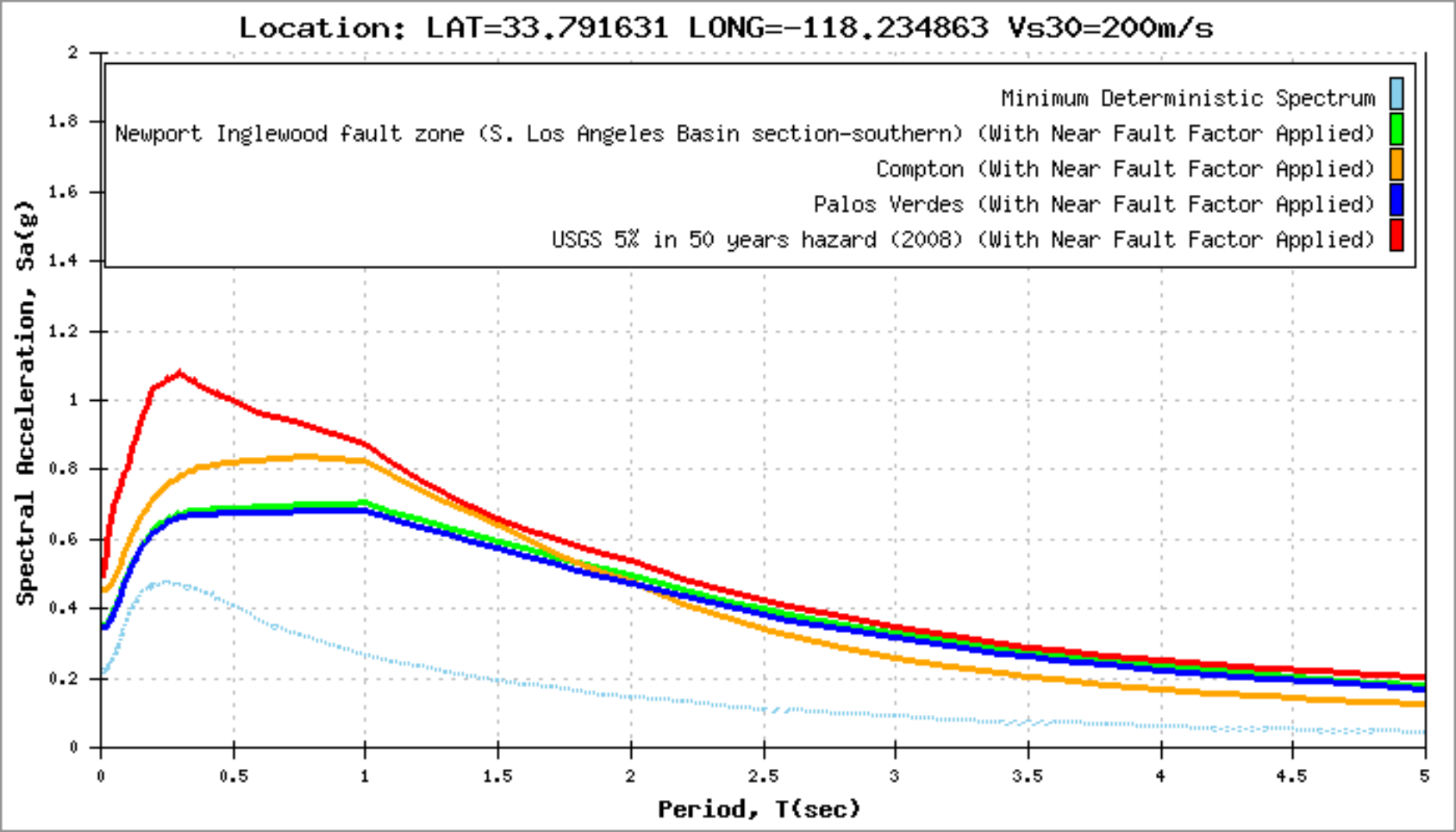


Figure 2 - Boring Location Map and Wall Alignment

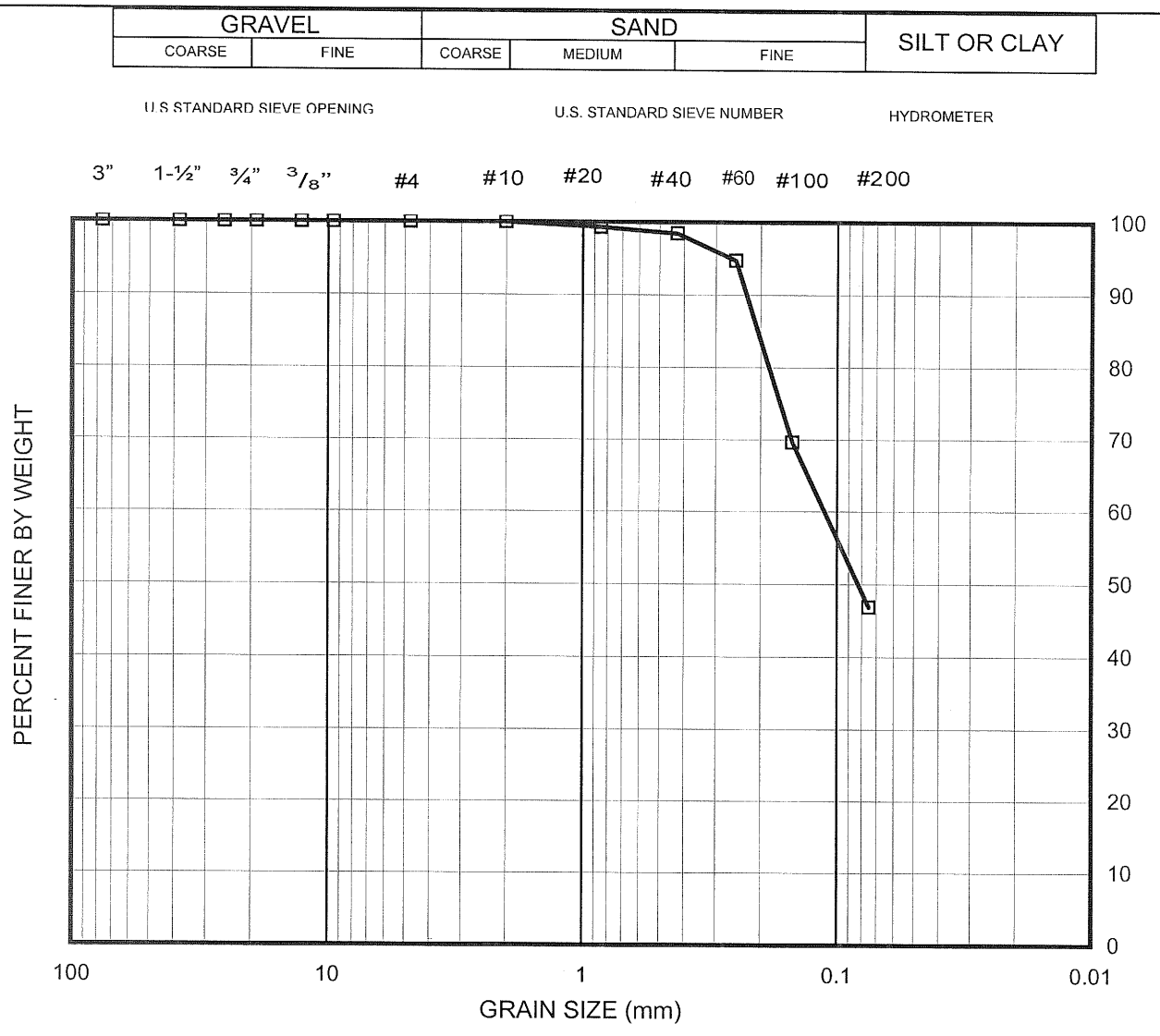
Appendix A

ARS Curve/Data


Location: LAT=33.791631 LONG=-118.234863 Vs30=200m/s
Minimum Deterministic Spectrum
Newport Inglewood fault zone (S. Los Angeles Basin section-southern) (With Near Fault Factor Applied)
Compton (With Near Fault Factor Applied)
Palos Verdes (With Near Fault Factor Applied)
USGS 5% in 50 years hazard (2008) (With Near Fault Factor Applied)
Spectral Acceleration, Sa(g)
Period, T(sec)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0.5
1.5
2.5
3
3.5
4
4.5
5

Appendix B

Laboratory Results



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-101	S-1	7.5	Tube	SC	N/A	N/A

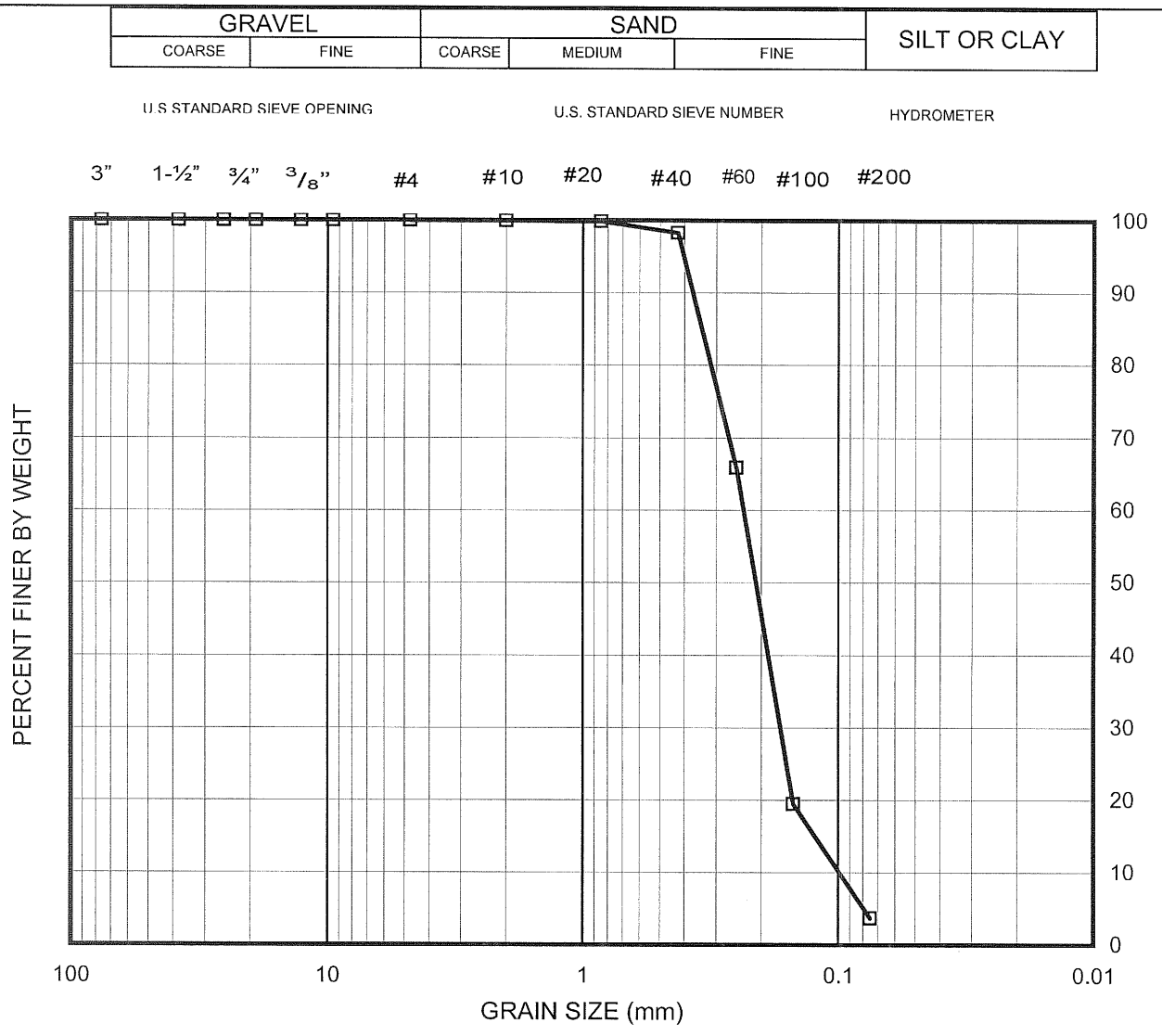
ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.: 30989856
Client Name: URS Corporation
EGL Project No.: 12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-102	S-6	30	Tube	SP	N/A	N/A

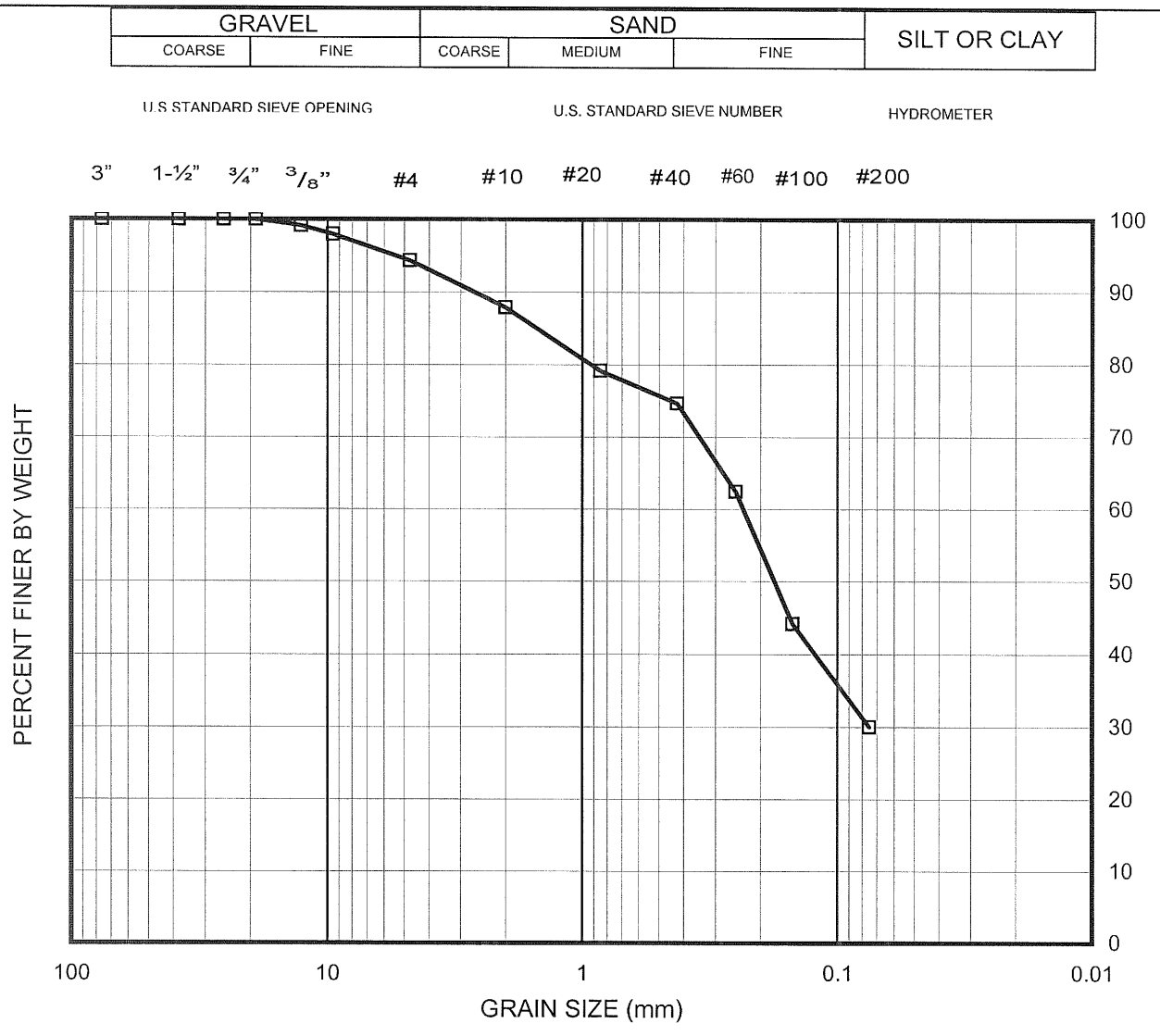
ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.: 30989856
Client Name: URS Corporation
EGL Project No.: 12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-103	S-1	5	Bag	SM	N/A	N/A

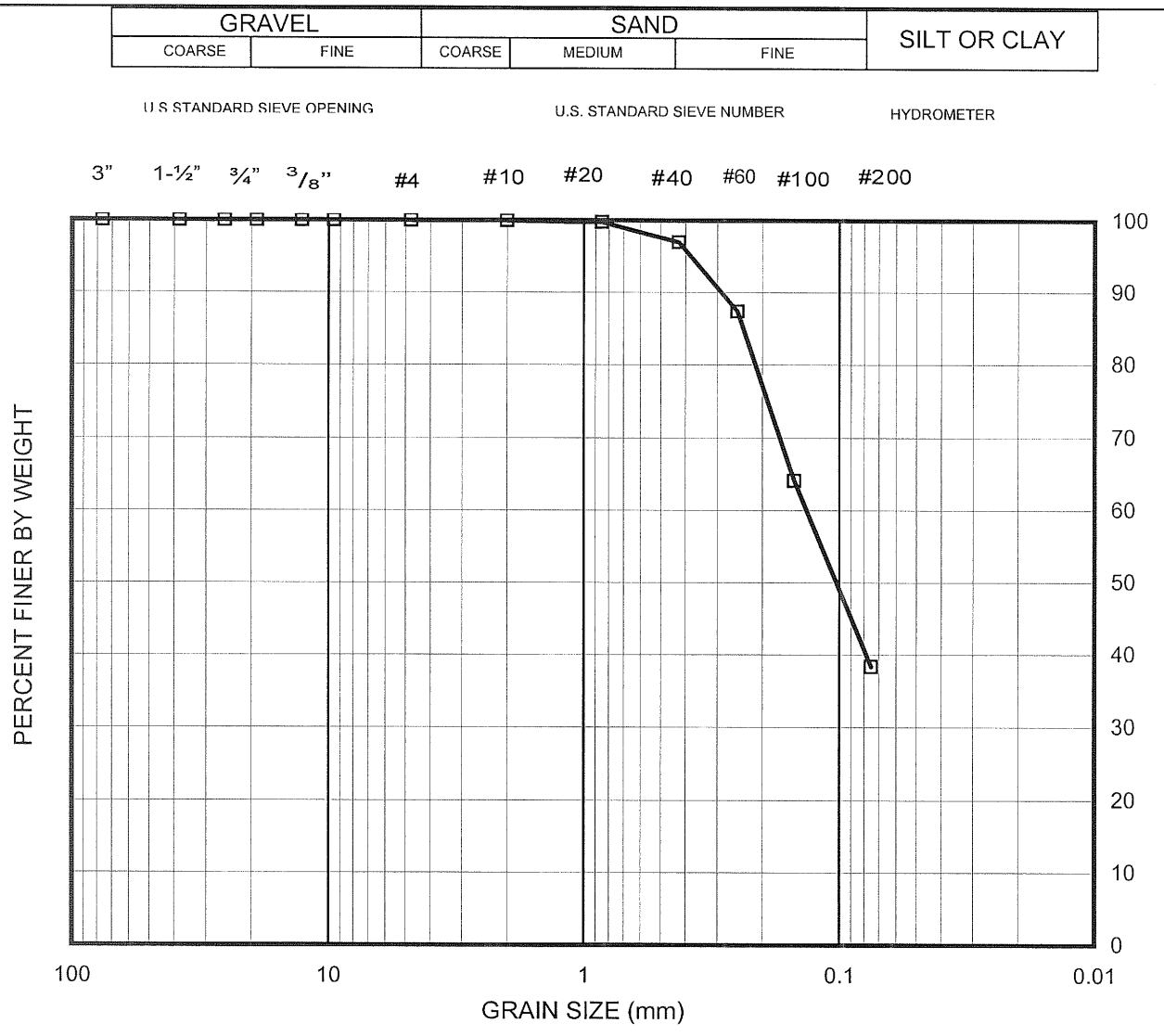
ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.: 30989856
Client Name: URS Corporation
EGL Project No.: 12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-103	S-3	15	Bag	SM	N/A	N/A

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.: 30989856
Client Name: URS Corporation
EGL Project No.: 12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE

SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-104	S-3	15	Tube	SM	N/A	N/A

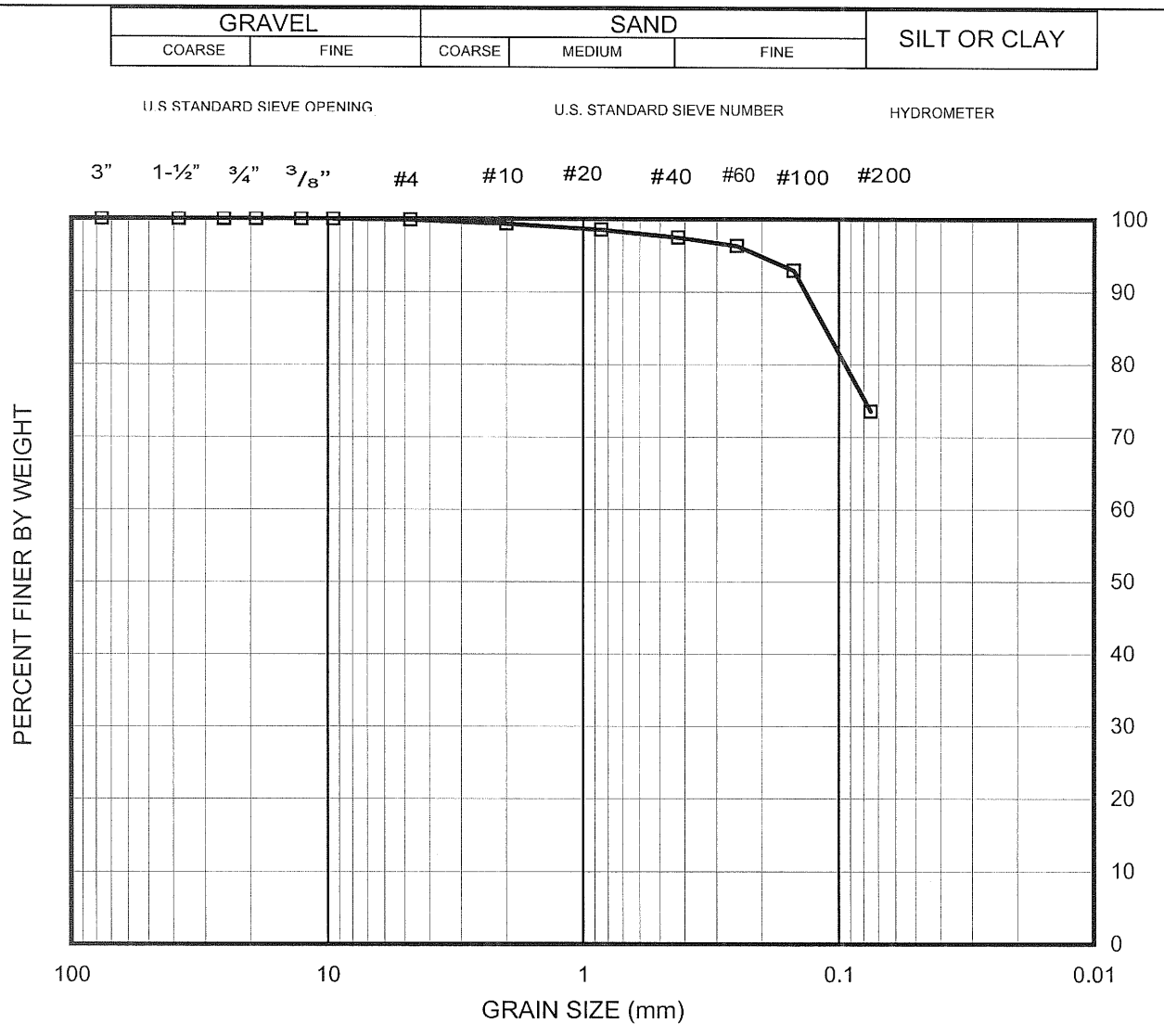
ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.: 30989856
Client Name: URS Corporation
EGL Project No.: 12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-104	S-10	50	Bag	ML	N/A	N/A

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.: 30989856
Client Name: URS Corporation
EGL Project No.: 12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE

SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-105	S-1	5	Bag	SM	N/A	N/A

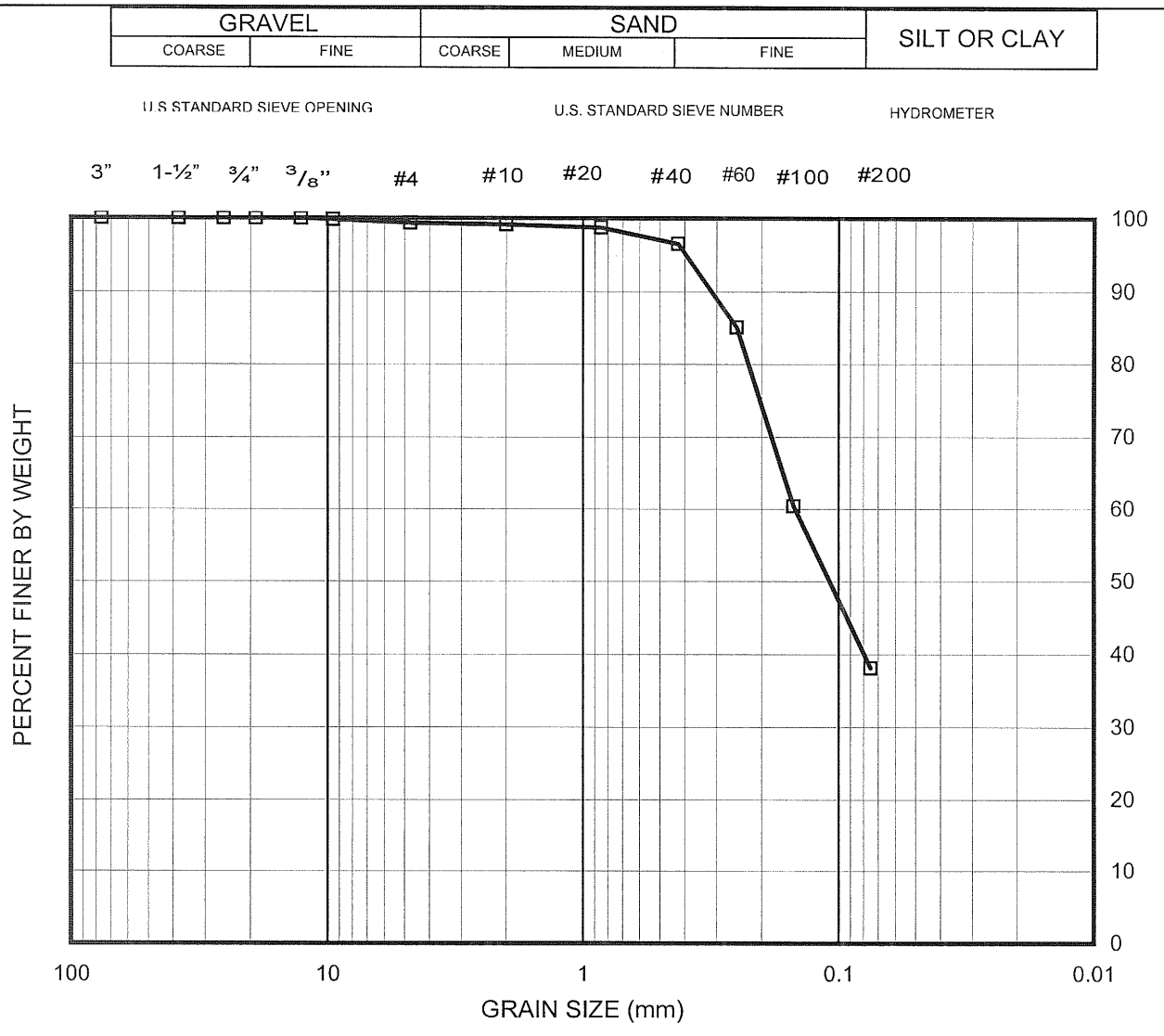
ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.: 30989856
Client Name: URS Corporation
EGL Project No.: 12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-105	S-3	15	Bag	SM	N/A	N/A

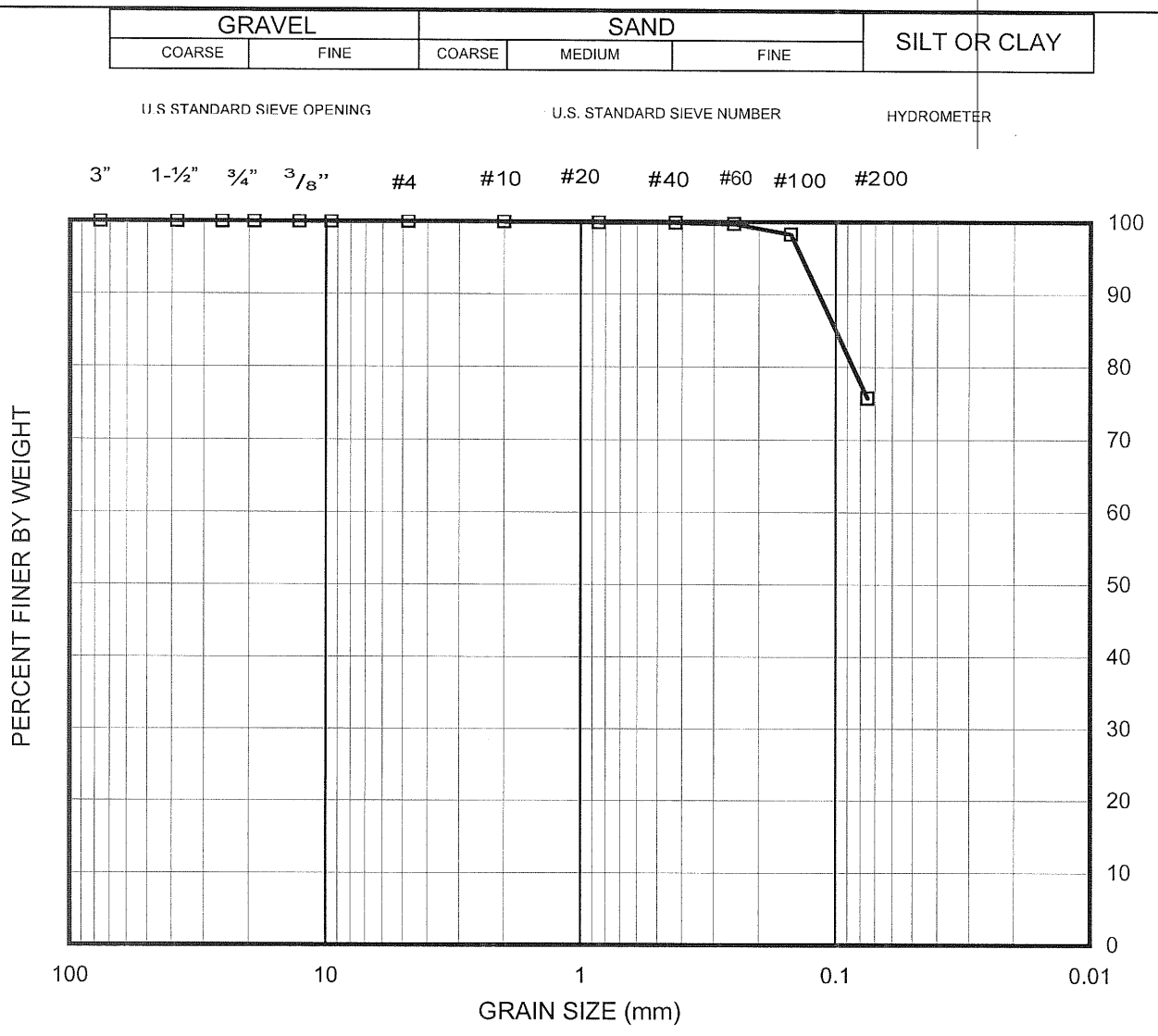
ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.: 30989856
Client Name: URS Corporation
EGL Project No.: 12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-105	S-7	35	Bag	ML	N/A	N/A

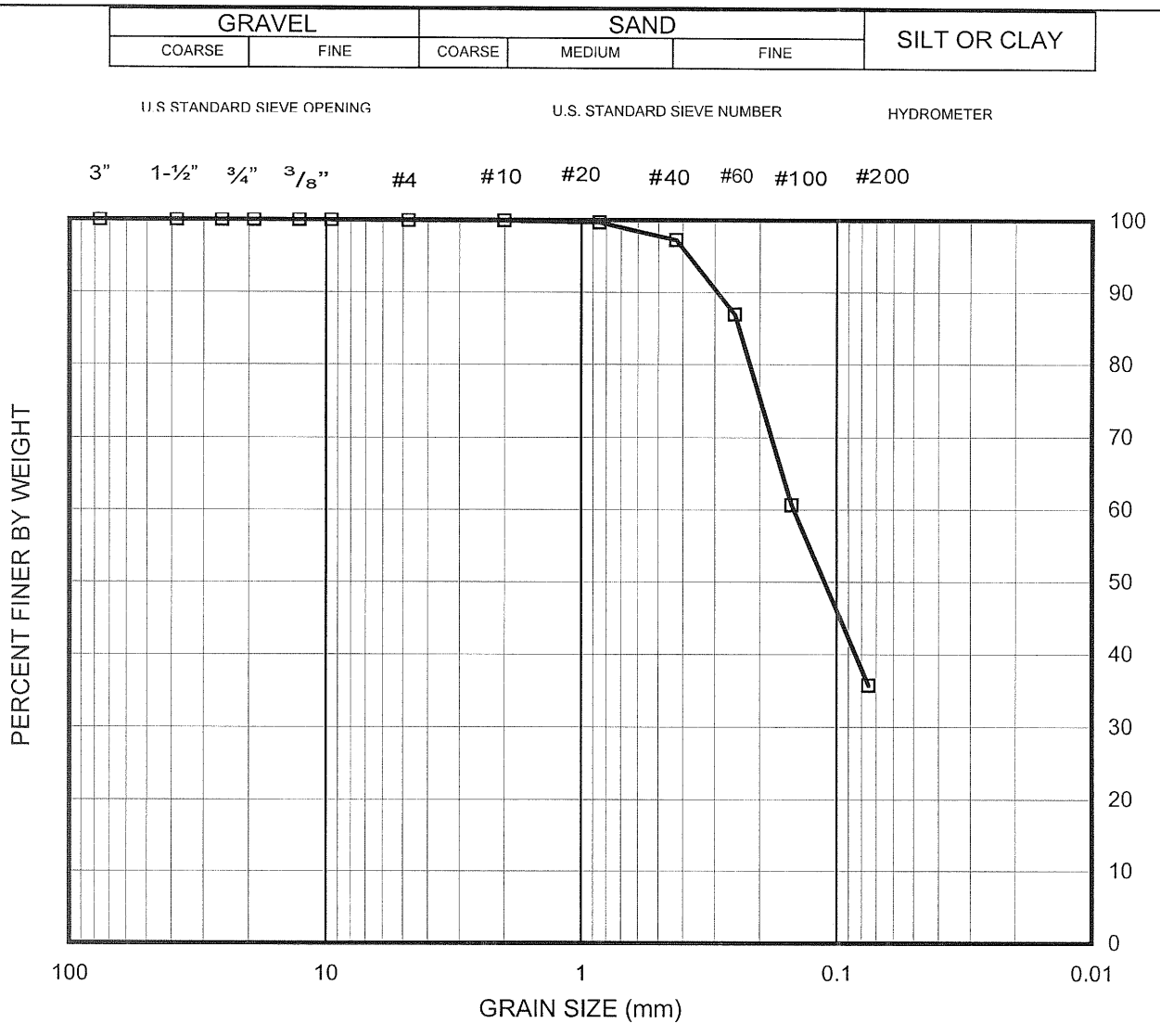
ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.: 30989856
Client Name: URS Corporation
EGL Project No.: 12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE



SYMBOL	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE TYPE	SOIL TYPE	LIQUID LIMIT	PLASTICITY INDEX
□	A-12-106	S-3	15	Bag	SM	N/A	N/A

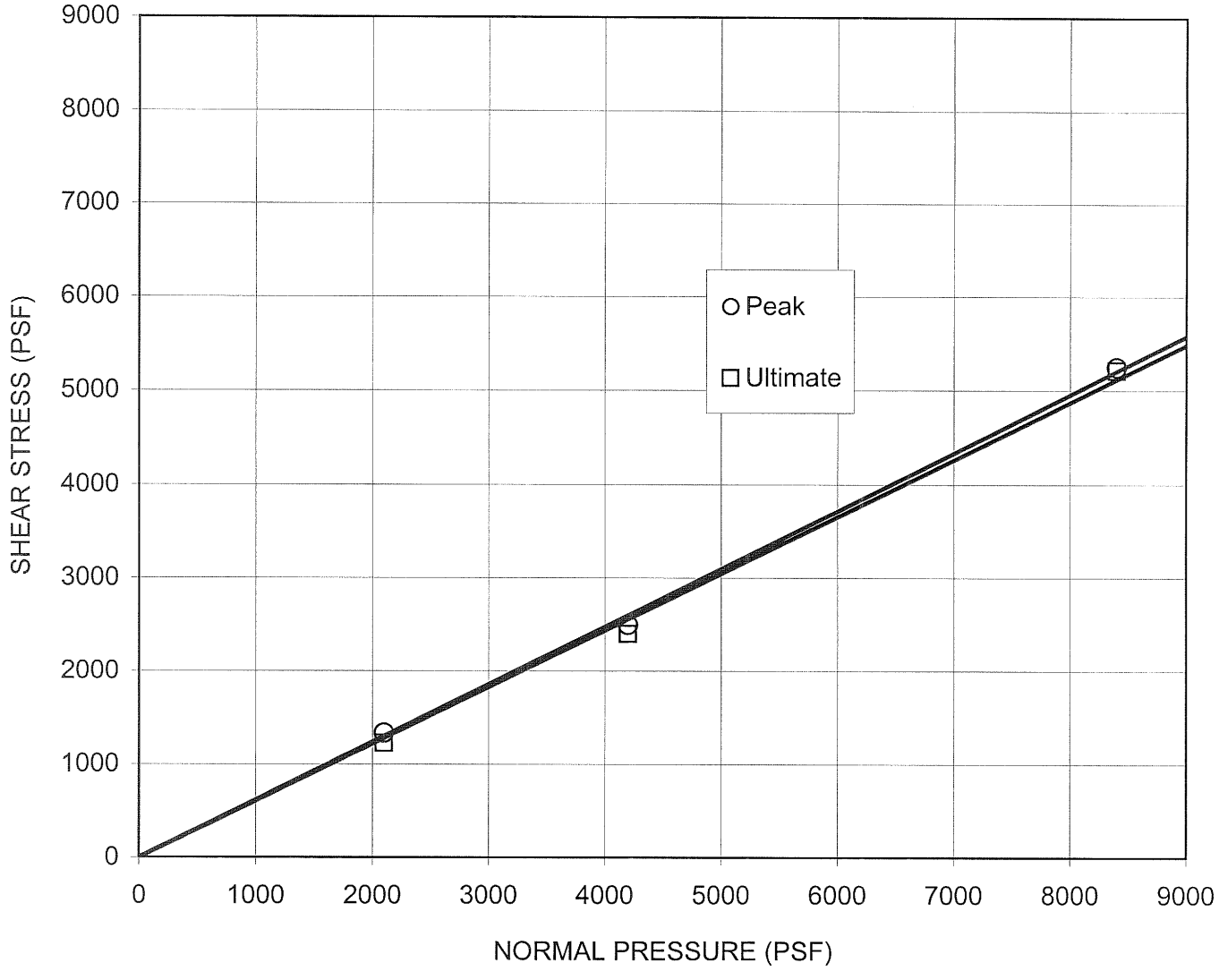
ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client Job No.:	30989856
Client Name:	URS Corporation
EGL Project No.:	12-008-004

GRAIN SIZE DISTRIBUTION CURVE

Aug-12 (ASTM D422) FIGURE



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
A-12-101	S-7	35	Tube	ML	○	0	31
					□	0	31

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
2100	31.4	34.3
4200	31.4	33.2
8400	31.4	31.9

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

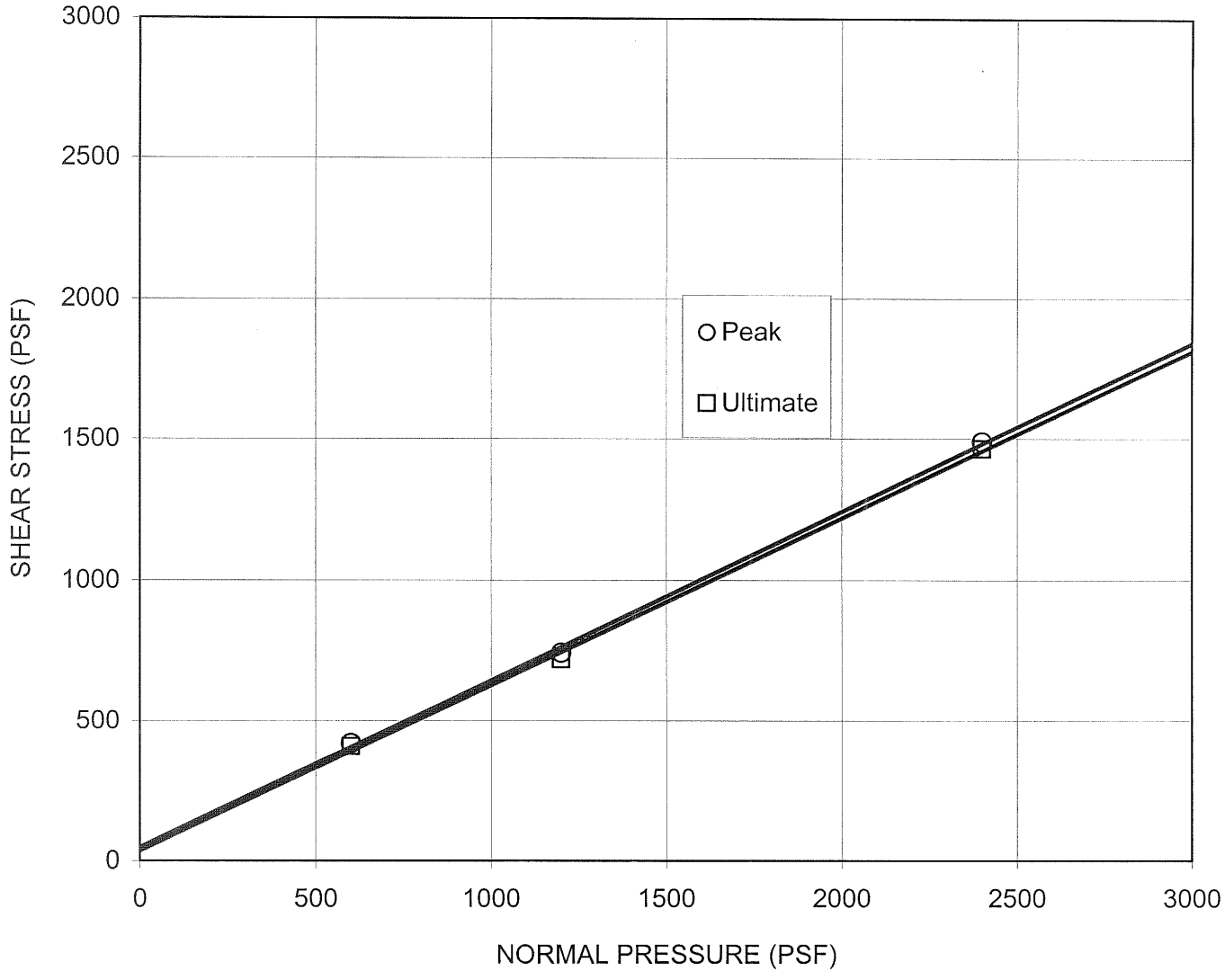
Client: URS Corporation

Project No.: 30989856

EGL Project No.: 12-008-004

DIRECT SHEAR

08/12 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
A-12-102	S-2	10	Tube	ML	○	48	31
					□	36	31

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
600	7.3	21.8
1200	7.3	20.7
2400	7.3	19.9

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

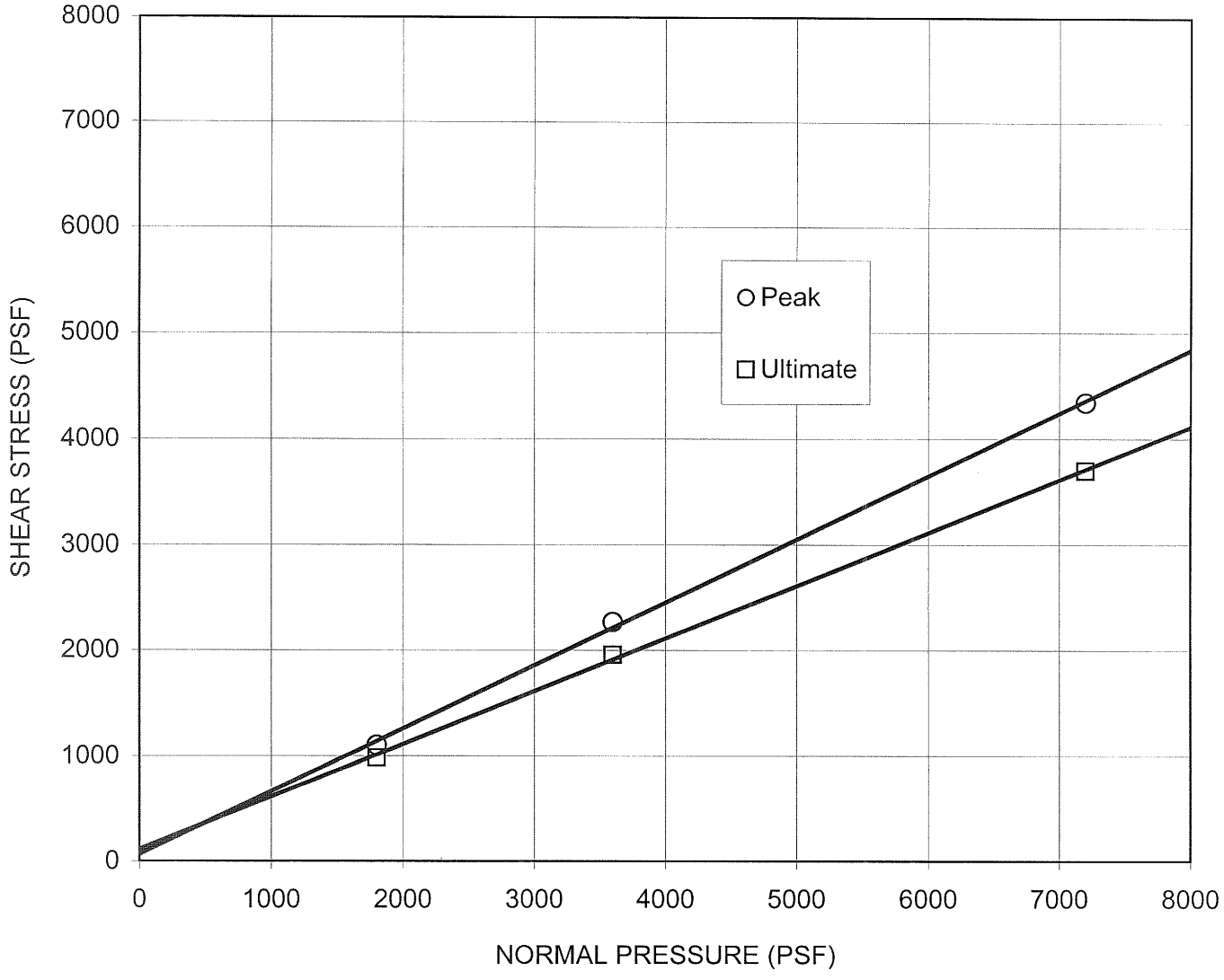
Client: URS Corporation

Project No.: 30989856

EGL Project No.: 12-008-004

DIRECT SHEAR

08/12 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
A-12-103	S-6	30	Tube	SM	○	66	31
					□	114	27

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
1800	24.1	29.4
3600	24.1	28.4
7200	24.1	28.9

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

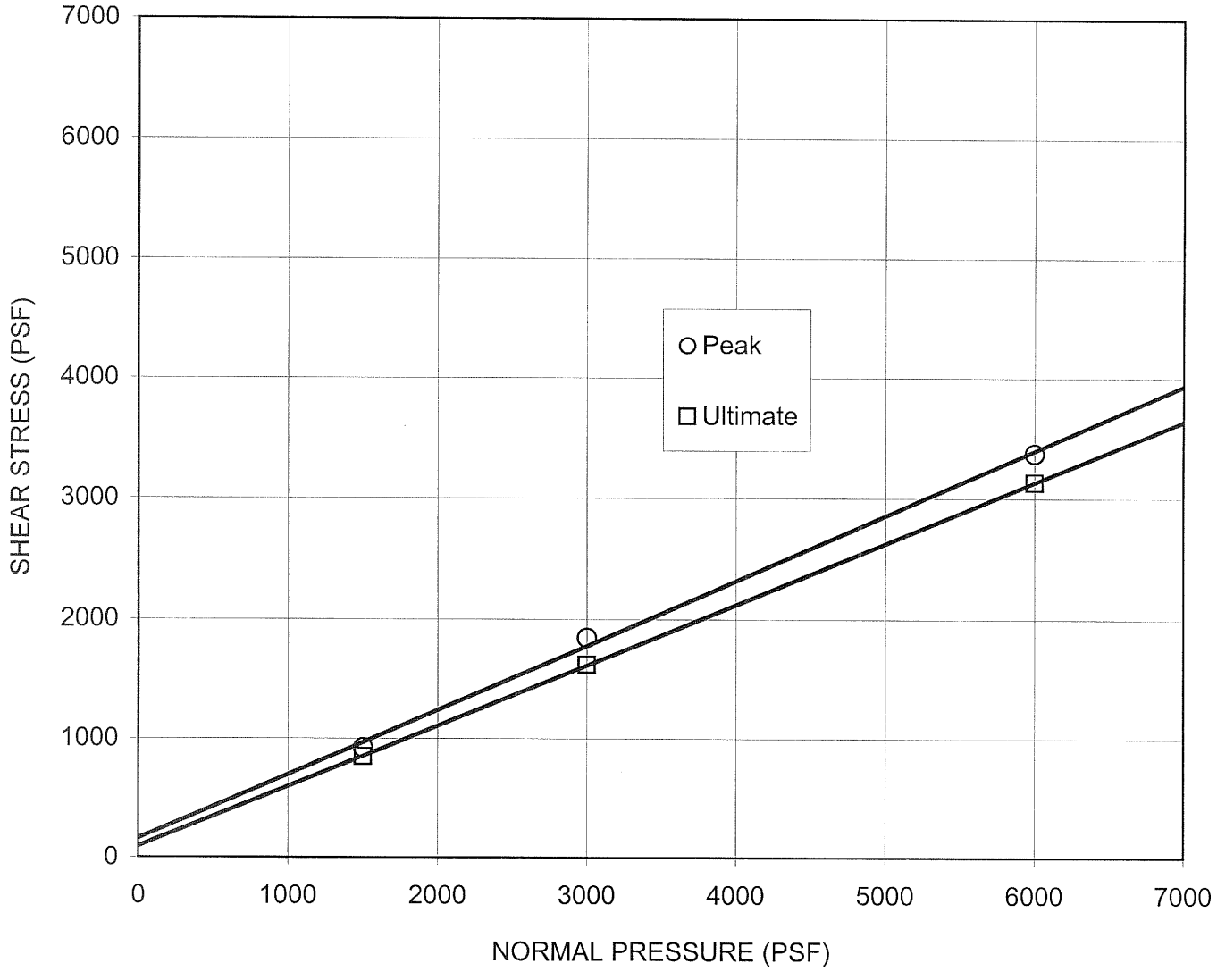
Client: URS Corporation

Project No.: 30989856

EGL Project No.: 12-008-004

DIRECT SHEAR

08/12 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
A-12-104	S-5	25	Tube	SM	○	162	28
					□	96	27

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
1500	33.3	33.3
3000	33.3	32.8
6000	33.3	32.4

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

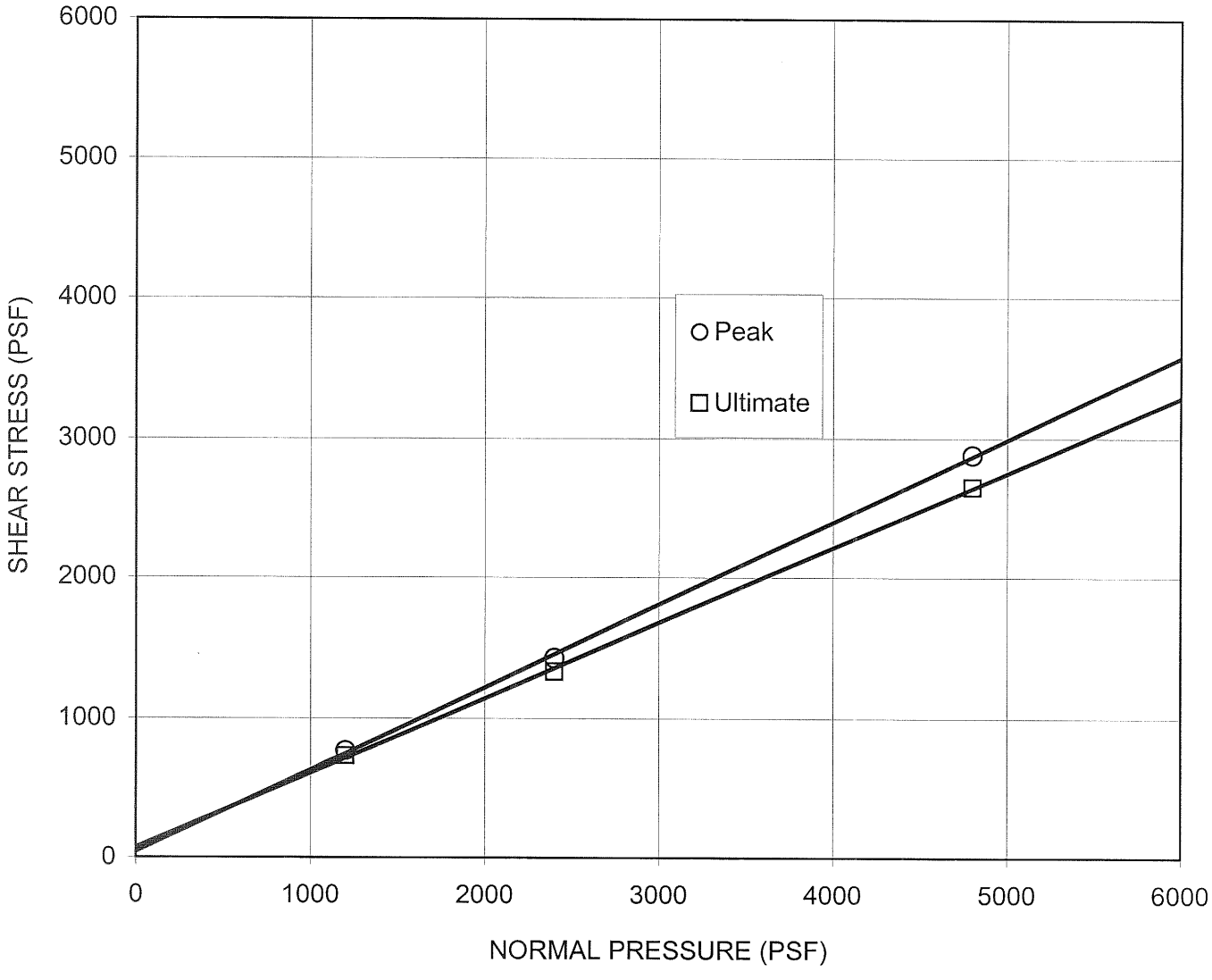
Client: URS Corporation

Project No.: 30989856

EGL Project No.: 12-008-004

DIRECT SHEAR

08/12 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
A-12-105	S-4	20	Tube	SM	○	42	31
					□	72	28

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
1200	12.0	30.6
2400	12.0	29.9
4800	12.0	28.5

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

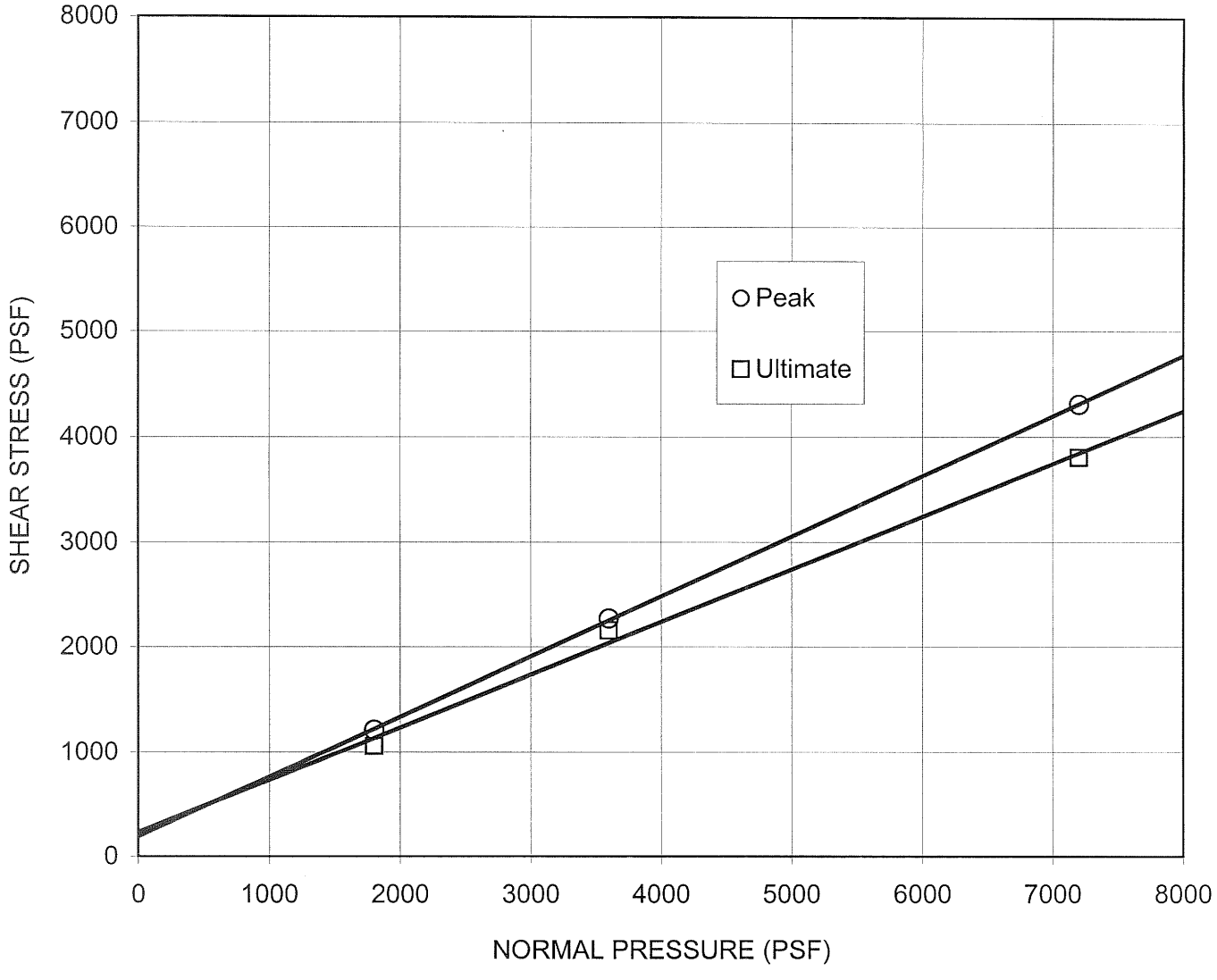
Client: URS Corporation

Project No.: 30989856

EGL Project No.: 12-008-004

DIRECT SHEAR

08/12 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
A-12-105	S-6	30	Tube	SP-SM	○	192	30
					□	231	27

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
1800	28.2	31.7
3600	28.2	30.2
7200	28.2	29.0

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

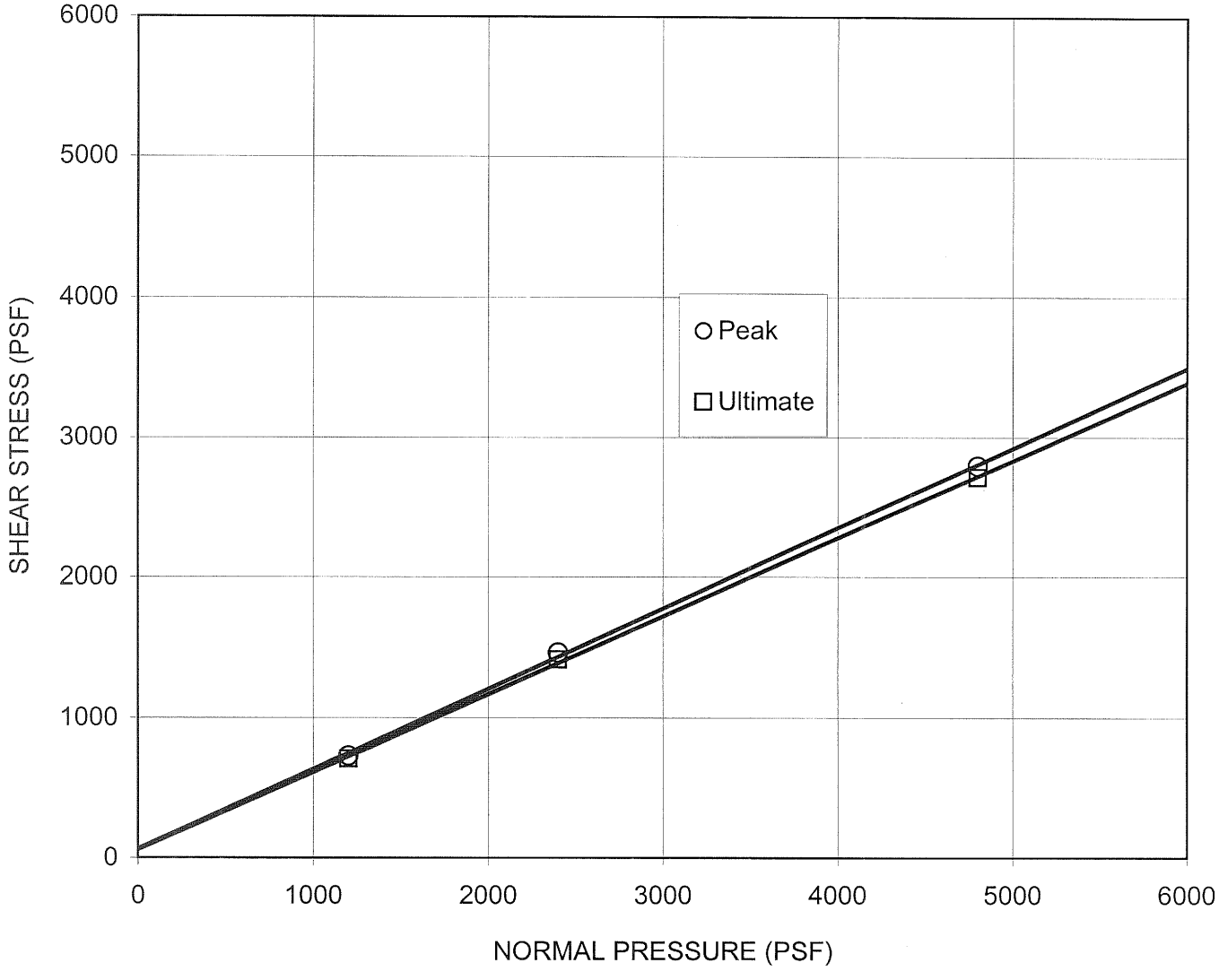
Client: URS Corporation

Project No.: 30989856

EGL Project No.: 12-008-004

DIRECT SHEAR

08/12 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
A-12-106	S-4	20	Tube	SM	○	66	30
					□	60	29

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
1200	6.4	30.0
2400	6.4	29.4
4800	6.4	28.1

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

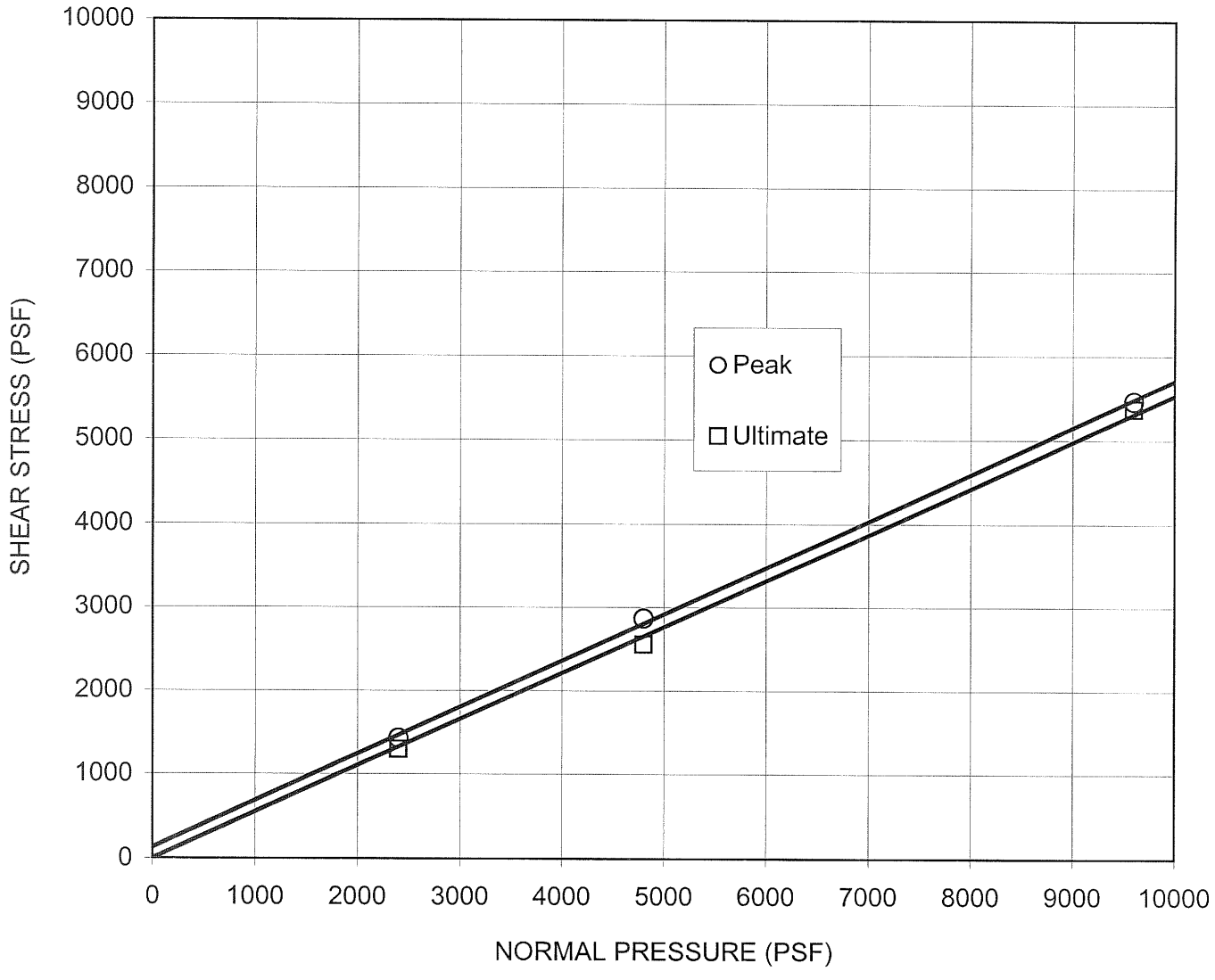
Client: URS Corporation

Project No.: 30989856

EGL Project No.: 12-008-004

DIRECT SHEAR

08/12 (ASTM D3080) Figure



Boring No.	Sample No.	Depth (ft)	Sample Type	Soil Type	Symbol	Cohesion (PSF)	Friction Angle
A-12-106	S-8	40	Tube	SM	○	132	29
					□	0	29

Normal Stress (psf)	Initial Moisture (%)	Final Moisture (%)
2400	26.7	28.8
4800	26.7	28.2
9600	26.7	28.1

ENVIRONMENTAL GEOTECHNOLOGY LABORATORY

Project Name:
Caltrans TO 59056 Tesoro Refinery Retaining Walls Project

Client: URS Corporation

Project No.: 30989856

EGL Project No.: 12-008-004

DIRECT SHEAR

08/12 (ASTM D3080) Figure

SUMMARY OF LABORATORY TEST RESULTS

PROJECT NAME: Caltrans TO 59056 Tesoro Refinery Retaining Walls Project
EGL JOB NO.: 12-008-004
PROJECT NO.: 30989856
CLIENT: URS Corporation
DATE: 8/20/2012
SUMMARIZED BY: JT

BORING NO	SAMPLE NO	DEPTH (ft)	MOISTURE CONTENT ASTM D2216 (%)	DRY DENSITY ASTM D2937 (PCF)	ATTERBERG LIMITS ASTM D4318 *(LL,PL,PI)
A-12-102	S-5	25			Non Plastic
A-12-102	S-8	40			Non Plastic
A-12-103	S-2	10	6.8	104.8	
A-12-103	S-4	20	8.3	93.7	
A-12-103	S-10	50			31,29,2
A-12-104	S-3	15	6.8	102.7	
A-12-104	S-7	35			Non Plastic
A-12-105	S--5	25			Non Plastic
A-12-105	S-9	45			Non Plastic
A-12-106	S-7	35			Non Plastic

*LL,PL,PI = LIQUID LIMIT, PLASTIC LIMIT, PLASTICITY INDEX

SUMMARY OF CORROSION TEST RESULTS

PROJECT NAME: Caltrans TO 59056 Tesoro Refinery Retaining Walls Project
EGL JOB NO.: 12-008-004
PROJECT NO.: 30989856
CLIENT: URS Corporation
DATE: 8/20/2012
Summarized By: JT

BORING NO.	SAMPLE NO.	DEPTH (ft)	pH CalTrans 643	Chloride Content CalTrans 422 (ppm)	Sulfate Content CalTrans 417 (% by weight)	Minimum Resistivity CalTrans 643 (ohm-cm)
A-12-101 to 106	Composite	0-10	7.71	135	0.003	3,500
A-12-101 to 106	Composite	15-50	7.78	490	0.005	590

Appendix C

Photographs

Photograph 1: East end of Wall 519 is shown (Station 520+46). Adjacent to Railroad Corridor.

Photograph 2: View of Cribwalls on north side of PCH. Cribwall side is in the foreground.

Photograph 3: East end of Retaining Wall No. 521 (Station 521+74).

Photograph 4: Another view of east end of Retaining Wall No. 521

GROUNDWATER SITE INVESTIGATION (SI) REPORT
FOR NEW CRIB WALLS

ALONG PACIFIC COAST HIGHWAY
BETWEEN PM 8.50 to PM 8.78
WILMINGTON, LOS ANGELES COUNTY, CALIFORNIA

PROJECT NUMBER: 185852004
EA NUMBER: 3X3901
E-FIS #0712000064

PREPARED FOR:
CALIFORNIA DEPARTMENT OF TRANSPORTATION, DISTRICT 7
07A3322
100 SOUTH MAIN STREET
LOS ANGELES, CALIFORNIA 90012

PREPARED BY:
STANTEC CONSULTING SERVICES INC.
3777 WORSHAM AVENUE, SUITE 200
LONG BEACH, CALIFORNIA 90808

JUNE 24, 2013

For individuals with sensory disabilities this document is available in alternate formats. Please call or write to Tuanchi (Jack) Liu, Department of Transportation, District 7, Division of Design, Office of Environmental Design, 100 South Main Street, 12-267, MS-16, Los Angeles, California, 90012, 213-897-1350 Voice, or use the CA Relay Service TTY number 1-800-735-2929.

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

At the request of the California Department of Transportation (Caltrans) District 7 North (07A3322), a groundwater Site Investigation (SI) was conducted to support the removal of existing crib walls and replacement with new crib walls supporting the roadbed along Pacific Coast Highway (PCH/Route 1) between post mile (PM) 8.50 and 8.78 near the Tesoro Oil Company refinery, in the City of Wilmington, in Los Angeles County, California (Figure 1).

Based on a preliminary hazardous waste site assessment, Caltrans concluded that there was a potential for heavy metals and petroleum hydrocarbons impact in groundwater beneath the existing crib walls and road bed. Groundwater dewatering will be required during construction. To support proposed construction activities, Caltrans requested this SI to evaluate the potential for chemical impacts in groundwater.

1.2 PURPOSE AND OBJECTIVES

The objective of this SI was to collect soil and groundwater data to assist in evaluating presence of chemicals of concern in groundwater below the proposed construction zone and, to evaluate options for management and disposal of impacted groundwater resulting from construction dewatering.

1.3 BACKGROUND

Caltrans plans to replace approximately 950 feet of crib wall that supports the PCH road bed from PM 8.50 and PM 8.78 (Figure 2). The existing crib walls were constructed in/or about 1946 and are in need of replacement. The project area is located adjacent to Tesoro Oil Company refinery complex in an area of known groundwater contamination. Construction dewatering will be necessary to install the cast in place drilled H-pile foundations for the crib wall.

According to the *Foundation Report* prepared by the Caltrans Geotechnical Services groundwater was encountered at an elevation of approximately 4 feet above mean sea level (AMSL), or approximately 25 feet below the grade of PCH.

Caltrans requested this SI to evaluate the existence of potential chemicals of concern in subsurface soil and groundwater within the construction zone and to make recommendations for handling or disposal of impacted groundwater. The remainder of this report describes the scope of work, methodology, findings, results, conclusions and recommendations of the SI.

1.4 GEOLOGY/HYDROGEOLOGY

The project is located within the West Coast Sub-basin of the Coastal Plain of Los Angeles Basin (West Coast Basin). It is bounded on the north by the Ballona Escarpment, an abandoned erosional channel from the Los Angeles River; on the east by the Newport-Inglewood fault zone; and on the south and west by the Pacific Ocean and consolidated rocks of the Palos Verdes Hills (DWR 1999). The surface of the sub-basin is traversed in the south by the Los Angeles River through the Dominguez Gap, and the San Gabriel River through the Alamitos Gap, both of which flow into San Pedro Bay (DWR, 2004). The project area is more specifically located within the Dominguez Gap and adjacent to the Dominguez Channel near San Pedro Bay.

Geology beneath the project area is composed of eroded Holocene deposits underlain by upper Pleistocene (Lakewood formation and Unnamed Upper Pleistocene formation) to upper Pliocene deposits containing “lower middle bathyal to neritic deposits”. Poland and others (1956, 1959) defined the Pico formation in hydrostratigraphic terms; the lower and middle divisions consist of sandstone, siltstone, and claystone and the upper division of “semi-consolidated sand, silt, and clay of marine origin.”(USGS, 2003)

Groundwater beneath the project area is subject to influence from the Dominguez Gap Barrier Project which targets seawater intrusion within the Gaspur Aquifer (Holocene) to create a groundwater ridge, which inhibits the inland flow of salt water into the subbasin to protect and maintain groundwater elevations in the south basin (DWR, 1999, as quoted in DWR, 2004). Depth to groundwater typically ranges from 20 to 25 feet below the project area or 1 to 6 feet AMSL.

2.0 SCOPE OF WORK

The scope of the SI consisted of the following general elements:

- Pre-field project activities:
    - Obtain groundwater boring permit for the drilling two borings,
    - Mark the proposed borings at the locations specified by Caltrans,
    - Conduct a geophysical survey to clear the proposed boring locations of potential underground utilities and obstructions, and
    - Develop a site-specific Health and Safety Plan (HASP) to guide the safe conduct of the field investigations.
- SI Activities:
    - Drill two soil boring to a depth of 35 feet below ground surface (bgs) using a direct push drill rig (direct push technology);
    - Collect one soil sample for profiling drill cuttings;
    - Install temporary wells for the purpose of collecting groundwater samples for chemical analysis;
    - Collect groundwater samples from the temporary wells for chemical analysis;
    - Remove temporary wells and abandon soil borings;
    - Locate borings using field a global positioning system (GPS) unit to NAD83 Datum at each soil boring location.
- Laboratory analysis:
    - Submit soil and groundwater samples for laboratory analysis of potential constituents of concern (COCs).
- Reporting:
    - Evaluate field and laboratory data, and develop a report for submittal to Caltrans summarizing findings, recommendations, and conclusions.

Where necessary, the scope of work was modified in the field as required and approved by Caltrans.

3.0 INVESTIGATION METHODOLOGY

This section describes the pre-field activities and methodology implemented to fulfill the purpose and objectives of the SI.

3.1 PRE-FIELD PROJECT ACTIVITIES

The pre-field assessment included procurement of permits, marking boring locations in the field, geophysical surveys to clear potential conflicts with utilities, and development of a Site-specific HASP. The following subsections describe each of these activities in greater detail.

3.1.1 Groundwater Boring Permit

Stantec staff prepared and submitted the groundwater boring permit application to the County of Los Angeles Department of Environmental Health, Drinking Water Division, for review and approval. The permit was approved on June 5, 2013 by Mr. B. Larsen. A copy of the approved permit is provided in Appendix A.

3.1.2 Mark Boring Locations

Stantec staff marked the boring locations, based on information provided on the map provided by Caltrans in the May 8, 2013 Task Order No. 04, *Groundwater Site Investigation for New Crib Walls Along Pacific Coast Highway Between PM 8.50 to PM 8.78, Los Angeles County.*

Once the boring locations were marked, Underground Service Alert (USA) was notified of the proposed field activities to clear the boring locations for potential conflicts with underground utilities.

3.1.3 Geophysical Survey

A geophysical survey was conducted in the area of the proposed boring locations to identify potential utilities and subsurface structures that may be in conflict with the borings locations.

Two complimentary surface geophysical instruments [ground penetrating radar (GPR) and electromagnetics (EM)] were used to evaluate the potential presence of buried objects within the site boundaries. These instruments may detect the presence of objects buried as deep as 5 to 13 feet. The effectiveness of these geophysical survey techniques depends on a number of factors including geometry and composition of the buried object, burial depth, surface cover, soil type and density, hydrogeology, and potential interference from surrounding cultural features (e.g., fences, buildings, etc.). These limitations must be considered in the decision making process.

The boring locations were adjusted slightly from their proposed locations to avoid conflict with below grade utilities.

3.1.4 Health and Safety Plan

A site-specific Health and Safety Plan (HASP) was developed and approved in accordance with Caltrans and California Occupational Safety and Health Administration (Cal OSHA) requirements to guide field sampling activities.

3.2 GROUNDWATER SAMPLING ACTIVITIES

The field methods used for the SI were generally consistent with those proposed in Stantec's May 15, 2013 *Groundwater Site Investigation for New Crib Walls* work plan. During borehole clearance activities, utilities were encountered in five initial borehole attempts. The borehole location was adjusted in the field until a "clear" borehole could be achieved.

A total of two borings were advanced and sampled for groundwater samples.

The following paragraphs describe field drilling and sampling protocols.

3.2.1 Drilling and Soil & Groundwater Sampling

Two (2) direct push technology (DPT) borings (1173-101 and 1173-102) were advanced using a Geoprobe 6610 DPT rig to a total depth of approximately 35 feet bgs, respectively (Figure 2). The borings advanced at the Site are described below:

- **Boring 1173-101** was advanced near the curb of southbound Pacific Coast Highway (PCH) to evaluate the nature and extent of potential groundwater contamination underneath southbound PCH. As directed by Caltrans in the Revised Table 1 of the Task Order Request, a soil sample was collected at 15 feet bgs. Soil and groundwater samples collected from this boring were labeled, preserved and transported to the laboratory for analysis of volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), title 22 Metals, semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and pH. The groundwater sample was additionally analyzed for total suspended solids (TSS).

- **Boring 1173-102** near the curb of northbound PCH to evaluate the nature and extent of potential soil and groundwater contamination underneath northbound PCH. As directed by Caltrans in the Revised Table 1 of the Task Order Request, groundwater samples collected from this boring were labeled, preserved and transported to the laboratory for analysis of VOCs, TPH, title 22 Metals, SVOCs, PCBs, TSS, and pH.

3.2.2 Soil Sampling

Prior to DPT drilling at each location, the borings were excavated to five (5) feet using a hand auger to clear the borehole of shallow utilities or other obstructions. At that point, the borings were advanced using the DPT rig. Continuous soil samples were collected for soil logging purposes from one boring 1173-101. In addition, one soil sample was collected and preserved for soil disposal profiling purposes. No soil sampling was conducted in boring 1173-102. Soil samples were collected from a Geoprobe sampler lined with acetate sample liners. At the selected sample depth, a six-inch section of sample liner was cut from the soil-filled liner and packaged by capping each end with a Teflon sheet followed by a tight-fitting plastic cap and sealed with non-VOC tape.

Observed soil and drilling conditions were recorded on field boring logs by the field geologist. Soil characteristics were classified in accordance with the latest edition of the Soil & Rock Logging Classification Manual (Field Guide), State of California, Department of Transportation, Engineering Service Center, Office of Structural Foundations (following USCS classification system), including color, moisture content, consistency, odor, staining, and groundwater depth.

VOC vapor headspace readings were performed on samples collected from the vadose zone from boring 1173-101 by discharging a portion of the soil from the sample liner into a re-sealable plastic bag, manually agitating the soil in the bag and then inserting the tip of a photoionization detector (PID) [calibrated to hexane] into the bag. The highest VOC reading was recorded on the field boring logs. Copies of field boring logs are provided in Appendix B.

Each sample was securely labeled, with a self-adhering label containing the sampler's initials, property location, boring I.D., sample I.D., sample depth, sample time and sample date. All samples were stored in an ice-filled cooler for shipment to the laboratory. The samples were delivered to the laboratory following proper chain-of-custody (COC) protocols.

3.2.3 Groundwater Sampling

Temporary wells were set within both borings for the purpose of collecting groundwater samples. To facilitate groundwater sampling, each temporary well was constructed using ¾-inch diameter Schedule 40 PVC casing with 15 feet of 0.020 inch slotted casing from 20 to 35 feet bgs and 20 feet of solid casing from the ground surface to 20 feet bgs. Each temporary well was purged of groundwater prior to sampling. Poly-tubing, equipped with a stainless steel bottom check valve (inertia pump), was lowered into the open borehole through which the groundwater was extracted. Groundwater was dispensed into laboratory provided, pre-cleaned, 40 milliliter (ml) glass vials preserved with hydrochloric acid (for TPH-gas and VOC analysis) and one liter non-preserved amber bottles (for TPH, SVOC, PCB, and metals analysis). 500 ml bottles for metals contained nitric acid preservative and were considered invalid for collecting samples that were not field filtered.

The groundwater sample containers were labeled with the appropriate identification information (boring number, sample depth, sample collection date, and sample collection time), placed into zip-lock baggies, logged on a chain-of-custody form, and stored in an ice-filled cooler for transport to the laboratory for analysis. Field data sheets for purging of the temporary wells are provided in Appendix B.

3.2.4 Decontamination

Prior to advancing borings at each location the drill rods were pressure cleaned. All sampling equipment was cleaned in an Alconox scrub solution and rinsed in a clean tap water and deionized water double rinse. All decontamination liquids and soil were contained on site for waste characterization, profiling and offsite disposal. All containers were labeled to identify the contents and the name and phone number of the Caltrans contact.

3.2.5 Investigation-Derived Waste Disposal

The soil and decontamination fluid drums were transported by Belshire Environmental Services of Foothill Ranch, California as non-hazardous waste; soil was recycled at Soil Safe of California, Inc. in Adelanto, California and decontamination waters were recycled at Demenno Kerdoon of Compton, California, respectively. Copies of the waste manifests are pending.

4.0 LABORATORY ANALYSIS

Select soil and groundwater samples were submitted under chain-of-custody to Advanced Technology Laboratories (ATL). ATL is certified by the California Environmental Laboratory Accreditation Program (ELAP) to perform the laboratory tests required for this project scope. Selected samples were analyzed for the following analytes:

Total Petroleum Hydrocarbons carbon chain (TPH-cc)	EPA test method 8015M
VOCs (including fuel oxygenates) full scan	EPA test method 8260B
Title 22 Metals	EPA test method 6010B
SVOCs	EPA test method 8270
PCBs	EPA test method 8082
pH	EPA test method 9045C or SM 4500 H+B
Total suspended solids	by SM 2540D

Prior to submitting soil and groundwater samples to the laboratory, the chain-of-custody documentation was reviewed for accuracy and completeness. The laboratory reports were cross-checked with the chain-of-custody forms to confirm accurate transposing of sample information. Laboratory analytical reports and quality control data are provided in Appendix C.

5.0 INVESTIGATION RESULTS

The following subsections describe the results and findings of field investigations and laboratory analysis of soil and groundwater samples.

5.1 FIELD FINDINGS

Based on field observations during soil sampling at the Site, the following are noted:

- The soils encountered during sampling were generally very dark grayish brown in color and consisted primarily of poorly graded sand.
- Groundwater was encountered at depths ranging between of approximately 23.5 to 24.5 feet bgs.
- No groundwater recharge issues were noted.
- PID readings in boring 1173-101 ranged from 2.4 to 271 parts per million (ppm) in the soil samples evaluated.
- Petroleum hydrocarbon odors were evident in samples collected below 10 feet in 1173-B101.

Boring logs are attached in Appendix B. GPS coordinates for boring 1173-101 are provided in Table 5.

5.2 ANALYTICAL RESULTS

The following subsection summarizes the soil and groundwater sample laboratory analytical results. Analytical data are presented on Tables 1 through 4; Tables 1 and 2 present soil analytical results and Tables 3 and 4 present groundwater analytical results. Copies of the laboratory reports and chain-of-custody forms are attached in Appendix C.

Two borings were advanced at the Site, one for the purpose of logging the soil profile and collecting soil samples, and both for collecting groundwater samples. The following subsections summarize the soil and groundwater analytical results.

5.2.1 Soil

Soil sample analytical results are summarized below for the sample collected from boring 1173-101-15 (15 feet bgs):

- Gasoline, diesel, and motor oil range hydrocarbons were reported at concentrations of 0.72J, 9.5, and 12 milligrams per kilogram (mg/kg), respectively. A J flag concentration indicates a value detected between the practical quantitation limit (PQL) and the method detection limit (MDL) and is considered to be an estimated concentration.
- Benzene, toluene, ethylbenzene and total xylenes (collectively BTEX) were reported at concentrations of 7.0, 3.0J, 12, 49 micrograms/kilogram (µg/kg), respectively.

- Isopropylbenzene, n-propylbenzene, naphthalene, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene were reported at concentrations of 26, 1.9J, 5.2, 3.5J and 9.7 µg/kg, respectively.

- SVOCs were not reported at concentrations above their respective MDLs in samples submitted for analysis.

- PCBs were not reported at concentrations above their respective MDLs in samples submitted for analysis.

- Metals were reported at concentrations consistent with expected background for Southern California and/or below regional screening levels (RSLs) for industrial soils (Table 2).

- pH was reported at 8.5 in the soil sample.

5.2.2 Groundwater

Groundwater sample analytical results are summarized below:

- Gasoline, diesel, and motor oil range hydrocarbons were reported at maximum concentrations of 500 milligrams per liter (µg/L), 220 mg/L and 20 mg/L, respectively, in the groundwater samples.

- BTEX were reported at maximum concentrations of 8,400, 15,000, 4,000 and 20,900 micrograms (µg/L), respectively, in the groundwater samples.

- Fuel oxygenates, methyl tert butyl ether (MTBE) and tert butanol (TBA) were reported at maximum concentrations of 80 and 890 µg/L respectively.

- Other VOCs: Sec-butylbenzene, n-butylbenzene, n-propylbenzene, isopropylbenzene, naphthalene, 4-isopropyltoluene, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene were reported at maximum concentrations of 180, 490, 820, 960, 2,600, 210, 2,100 and, 7,200 µg/L, respectively.

- SVOCs: 2,4-dimethylphenol, 2-methylnaphthalene, acenaphthene, fluorine, naphthalene, and phenanthrene were reported at maximum concentrations of 770, 860, 18, 16, 1,300 and 31 µg/L, respectively, in the groundwater samples submitted for analysis.

- PCBs were not reported at concentrations above their respective reporting limits in the groundwater samples submitted for analysis.

- Antimony, arsenic, barium, lead, and thallium were reported above their respective MCLs in at least one of the temporary monitoring wells. (Table 4).

- pH in the groundwater samples was reported at 6.8 and 7.2.

- TSS was reported at 16,000 and 18,000 mg/L in the groundwater samples.

6.0 QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

QA/QC procedures were performed in general accordance with the Work Plan and Task Order. Field QA/QC procedures included analyses of trip blanks and equipment blanks. None of the analytes tested in the trip blank and field equipment blanks reported analytes above laboratory reporting limits, with the exception of the following:

- Trip Blank:
    - Methylene chloride, a common laboratory artifact, was reported at a J-flagged concentration between the PQL and MDL at 0.79 mg/ L. Methylene chloride was not reported in the primary samples.

Laboratory quality assurance and quality control (QA/QC) data (method blanks, laboratory control samples and duplicates, matrix spike samples and duplicates) were also reviewed for compliance with QA/QC objectives. As indicated in the laboratory reports, the following data qualifiers were noted:

- Surrogates:
    - One of the eight SVOC surrogates, 2-fluorophenyl, was reported out of control high on aqueous samples 1173-101-24 and 1173-102-24.5. All other surrogates were reported within acceptable limits. The biased high result suggests that the reported data may be conservative.
- Hold Time:
    - pH analyses on aqueous samples were conducted on the same day as sampling. The hold time is listed as “analyze immediately upon receipt”.
- Method Blank:
    - Chromium, nickel and zinc were reported at J-flagged concentrations between the MDL and PQL in method blank (B3F0204).
    - Barium and zinc were reported at a J-flagged concentration in the blank (B3F0241) at a concentration between the PQL and MDL.
- Duplicate Samples:
    - The RPD was out of control for TPH diesel (B3F0238). The original sample reported 9.5 mg/kg and the duplicate reported 7.23 mg/kg TPH diesel. This variability is not uncommon in soil samples and is the result of sample heterogeneity.
    - The RPD was out of control for molybdenum at J-flagged concentration between the PQL and MDL (B3F0204).
    - The pH analysis on the laboratory duplicate was past the hold time, but was reported consistent with the original sample (B3F0218).

Based upon review of the data, as qualified, are acceptable for the purposes described in this document.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

Subsurface soil and groundwater samples were collected beneath PCH near the Dominguez Channel, in Wilmington, Los Angeles County, California for the purpose of evaluating the potential for encountering contaminated groundwater in the area of the proposed construction dewatering activities for the replacement of the existing crib walls.

Based on field and laboratory data collected during the SI, the following are concluded:

- Although the reported concentrations of TPH and VOCs in the soil sample were below typical action levels, petroleum-impacted soil is likely to be encountered during foundation construction activities (i.e.; drill cuttings from the CIDH piles and foundation excavation) activities that exceed the Los Angeles Regional Water Quality Control Board (RWQCB) soil screening levels for TPH and BTEX (RWQCB, 1996) (Appendix D).

- TPH, VOCs and metals-impacted groundwater will be encountered during drilling of the CIDH piles at concentrations above California Maximum Contaminant Levels for drinking water (California Department of Public Health (CDPH, 2008)). Furthermore, it is probable that non aqueous phase liquids (i.e.; free product) may also be encountered during dewatering.

Contaminated soil and groundwater derived during construction activities for the new crib walls will be required to be properly managed and transported off site and disposed of at licensed disposal facilities. According to communications between Caltrans and Tesoro, an agreement has been reached that would allow impacted-groundwater to be transported to the refinery slop tank for treatment and disposal.

However, it is currently unclear as to whether the slop tank system has sufficient capacity to treat the entire dewatering waste stream that will be generated during construction. Subsurface soils in the saturated zone were found to consist of poorly-graded sands which tend to exhibit high transmissivity. As a result, a significant amount of water is likely to be generated during dewatering activities.

Contaminated soil that exceeds typical RWQCB SSLs will be transported and disposed to a recycling facility.

To reduce costs associated with waste generation and disposal, a driven foundation system might be considered in place of a drilled cast in place pile system.

7.2 RECOMMENDATIONS

Caltrans considers construction projects in three phases:

- Phase 1 – Pre-construction

- Phase 2 – Construction

- Phase 3 – Post-construction

Environmental remediation recommendations are provided for each of the three phases.

7.2.1 Phase 1 – Pre-construction Recommendations

No environmental recommendations for this phase of the project. However, Caltrans may consider conducting a slug test to assess potential dewatering pump rates to achieve dewatering goals. The dewatering rate may directly affect the disposal options for contaminated groundwater.

7.2.2 Phase 2 – Construction Recommendations

Excavation of contaminated soil and pumping of contaminated groundwater present special health and safety and waste management concerns. The following paragraphs provide recommendations for health and safety and waste management activities during construction.

Health and Safety Considerations:

The contractor will be required to develop and implement a site-specific Health and Safety Plan (HASP) in accordance with Caltrans and California Occupational Safety and Health Administration (Cal OSHA) requirements. The Site specific HASP includes general safety information, job safety analysis, material safety data sheets, required personal protective equipment (PPE), employee safety training and medical surveillance requirements, contaminant exposure limits, and contaminant exposure mitigation procedures and spill response actions.

All construction personnel are to be trained in hazardous waste operations and emergency response and certified with 40-hour HAZWOPPER Training including annual 8-Hour Refresher, first aid/CPR, annual physical examinations and respirator fit tests. Training and certification for site managers includes Supervisor 8-Hour Training.

As detailed in the HASP, the appropriate personal protective equipment (PPE) shall be worn based on exposure levels. At a minimum, workers should wear long pants and shirts, steel toed boots with shanks, safety glasses and chemical resistant goggles (or full face shields) to protect from splashes of contaminated water, approved safety vests, appropriate hearing protection (plugs of muffs), hard hats, and chemical resistant gloves. .

Dust Control Plan

A dust control plan (DCP) should be developed and implemented during construction and soil handling activities and particulate meters to protect workers and the general public from hydrocarbon and VOC-impacted vapors, dust, and soil.

The DCP should include the following general elements:

1. Identification of personnel designated to be on site
2. Job hazard analysis for work assignments
3. Summary of potential risks
4. Worker exposure air monitoring plan
5. Description of personal protective equipment
6. Delineation of work zones on the job site
7. Decontamination procedures
8. General safe work practices
9. Site security measures

10. Emergency response plans
11. Description of worker training

Management, Disposal and Re-Use of Excavated Soil

Previous shallow soil investigations (upper five feet bgs) by GeoCon (June and September 2012) reported elevated concentrations of TPH at up to 20,000 mg/kg. In addition, Stantec, field geologists reported petroleum odors and elevated volatile organic vapors in soil below 10 feet bgs in the single soil boring sampled during this investigation. Consequently, the potential for encountering contaminated soil in excavations for the crib walls and in spoils from the CIDH boreholes is relatively high.

It is recommended that the contractor obtain a South Coast Air Quality Management Plan (SCAQMD) Rule 1166 permit for excavation of VOC-impacted soil. Depending on the quantity of soil to be excavated, a Various Locations Rule 1166 Plan may be applied for if less than 2,000 cubic yards (yds^3) of VOC-contaminated soil are to be excavated. However, if greater than 2,000 yds^3 are to be excavated, application for a Site Specific Rule 1166 Plan will be necessary. Full time monitoring of VOC-vapors using a PID calibrated to hexane will be required. Vapor mitigation including management of soil stockpiles (covers or containerization), limitations on exposed soil excavations and vapor suppression are required depending on the vapor emission levels.

During soil excavation and handling, air monitoring for VOC emissions must be conducted in compliance with the SCAQMD Rule 1166 Plan (if necessary), and the results recorded and reported on the air monitoring forms in accordance with permit requirements.

Any soil considered as surplus should be stockpiled, sampled and analyzed to assure that the soil is suitable for its intended purpose or disposed to an appropriately licensed facility. It is recommended that the suitability of excess soil for potential re-use be evaluated in accordance with the Department of Toxic Substances Control "Information Advisory – Clean Imported Fill Material", dated October 2001. The data may be considered for re-use if the 95 percent Upper Confidence Limit of the mean is less than the Los Angeles Regional Water Quality Control Board soil screening levels (RWQCB, 1996) (Appendix D).

Soil generated from the project area should not be used for residential use.

Given the history of the Site, undiscovered or unknown environmental conditions may be encountered during grading and development of the proposed project. If encountered, additional investigations and removal actions may be required at that time.

Management and Disposal of Groundwater Generated During Construction Dewatering

Based on groundwater concentrations reported herein, groundwater generated during construction dewatering will not be eligible for untreated disposal to the storm drain, unless it is treated to meet the conditions of Caltrans NPDES MS4 permit (Order No. 2012-0011-DWQ) due to the presence of elevated petroleum hydrocarbons, VOCs, SVOCs and metals.

However, the concentrations were within the specific pollutant limits outlined in the City of Los Angeles Industrial Waste Management Division Industrial Waste Control Ordinance. Consequently, groundwater generated during dewatering activities could be disposed to the industrial sewer per the discharge requirements. However, given the potential expectation of free product, discharge through an oil water separator may be .necessary prior to discharge to the sanitary sewer. To fully evaluate this option, additional inquiries are necessary to evaluate the location and capacity of the nearest sewer discharge point.

Water generated during construction activities must be properly contained in appropriate storage containers. Containers could include Department of Transportation (DOT) approved drums and/or aboveground Baker storage tanks (AST). Drums and ASTs must be contained within secondary containments to capture any release of fluids.

If free product or explosive atmospheres (measured using a lower explosion limit (LEL) meter are present in dewatering wells or borings, explosion proof pumps will be required for dewatering.

All containers and trucks containing free product must be grounded in accordance with the National Fire Protection Association Code 70, National Electric Code. Grounding shall be completed using 5/8-inch diameter copper grounding rod set a minimum of 8 feet into the ground, connected to the AST and grounding rod using #8 grounding wire, and metal clips connected to the AST and grounding rod.

Stored waste water to be transported off site for disposal should be performed by a State licensed waste hauler. The waste hauler must possess appropriate approvals, safety training and certifications to work or travel on the disposal facility.

Periodic measurement for VOC vapors will be required when handling waste water will be necessary. Such monitoring will be conducted for vapor concentration (health and safety monitoring), percent oxygen and LEL. Measurements for VOCs shall be performed using a PID calibrated to hexane. Oxygen and LEL shall be performed using a calibrated combustible gas/oxygen meter.

7.2.3 Stage 3 – Post-construction Recommendations

No post construction environmental remediation recommendations.

7.3 COST EVALUATION

Cost estimates for each of the three project phases (pre-construction, construction and post-construction) are provided below.

7.3.1 Phase I—Pre-Construction

No additional costs, other than Caltrans internal environmental management costs, are expected to be incurred during this phase.

7.3.2 Phase 2—Construction

Environmental remediation costs will be incurred to address contaminated soil and groundwater generated during construction. The estimated costs provided below are based on the following assumptions:

1. New crib walls will be constructed at the site, along PCH between PM 8.50 and PM 8.78. Based on conversations with Caltrans, subsurface work for the new crib walls is proposed to extend to a depth of approximately 25 feet below the road surface, or just below the groundwater table. Dewatering will be required to support installation of the CIDH pile foundation system.

2. A tentative agreement between Caltrans and Tesoro for the handling of impacted groundwater has been approved, and this agreement will be finalized prior to initiation of

construction activities for the new crib walls. Groundwater wastes derived during construction activities for the new crib walls will be approved for transport and processed through the Tesoro refinery slop tank

3. Surplus contaminated groundwater that exceeds the capacity of the Tesoro refinery will be disposed to an appropriately licensed recycling facility (i.e.; Demenno Kerdoon).

4. Nonhazardous TPH-contaminated soil will be transported and disposed to a recycling facility, such as Soil Safe in Adelanto, California.

Due to the limited amount of data available with respect to the volume and contaminant concentration of soil and groundwater generated during construction, unit costs are provided for the construction phase. The unit costs may be used to estimate total costs once the excavation and dewatering volumes are better understood.

Impacted groundwater extracted during construction dewatering activities for the new crib wall will be managed and disposed to Tesoro's slop tanks. Provided in Table 6, Stantec has provided approximate hourly or unit costs for the storage, transportation, and disposal of impacted groundwater. It is assumed that extracted groundwater will be temporarily stored in 500 BBL Baker Tank(s) prior to being trucked to the Tesoro slop tank. Surplus water that exceeds the capacity of Tesoro's treatment system will be transported and disposed to Demenno Kerdoon. Stantec has evaluated two scenarios for the transportation and disposal of impacted groundwater:

- Scenario 1: The transportation of impacted groundwater from the 500 BBL Baker Tank(s) to the Tesoro refinery slop tank. This scenario includes an approved agreement between Caltrans and Tesoro for the processing of extracted groundwater through the refinery Slop Tank. A licensed waste hauler, approved by Tesoro, should be contracted to remove and transport extracted groundwater from the 500 BBL Baker Tank(s) using either a 70 BBL or 100 BBL tanker truck to the Tesoro refinery slop tank for processing;

- Scenario 2: The transportation of impacted groundwater from the 500 BBL Baker Tank(s) to Demenno Kerdoon for disposal/recycling. A licensed waste hauler will be contracted to remove and transport extracted groundwater from the 500 BBL Baker Tank(s) using either a 70 BBL or 100 BBL tanker truck to Demenno Kerdoon for disposal/recycling.

Based on preliminary review of groundwater analytical results, it appears that extracted groundwater may be transported as a hazardous gasoline mixture (RCRA exempt).

TPH-impacted soil that exceeds the RWQCB SSLs will be transported and disposed at a recycling facility.

The unit rates for transportation and disposal of construction-derived groundwater and soil waste are provided in Table 6.

7.3.3 Phase 3—Post-Construction

No additional costs are expected to be incurred during this phase.

8.0 LIST OF PREPARERS

This Site Investigation report has been prepared under the direction of the following environmental professionals.

Preparers:

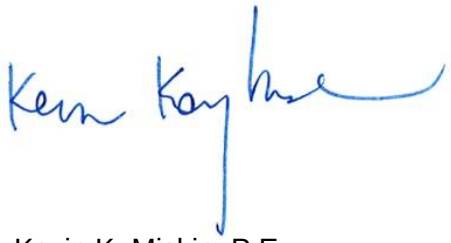
- Kevin K. Miskin, P.E.
  Stantec Consulting Services Inc. (Stantec)
  M.S., Civil Engineering, Purdue University, West Lafayette, Indiana
  Site Investigation Report Senior Reviewer

- Kelly Brown, P.G.
  Stantec
  B.S., Geology, University of California Santa Cruz, Santa Cruz, California
  Site Investigation Report Reviewer, Task Support Manager

If you have any questions or comments regarding the information enclosed herein, please contact the undersigned at your convenience.

Respectfully submitted,
Stantec Consulting Services Inc.

Monica L. Aragon, PG
Stantec Task Manager
Tel: 562.354.2643
Fax: 562.354.2669
Email: Monica.Aragon@stantec.com



Kevin K. Miskin, P.E.
Stantec Project Manager
Tel: 909.335.6116 x8210
Fax: 909.335.6120
Email: Kevin.Miskin@stantec.com

Kelly Brown, PG
Stantec Task Support Reviewer
Tel: 562-354-2638
Fax: 562-354-2669
Email: Kelly.Brown@stantec.com

9.0 REFERENCES

Department of Water Resources (DWR), 1999 Southern District. 1999. Watermaster Service in the West Coast Basin, Los Angeles County, July 1, 1998 – June 30, 1999. 84 p.

DWR, 2004, California Groundwater Bulletin 118, Coast Hydrologic Region, Coastal Plain of Los Angeles Groundwater Basin, West Coast Subbasin, Updated February 27.

California Environmental Protection Agency, 2005, *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties*, January.

California Office of Environmental Health Hazard Assessment, 2010, *Soil Screening Numbers, Updated Table*, http://oehha.ca.gov/risk/chhsltable.html. September 23.

California Department of Public Health, 2008, *Maximum Contaminant Levels and Regulatory Dates for Drinking Water, U.S. EPA Vs. California*, http://www.cdph.ca.gov/certlic/ drinkingwater/ Documents/DWdocuments/EPAandCDPH-11-28-2008.pdf, November.

California Regional Water Quality Control Board, Los Angeles Region, 1996, *Interim Site Assessment & Cleanup Guidebook*, May.

Geocon Consultants Inc. (Geocon), 2012, *Site Investigation Report for New Crib Wall, Tesoro Oil Company Property Adjacent to Pacific Coast Highway, Post Mile 8.50 to 8.78, City of Carson, Los Angeles County, California*. June 12.

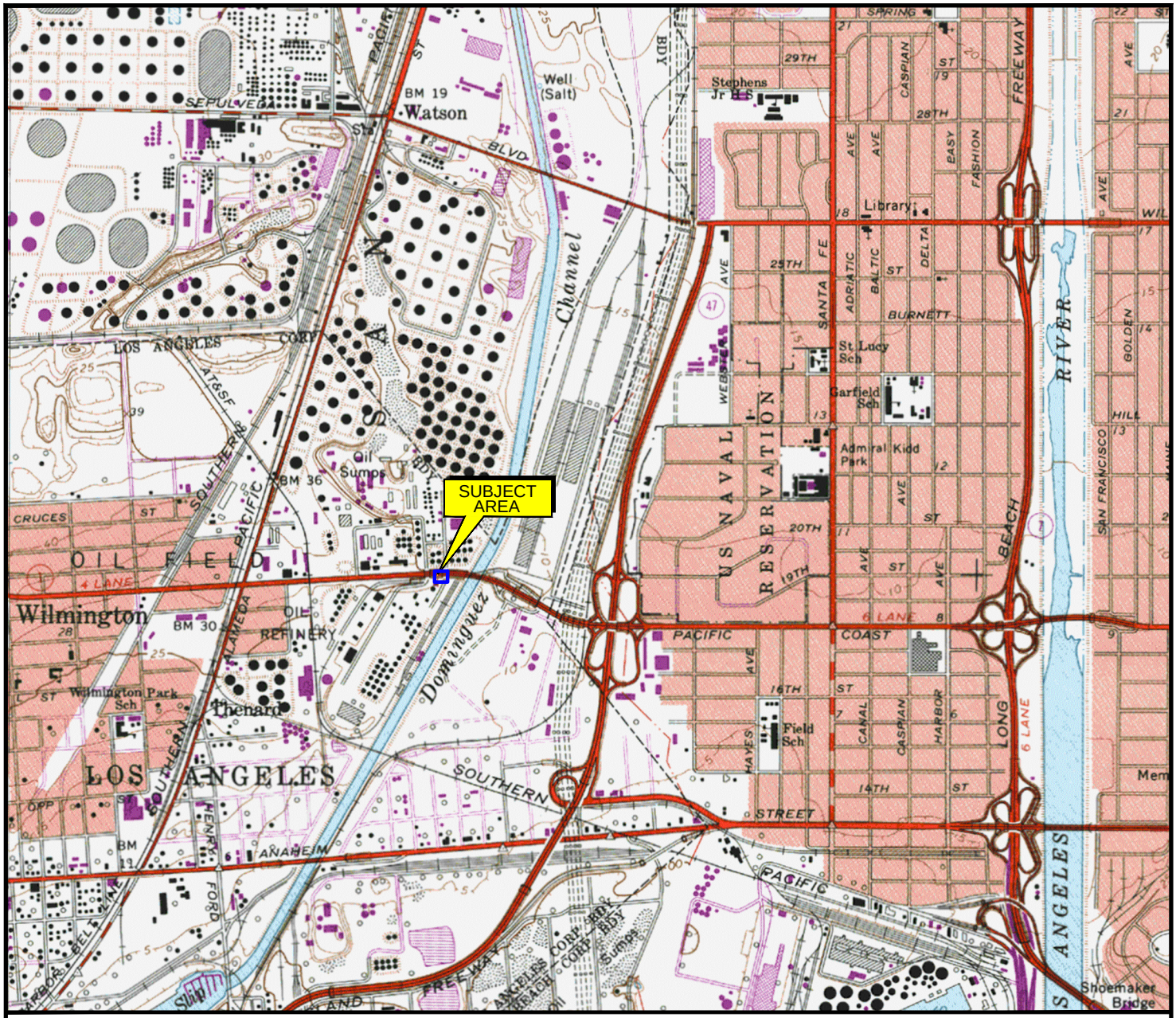
Geocon, 2012, *Site Investigation Report for Four Crib Wall Areas, Tesoro Oil Company Property Adjacent to Pacific Coast Highway, Post Mile 8.50 to 8.78, City of Carson, Los Angeles County, California*. September 30.

Stantec Consulting Corporation (Stantec), 2013, *Groundwater Site Investigation for New Crib Walls*, dated May 15, 2013

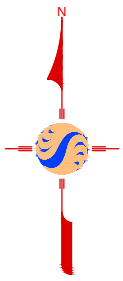
United States Geological Survey (USGS), 2003, Geohydrology, Geochemistry, and Ground-Water Simulation-Optimization of the Central and West Coast Basins, Los Angeles, County, California, Water-Resources Investigations Report 03-4065.

United States Environmental Protection Agency (USEPA), 2012, *Regional Screening Levels (RSL's)*, http://www.epa.gov/region9/superfund/prg/. May.

FIGURES



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAPS, LONG BEACH QUADRANGLE, 1964
PHOTOREVISED, 1981



0 2000 4000

APPROXIMATE SCALE (FEET)

Stantec
290 Conejo Ridge Avenue
Thousand Oaks, CA 91361
(805) 230-1266/230-1277 (Fax)

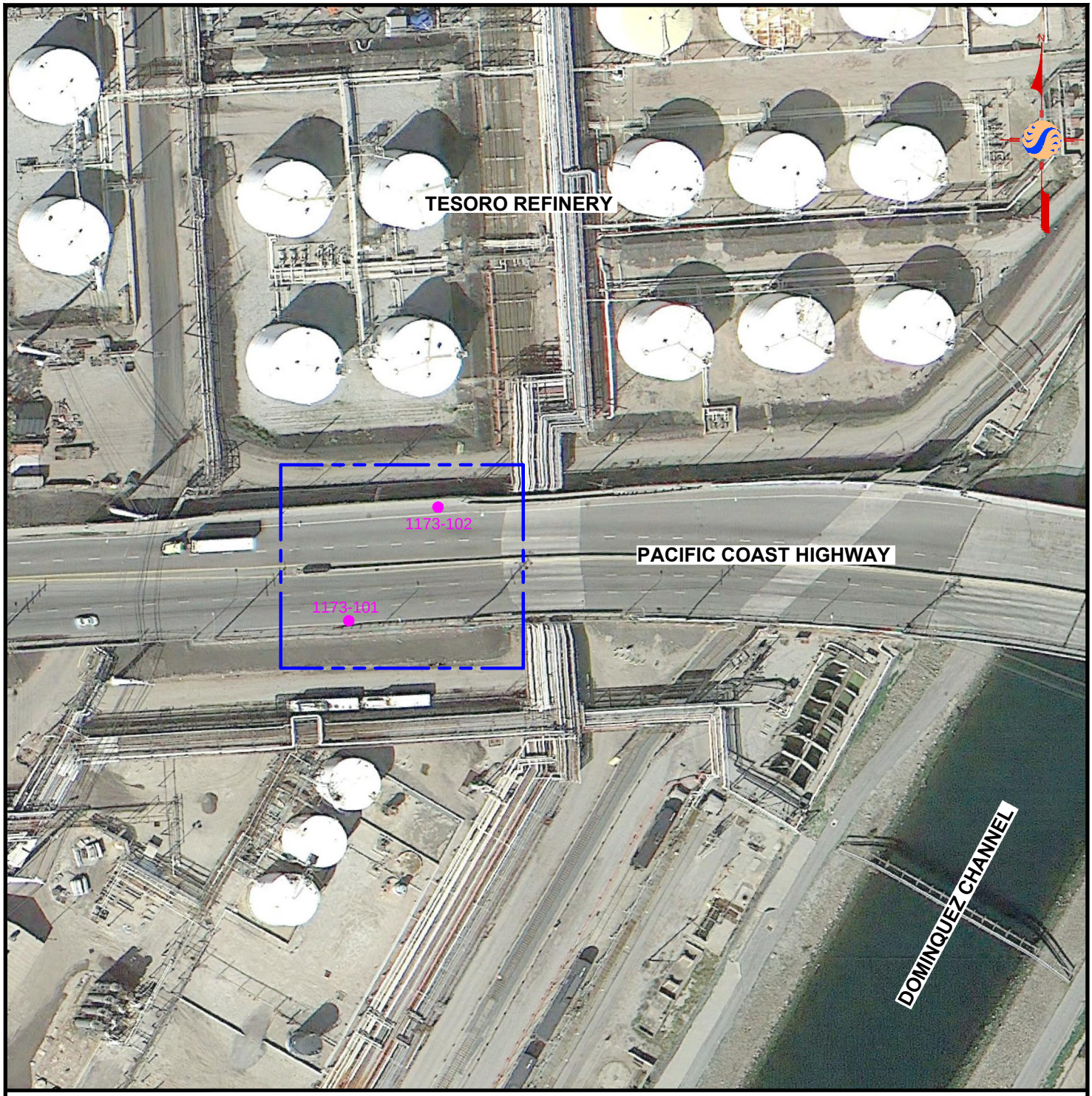
FOR:
CALTRANS
Pacific Coast Highway
Between PM 8.50 to PM 8.78
Wilmington, Los Angeles County, California

SITE LOCATION MAP

FIGURE: **1**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
	R. Roman	M. Aragon	M. Aragon	06/18/13

FILEPATH:C:\CADD-37\Client\Caltrans\Wilmington_CA\CT-WilmingtonCA_SLM.dwg|TRoman|Jun 20, 2013 at 15:34|Layout: F1_SLM



LEGEND

APPROXIMATE SUBJECT AREA

1173-101 SOIL BORING LOCATIONS

NOTES:

1. MAP REFERENCES; GOOGLE EARTH PRO AERIAL IMAGE, DATED MARCH 7, 2011.
2. NAD 83 CALIFORNIA STATE PLANES, ZONE 5 (FT.). NOT A SURVEYED MAP, SITE FEATURES AND LOCATIONS ARE APPROXIMATE.

0 100 200

APPROXIMATE SCALE (FEET)

Stantec
290 Conejo Ridge Avenue
Thousand Oaks, CA 91361
(805) 230-1266/230-1277 (Fax)

FOR:
CALTRANS
Pacific Coast Highway
Between PM 8.50 to PM 8.78
Wilmington, Los Angeles County, California

BORING LOCATION MAP

FIGURE: **2**

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
	R. Roman	M. Aragon	M. Aragon	06/18/13

FILEPATH:C:\CADD-37\Client\Caltrans\Wilmington_CA\CT-WilmingtonCA_SLM.dwg|TRoman|Jun 20, 2013 at 15:23|Layout: F2_SM

TABLES

TABLE 1 - SUMMARY OF SOIL ANALYTICAL RESULTS
TPH, VOC, SVOC, PCBs, pH
TO-04: GROUNDWATER SI FOR NEW CRIB WALLS
WILMINGTON, LOS ANGELES COUNTY, CALIFORNIA
Location: PCH; PM 8.50 to PM 8.78
PN: 185852004 (EA#3X3901)

CALTRANS UNIQUE SAMPLE ID [1]	SAMPLE DEPTH [2]	SAMPLE DATE	GAS RANGE ORGANICS by EPA Test Method 8260[3] in mg/kg	TPH Reported as Diesel/Motor Oil Ranges [3]		VOLATILE ORGANIC COMPOUNDS (VOCs)[3] in ug/kg										SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs) [3]	PCBs [3]	pH [3]
				DIESEL RANGE HYDROCARBONS (C8-C22) in mg/kg	MOTOR OIL RANGE HYDROCARBONS (C23-C40) in mg/kg	BENZENE	TOLUENE	ETHYLBENZENE	ISOPROPYLBENZENE	N-PROPYLBENZENE	NAPHTHALENE	1,3,5-TRIMETHYLBENZENE	1,2,4-TRIMETHYLBENZENE	M,P-XYLENES	O-XYLENES	VARIOUS	VARIOUS	
LARWQCB Maximum Soil Screening Levels [4] (<20ft above GW)			*100 mg/kg*	*100 mg/kg*	*1000 mg/kg*	*11*	*300*	*700*	*--*	*--*	*--*	*--*	*--*	*1,750*	*1,750*	*--*	*--*	
US EPA Regional Soil Screening Levels for Industrial Soils in ug/Kg [5]			*---*	*---*	*---*	*5,400*	*45,000,000*	*27,000*	*--*	*21,000,000**	*18,000*	*10,000,000*	*260,000*	*2,700,000*	*2,700,000*	VARIES	VARIES	
1173-101-15	15	06/10/13	0.72 J	**9.5**	**12**	**7.0**	3.0 J	**12**	**26**	1.9 J	**5.2**	3.5 J	**9.7**	**37**	**12**	ALL<MDL	ALL<MDL	8.5

NOTES:

(1) - Boring identification number/Caltrans Unique ID assigned

(2) - Sample depth reported in feet below the ground surface

(3) - TPH by EPA Test Method 8015M, VOCs by EPA Test Method 8260B, SVOCs by EPA Test Method 8270, PCBs by EPA Test Method 8082, pH by EPA Test Method 9045

(4) - CRWQCB Maximum Soil Screening Levels for TPH above Drinking Water Aquifers, May 1996, in mg/Kg.

(5) - United States Environmental Protection Agency (Region 9) Regional Screening Levels (RSLs; in mg/Kg) for VOCs for industrial soil (last updated May 2012).

BOLD values are concentrations detected above the laboratory practical quantitation limit (PQL)

Grey shaded values are concentrations exceeding at least one of the respective regulatory screening levels listed for the constituent.

<10 - analyte not reported at or above stated laboratory method detection limit (MDL)

-- No agency action level established for this constituent.

J - J-flagged data - analyte detected between the MDL and the PQL

*RSL listed is for propylbenzene

TABLE 2 - SUMMARY OF SOIL ANALYTICAL RESULTS
METALS
TO-04: GROUNDWATER SI FOR NEW CRIB WALLS
WILMINGTON, LOS ANGELES COUNTY, CALIFORNIA
Location: PCH; PM 8.50 to PM 8.78
PN: 185852004 (EA#3X3901)

Caltrans Unique Sample ID	Sample Depth (feet bgs)	Sample Date	TITLE 22 METALS by EPA Test Method 6010 in mg/kg															
			ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CHROMIUM	COBALT	COPPER	LEAD	MERCURY	MOLYBDENUM	NICKEL	SELENIUM	SILVER	THALLIUM	VANADIUM	ZINC
CALIFORNIA HUMAN HEALTH SCREENING LEVELS (1)			*380*	*0.24*	*63,000*	*190*	*7.5*	*100,000*	*3,200*	*38,000*	*320*	*180*	*4,800*	*16,000*	*4,800*	*4,800*	*63*	*6,700*	*100,000*
REGIONAL SCREENING LEVELS (2)			*410*	*1.6*	*190,000*	*2,000*	*7.5 (2)*	*--*	*300*	*41,000*	*800*	*43*	*5,100*	*16,000*	*5,100*	*5100*	*10*	*5,200*	*310,000*
EXPECTED BACKGROUND CONCENTRATIONS (3)			*0.15-1.95*	*0.6-11.0*	*133-1400*	*0.25-2.70*	*0.05-1.70*	*23-1579*	*2.7-46.9*	*9.1-96.4*	*12.4-97.1*	*0.05-0.90*	*0.1-9.6*	*9-509*	*0.015-0.430*	*13.2-39.4*	*9.8-36.2*	*75-288*	*133-236*
1173-101-15	15	6/10/2013	<0.22	**1.4**	**57**	<0.02	0.22 J	**11**	**4.3**	**11**	**3.0**	<0.008	0.58 J	**5.5**	<0.24	<0.06	<0.30	**14**	**21**

NOTES:

All soil results in mg/Kg

Sample depth in feet below the ground surface

<0.5 - Analyte not reported at or above stated reporting limit

(1) FOR SOIL: California Human Health Screening Levels for Commercial/Industrial Land Use, California Environmental Protection Agency, January 2005; updates 2009 & 2010 Office of Environmental Health Hazard Assessment Table 1.

(2) United States Environmental Protection Agency (Region 9) Regional Screening Levels (RSLs; in mg/Kg) for VOCs for industrial soil (last updated 2012)

(3) Marrett, D.J., A.L. Page, G.R. Bradford, D. Bakhtar, R.C. Graham, A.C. Chang, Background Levels of Soil Trace Elements in Southern California Soils, April, 1991

= Shaded cells indicate a concentration that exceeds either the RSL and/or the background concentration for that particular metal.

NA - not analyzed

TABLE 3 - SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
TPH, VOC, SVOC, PCBs, pH, TSS
TO-04: GROUNDWATER SI FOR NEW CRIB WALLS
WILMINGTON, LOS ANGELES COUNTY, CALIFORNIA
Location: PCH; PM 8.50 to PM 8.78
PN: 185852004 (EA#3X3901)

CALTRANS UNIQUE SAMPLE ID [1]	SAMPLE DEPTH [2]	SAMPLE DATE	GAS RANGE ORGANICS by EPA Test Method 8260[3] in mg/L	TPH REPORTED AS DIESEL/MOTOR OIL RANGES [3]		VOLATILE ORGANIC COMPOUNDS (VOCs)[3] in ug/L														SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs) [3] in ug/L						PCBs [3]	pH [3]	TSS in mg/L
				DIESEL RANGE HYDROCARBONS (C8-C22) in mg/L	MOTOR OIL RANGE HYDROCARBONS (C23-C40) in mg/L	BENZENE	TOLUENE	ETHYLBENZENE	TOTAL XYLENES	MTBE	TBA	METHYLENE CHLORIDE	sec-BUTYLBENZENE	n-BUTYLBENZENE	n-PROPYLBENZENE	ISOPROPYLBENZENE	NAPHTHALENE	4-ISOPROPYLTOLUENE	1,3,5-TRIMETHYLBENZENE	1,2,4-TRIMETHYLBENZENE	2,4-DIMETHYLPHENOL	2-METHYLNAPHTHALENE	ACENAPHTHALENE	FLUORENE	NAPHTHALENE	PHENANTHRENE	VARIOUS		
MAXIMUM CONTAMINANT LEVELS [4]			---	---	---	*1*	*150*	*300*	*1,750*	*13*	--	*5*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	VARIES		
1173-101-24	24	06/10/13	**500**	**140**	**16**	**8,400**	**15,000**	**4,000**	**20,900**	**80**	**890**	<30	**180**	**490**	**820**	**920**	**2,600**	**210**	**2,100**	**7,200**	**770**	**860**	**18**	**16**	**860**	**31**	<0.09	**7.2**	**18,000**
1173-102-24.5	24.5	06/10/13	**170**	**220**	**20**	**5,700**	**180**	**1,900**	**7,120**	<5.2	**18**	<20	**150**	**390**	**610**	**960**	**1,700**	**200**	**1,400**	**4,200**	<28	**830**	**16**	**15**	**1,300**	**30**	<0.08	**6.8**	**16,000**
EB	--	06/10/13	<0.03	**0.15**	<0.05	<0.23	<0.20	<0.17	<0.66	<0.26	<4.6	<30	<0.21	<0.23	<0.23	<0.20	<0.35	<0.28	<0.26	<0.30	<2.8	<0.56	<0.72	<0.53	<0.46	<0.56	<0.07	**7.9**	<8.9
TB	--	06/10/13	<0.03	**--**	--	<0.23	<0.20	<0.17	<0.66	<0.50	<4.6	**0.79**	--	--	--	--	--	--	--	--	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	**--**	--

NOTES:

(1) - Boring identification number/Caltrans Unique ID assigned
(2) - Sample depth reported in feet below the ground surface
(3) - TPH by EPA Test Method 8015M, VOCs by EPA Test Method 8260B, SVOCs by EPA Test Method 8270, PCBs by EPA Test Method 8082, pH by EPA Test Method 9045
(4) - Maximum Contaminant Levels for Drinking Water US EPA vs. California, November 2008, in ug/L.
BOLD values are concentrations detected above the laboratory practical quantitation limit (PQL)
Grey shaded values are concentrations exceeding at least one of the respective regulatory screening levels listed for the constituent.
<10 - analyte not reported at or above stated laboratory method detection limit (MDL)
-- No agency action level established for this constituent.
J - J-flagged data - analyte detected between the MDL and the PQL
NA - NOT ANALYZED
mg/L - milligrams per liter
TBA = Tertiary-butanol
MTBE = Methyl-tert-butyl-ether
TSS -Total Suspended Solids (Residue, Non-Filtrable) = by SM 2540D
µg/l = micrograms per liter

TABLE 4 - SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
METALS
TO-04: GROUNDWATER SI FOR NEW CRIB WALLS
WILMINGTON, LOS ANGELES COUNTY, CALIFORNIA
Location: PCH; PM 8.50 to PM 8.78
PN: 185852004 (EA#3X3901)

Caltrans Unique Sample ID	Sample Depth (feet bgs)	Sample Date	TITLE 22 METALS by EPA Test Method 6010 in mg/L															
			ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CHROMIUM	COBALT	COPPER	LEAD	MERCURY	MOLYBDENUM	NICKEL	SELENIUM	SILVER	THALLIUM	VANADIUM	ZINC
MAXIMUM CONTAMINANT LEVELS [(1)]			***0.006***	***0.01***	***1***	***0.004***	***0.005***	***0.05***	***--***	***1.3***	***0.015***	***0.002***	***--***	***0.1***	***0.05***	***--***	***0.002***	***--***	***--***
GROUNDWATER SAMPLE RESULTS IN MG/L																			
1173-101-24	24	6/10/2013	**0.0098**	<0.0068	**1.1**	<0.0003	<0.0003	**0.0047**	0.0008 J	**0.020**	0.0043 J	0.00003 J	**0.055**	**0.0067**	<0.0084	<0.0023	**0.021**	**0.057**	**0.045**
1173-101-24.5	24.5	6/10/2013	0.0049 J	**0.042**	**0.54**	<0.0002	<0.0002	0.0022 J	0.0004 J	**0.013**	**0.046**	<0.00003	**0.012**	0.0022 J	<0.0067	<0.0018	**0.020**	**0.0040**	**0.061**

NOTES:

Sample depth in feet below the ground surface

<0.5 - Analyte not reported at or above stated reporting limit

(1) - Maximum Contaminant Levels for Drinking Water US EPA vs. California, November 2008, in ug/L.

= Shaded cells indicate a concentration that exceeds either the RSL and/or the background concentration for that particular metal.

NA - not analyzed

Samples were filtered at the lab prior to preservation

TABLE 5 - BORING GPS COORDINATES
TO-04: GROUNDWATER SI FOR NEW CRIB WALLS
WILMINGTON, LOS ANGELES COUNTY, CALIFORNIA
Location: PCH; PM 8.50 to PM 8.78
PN: 185852004 (EA#3X3901)

CALTRANS UNIQUE BORING ID[(1)]	LATITUDE	LONGITUDE
OP-1: 1173-101	33°47'29"	118°13'57"
OP-4: 1173-102	33°47'30"	118°13'56"

NOTES:

(1) - Boring identification number/Caltrans Unique ID assigned

TABLE 6 - REMEDIAL COST EVALUATION
TO-04: GROUNDWATER SI FOR NEW CRIB WALLS
WILMINGTON, LOS ANGELES COUNTY, CALIFORNIA
Location: PCH; PM 8.50 to PM 8.78
PN: 185852004 (EA#3X3901)

	Task	Unit	Unit Cost	Comments
Phase I: Pre-Construction	**Phase 1: Pre Construction Investigations**			
	No Pre-Construction Activities or Costs Anticipated			
Phase 2: Construction Monitoring and Remediation	**Phase 2: Construction Monitoring and Remediation**			
	2a HASP and DCP			
	Development of HASP and DCP	lump sum	$ 5,000.00	Develop HASP and DCP
	2b Environmental Construction Costs			
	Environmental Surcharge	percent	20%	Assess 20 percent surcharge to "normal" construction costs to account for Hazwopper training requirements for construction labor, environmental monitoring and reduced efficiency to comply with SCAQMD Permit requirements for excavation and stockpile management. Includes monitoring instruments, secondary containment on Baker tank, and health and safety officer.
	Import, backfill and compaction	ton	$ 17.00	Import, backfill, compaction and compaction testing
	2b Construction Derived Waste--Soil			
	Soil Safe, Adelanto, CA	ton	$ 65.00	Transport and thermal recycling at Soil Safe, Adelanto, CA
	2c Construction Derived Waste--Water			
	70 BBL Vacuum Truck	hour	$ 100.00	
	70 BBL Vacuum Truck - Overtime	hour	$ 117.00	
	70 BBL Vacuum Truck - Double-Overtime	hour	$ 142.50	
	100 BBL Vacuum Truck	hour	$ 105.00	
	100 BBL Vacuum Truck - Overtime	hour	$ 125.50	
	100 BBL Vacuum Truck - Double-Overtime	hour	$ 154.50	
	Scenario 1--Tesoro			
	Disposal of waste water	gallon	$ -	No charge at Tesoro for wastewater disposal
	Disposal Truck Washout (if required)	washout	$ 325.00	Charge to rinse out truck
	Scenario 2--Demenno Kerdoon			
	Disposal of waste water (Non-hazardous)	gallon	$ 0.53	liquid only
	Disposal of waste water (Hazardous)	gallon	$ 0.65	liquid only
	Disposal of Solids Surcharge (Non-Hazardous)	gallon	$ 2.75	sediment in waste water
	Disposal of Solids Surchargen (Hazardous)	gallon	$ 3.28	sediment in waste water
	Disposal Truck Washout (if required)	each	$ 325.00	Charge to rinse out truck
Phase 3: Post-Construction Remediation	**Phase 3 : Post-Construction Remediation**			
	No Post-Construction Activities or Costs Anticipated			

APPENDIX A
GROUNDWATER BORING PERMIT

ENVIRONMENTAL HEALTH

Drinking Water Program

5050 Commerce Drive, Baldwin Park, CA 91706
Telephone: (626) 430-5420 • Facsimile: (626) 813-3013 • Email: waterquality@ph.lacounty.gov
http://publichealth.lacounty.gov/eh/ep/dw/dw_main.htm

Well Permit Approval

TO BE COMPLETED BY APPLICANT:

WORK SITE ADDRESS	CITY	ZIP	EMAIL ADDRESS FOR WELL PERMIT APPROVAL
PACIFIC COAST HWY X DOMINGUEZ CHANNEL (E.O ST.)	WILMINGTON	90744	cathy.sanford@stantec.com

NOTICE:

- WORK PLAN APPROVALS ARE VALID FOR 180 DAYS. 30 DAY EXTENSIONS OF WORK PLAN APPROVALS ARE CONSIDERED ON AN INDIVIDUAL (CASE-BY-CASE) BASIS AND MAY BE SUBJECT TO ADDITIONAL PLAN REVIEW FEES (HOURLY RATE AS APPLICABLE).
- WORK PLAN MODIFICATIONS MAY BE REQUIRED IF WELL AND GEOLOGIC CONDITIONS ENCOUNTERED AT THE SITE INSPECTION ARE FOUND TO DIFFER FROM THE SCOPE OF WORK PRESENTED TO THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.
- THIS WELL PERMIT APPROVAL IS LIMITED TO COMPLIANCE WITH THE CALIFORNIA WELL STANDARDS AND THE LOS ANGELES COUNTY CODE AND DOES NOT GRANT ANY RIGHTS TO CONSTRUCT, RENOVATE, OR DECOMMISSION ANY WELL. THE APPLICANT IS RESPONSIBLE FOR SECURING ALL OTHER NECESSARY PERMITS SUCH AS WATER RIGHTS, PROPERTY RIGHTS, COASTAL COMMISSION APPROVALS, USE COVENANTS, ENCROACHMENT PERMISSIONS, UTILITY LINE SETBACKS, CITY/COUNTY PUBLIC WORKS RIGHTS OF WAY, ETC.
- ALL FIELD WORK MUST BE CONDUCTED UNDER THE DIRECT SUPERVISION OF A PROFESSIONAL GEOLOGIST LICENSED IN THE STATE OF CALIFORNIA.
- THIS PERMIT IS NOT COMPLETE UNTIL ALL OF THE FOLLOWING REQUIREMENTS ARE SIGNED BY THE DEPUTY HEALTH OFFICER. WORK SHALL NOT BE INITIATED WITHOUT A WORK PLAN APPROVAL STAMPED BY THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.
- **NOTIFY THE DRINKING WATER PROGRAM BY EMAIL 3 BUSINESS DAYS BEFORE WORK IS SCHEDULED TO BEGIN.**

blarsen@ph.lacounty.gov (818) 902-4450

TO BE COMPLETED BY DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM:

☐ WORK PLAN INCOMPLETE; SUBMIT THE FOLLOWING:	☒ WORK PLAN APPROVED DATE: 6/5/13
	Los Angeles County Drinking Water stamp ADDITIONAL APPROVAL CONDITIONS:

Belinda Larsen
REHS NO: 5838

On 5/31/13 $260.00 was paid for permit # 892790, 1-2 to drill 2 soil borings into groundwater. Follow the work plan submitted. Observe the setbacks

☐ ANNULAR SEAL FINAL INSPECTION REQUIRED		☐ WELL COMPLETION LOG REQUIRED	
DATE ACCEPTED:	REHS signature	DATE ACCEPTED:	REHS signature
☐ WATER QUALITY—BACTERIOLOGICAL STANDARDS REQUIRED		☐ WATER QUALITY—CHEMICAL STANDARDS REQUIRED	
DATE ACCEPTED:	REHS signature	DATE ACCEPTED:	REHS signature
☐ WATER SUPPLY YIELD REQUIRED		☐ OTHER REQUIREMENT	
DATE ACCEPTED:	REHS signature	DATE ACCEPTED:	REHS signature

Revised: October 2012

APPENDIX B
FIELD BORING LOGS AND FIELD DATA SHEETS

PROJECT: **CalTrans**
LOCATION: **PCH, Wilmington**
PROJECT NUMBER: **185832004**

WELL / PROBEHOLE / BOREHOLE NO:
1173-101
PAGE 1 OF 1

DATE: STARTED **6/10/2013** COMPLETED: **6/10/2013**
TIME: STARTED COMPLETED:
DRILLING COMPANY: **CoreProbe**
DRILLING EQUIPMENT: **GeoProbe 6610 DT**
DRILLING METHOD: **Direct Push**
SAMPLING EQUIPMENT: **Nylon tubing/Acetate liners**

NORTHING (ft):
EASTING (ft):
LATITUDE: **33° 47' 29.863"**
LONGITUDE: **118° 13' 57.4"**
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **24**
BOREHOLE DEPTH (ft): **35.0**
STATIC DTW (ft): **24.5**
WELL DEPTH (ft): **35**
WELL CASING DIAM. (in): **3/4**
BOREHOLE DIAM. (in):**2**
LOGGED BY: **Cathy Sanford**
CHECKED BY:

Depth (feet)	USCS	Description	Sample	Time Sample ID Method	Measured Recov. (feet)	Blow Count	Headspace PID (ppm)
		6" Asphalt Surface					
5	SP	**POORLY GRADED SAND** ; SP; (2.5Y 3/2) very dark grayish brown; fine-grained sand; moist	NR				
				9:48 -	3.0		2.4
10	SP	SP; (same as above) hydrocarbon odor	NR				
				9:54 - 10:00 1173-101-15' soil sample	3.5		271
15	SP	SP; (same as above)	NR				
				10:02 -	3.0		
20	SP	SP; encountered wet soil; strong hydrocarbon odor	NR				
				10:05 -	3.5		
25	SP	SP; (same as above)					
				10:10 -	4.5		
30	SP	SP; (same as above) hydrocarbon odor					
				10:15 -	5.0		
35		Note: Temporary groundwater well abandoned following collection of groundwater sample. PVC extracted and borehole backfilled with hydrated bentonite and concrete seal Hole terminated at 35 feet.					

Well Construction: 3/4 PVC blank casing; slot screen

GEO FORM 304_STANTEC037_CALTRANS-1173.GPJ_SECOR037.GDT 6/20/13

PROJECT: **CalTrans**
LOCATION: **PCH, Wilmington**
PROJECT NUMBER: **185832004**

WELL / PROBEHOLE / BOREHOLE NO:

1173-102

Stantec

DATE: STARTED **6/10/2013** COMPLETED: **6/10/2013**
TIME: STARTED COMPLETED:
DRILLING COMPANY: **CoreProbe**
DRILLING EQUIPMENT: **GeoProbe 6610 DT**
DRILLING METHOD: **Direct Push**
SAMPLING EQUIPMENT: **Nylon tubing**

NORTHING (ft):
EASTING (ft):
LATITUDE: **33° 47' 30.512"**
LONGITUDE: **118° 13' 56.65"**
GROUND ELEV (ft):
TOC ELEV (ft):
INITIAL DTW (ft): **N/A**
BOREHOLE DEPTH (ft): **35.0**
STATIC DTW (ft): **24.5**
WELL DEPTH (ft): **35**
WELL CASING DIAM. (in): **3/4**
BOREHOLE DIAM. (in):**2**
LOGGED BY: **Cathy Sanford**
CHECKED BY:

Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (ppm)	Depth (feet)	Well Construction
0			6" asphalt							
		SP	SP							
5			Hand Augered to 7' bgs No logging of soil or collection of soil samples							
10										3/4 PVC blank casing
15										
20										
25										slot screen
30										
35			Note: Temporary well abandoned following collection of groundwater sample. All PVC extracted from borehole and backfilled with hydrated bentonite,surface seal with concrete dyed to match asphalt surface. Hole terminated at 35 feet.							

GEO FORM 304_STANTEC037_CALTRANS-1173.GPJ_SECOR037.GDT 6/20/13

PROJECT: CalTrans
LOCATION: PCN, Wilmington
PROJECT NUMBER: 185832804

WELL / PROBEHOLE / BOREHOLE NO: ~~XXXX~~-101
1173

Stantec

DRILLING: STARTED 6/10/13 COMPLETED: 6/10/13
INSTALLATION: STARTED " COMPLETED: "
DRILLING COMPANY: CoreProbe
DRILLING EQUIPMENT: Geoprobe 6610 DT
DRILLING METHOD: Direct Push
SAMPLING EQUIPMENT: Nylon tubing/Acetate liners

NORTHING (ft):
LATITUDE: 33° 47' 29.863 N
GROUND ELEV (ft):
INITIAL DTW (ft): 24
STATIC DTW (ft): 24.5
WELL CASING DIAMETER (in): 3/4
LOGGED BY: Cathy Sanford

EASTING (ft):
LONGITUDE: 118° 13' 57.384 W
TOC ELEV (ft):
BOREHOLE DEPTH (ft): 35
WELL DEPTH (ft): 35
BOREHOLE DIAMETER (in): 2
CHECKED BY:

Time & Depth (feet)	Graphic Log		Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Borehole Backfill
			~6" Asphalt surface * Hand Auger to 5' bgs							3/4" PVC Blank Casing 0'-20' bgs No Annular Seal
		SP	Poorly Graded Sand: 2.5y 3/2 very dark grayish brown, fine-grained, moist.		9:48	3.0		2.4		
10		SP	SAA: Hydrocarbon odor.		9:54	3.5		271		
					1173-101-15 (soil sample)					
15		SP	SAA		10:00	3.0				
20					10:05	3.5			20	Slot screen 20'-35' bgs No Annular fill.
	▼		@24' encounter wet soil							
25	▽	SP	SAA: strong hydrocarbon odor.		10:10	4.5				
30		SP	SAA.		10:15	5.0				
35									35	

Note: temporary groundwater well abandoned following collection of groundwater sample. PVC extracted and borehole backfilled w/ hydrated bentonite. Concrete surface seal.

PROJECT: CalTrans
LOCATION: PCH - Wilmington
PROJECT NUMBER: 185832004

WELL / PROBEHOLE / BOREHOLE NO: 1173-102

Stantec

DRILLING: STARTED 6/10/2013 COMPLETED: 6/10/2013
INSTALLATION: STARTED 6/10/2013 COMPLETED: 6/10/2013
DRILLING COMPANY: Core Probe
DRILLING EQUIPMENT: GeoProbe 6610 DT
DRILLING METHOD: Direct Push
SAMPLING EQUIPMENT: Nylon tubing

NORTHING (ft):
LATITUDE: 33° 47' 30.542 N
GROUND ELEV (ft):
INITIAL DTW (ft):
STATIC DTW (ft): 24.5
WELL CASING DIAMETER (in): 3/4
LOGGED BY: Cathy Sanford

EASTING (ft):
LONGITUDE: 118° 13' 56.659 W
TOC ELEV (ft):
BOREHOLE DEPTH (ft): 35.0
WELL DEPTH (ft): 35.0
BOREHOLE DIAMETER (in): 2
CHECKED BY:

Time & Depth (feet)	Graphic Log		Description	Sample	Time Sample ID	Measured Recov. (feet)	Blow Count	Headspace PID (units)	Depth (feet)	Borehole Backfill
			~6" Asphalt							
			Hand Auger to 7 feet bgs							
			No Logging of Soil or Collection of Soil Samples							
7										3/4" diameter Blank Casing PVC 0'-20' bgs
10										
20									20	Slot Screen 20'-35' bgs No Annular fill
30										
35			Note: temporary well abandoned following collection of groundwater sample. All PVC extracted from bore hole, backfilled with hydrated bentonite, surface seal w/ concrete dyed to match asphalt surface.						35	

Stantec
INTERNATIONAL INCORPORATED

WELL DEVELOPMENT LOG

Well Number: 1173-101

Client: CalTrans- GW Investigation

Job No: 185832004

Location: PCH- Wilmington near Dominguez Channel

Sample Time: 10:55

SECOR Rep: Cathy Sanford

Sample #: 1173-101-24

DEVELOPMENT/PURGING LOG

DATE	TIME	DTFP (0.01) ft.	DTW (0.01) ft.	DTB (0.01) ft.	Vol. Purged (Gal)	pH	Temp °F °C	DO mg/L EC ~~μ mhos~~ ORP	Turbidity Color
6/10/2013	10:30	NA	23.5	35.0	—				
	10:39				0.30	6.73	24.86	7.26 / -71	very turbid black
	10:50				1.25	6.56	24.01	8.18 / -18	" black

Well Volume Calculations

• Water Column (ft)	(WCH)	DTB-DTW 35-23.5	11.5
• Casing Diameter		2",4", 3/4"	3/4"
• Casing Capacity (gal/ft)	(CK)	2" (.16), 4" (.65), 3/4(0.0229)	0.0229
• Casing WC Volume (gal)	(CV)	(CK) (WCH)	0.26
• Borehole Diameter		6",8",10", 2"	2"
• Borehole Capacity (gal/ft)	(BK)	6"(1.46), 8"(2.6), 10"(4.1) (.16)	.16
• Borehole WC Volume (gal)	(BV)	(BK)(WCH)	1.84
• Porosity	(N)	Sand (.3)	0.3
• Annulus WC Volume (gal)	(AV)	(BV-CV)(N)	0.474
• Total Well Volume (gal)	(TV)	CV+AV	0.734
• Min. Development Vol. (gal)	(DV)	(1.5)(TV)	1.101
• LPH Thickness (ft)	(Well)	DTW-DTFP None -	0.0

Recovery Calculations

• Bailer/Pump Type	
• Pump Rate (gpm)	
• DTW Before Purging (ft)	
• DTW After Purging (ft)	
• Recovery Time After 80% WC Recharge (min)	
• Recovery Time To Static Water Level (min)	
• Recharge Rate (ft/min)	
• Comments	

Stantec

INTERNATIONAL INCORPORATED

WELL DEVELOPMENT LOG

Well Number: 1173-102

Client: CalTrans - GW Investigation

Job No: 185832004

Location: PCH - Wilmington near Dominguez Channel

Sample Time: 16:15

SECOR Rep: Cathy Sanford

Sample #: 1173-102-24.5

DEVELOPMENT/PURGING LOG

DATE	TIME	DTFP (0.01) ft.	DTW (0.01) ft.	DTB (0.01) ft.	Vol. Purged (Gal)	pH	Temp °F Celcius	DO mg/L EC ORP ~~mhos~~	Turbidity Color
6/10/2013	15:50	NA	24.5	35.0	—				
	16:04				0.10	6.6	25.5	12.9 / -86.8	very turbid · black
	16:09				0.50	6.6	24.6	12.5 / -104.	" "
	16:14				1.25	6.2	25.3	14.9 / -75	turbid · dark gray

Well Volume Calculations

• Water Column (ft)	(WCH)	DTB-DTW 35-24.5	10.5
• Casing Diameter		2",4" 3/4"	3/4"
• Casing Capacity (gal/ft)	(CK)	2" (.16), 4" (.65), 3/4(0.0229)	00229
• Casing WC Volume (gal)	(CV)	(CK) (WCH)	0.24
• Borehole Diameter		6",8",10" , 2"	2"
• Borehole Capacity (gal/ft)	(BK)	6"(1.46), 8"(2.6), 10"(4.1)	0.16
• Borehole WC Volume (gal)	(BV)	(BK)(WCH)	1.68
• Porosity	(N)	Sand (.3)	.3
• Annulus WC Volume (gal)	(AV)	(BV-CV)(N)	0.432
• Total Well Volume (gal)	(TV)	CV+AV	0.672
• Min. Development Vol. (gal)	(DV)	(1.5)(TV)	1.008
• LPH Thickness (ft)	(Well)	DTW-DTFP NONE	0.0

Recovery Calculations

• Bailer/Pump Type	
• Pump Rate (gpm)	
• DTW Before Purging (ft)	
• DTW After Purging (ft)	
• Recovery Time After 80% WC Recharge (min)	
• Recovery Time To Static Water Level (min)	
• Recharge Rate (ft/min)	
• Comments	

APPENDIX C
ANALYTICAL LABORATORY REPORTS AND CHAIN-OF-CUSTODY RECORDS

ADVANCED TECHNOLOGY LABORATORIES

June 21, 2013

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196
ORELAP No.: CA300003
TCEQ No.: T104704502

Kelly Brown
Stantec
3777 Worsham Avenue, Ste. 200
Long Beach, CA 90808
Tel: (909) 255-8202
Fax:(909) 335-6120

Re: ATL Work Order Number : 1301702

Client Reference : Wilmington-PCH Dominguez, 185832004

Enclosed are the results for sample(s) received on June 10, 2013 by Advanced Technology Laboratories. The sample(s) are tested for the parameters as indicated on the enclosed chain of custody in accordance with applicable laboratory certifications. The laboratory results contained in this report specifically pertains to the sample(s) submitted.

Thank you for the opportunity to serve the needs of your company. If you have any questions, please feel free to contact me or your Project Manager.

Sincerely,

Eddie Rodriguez
Laboratory Director

Certificate of Analysis

Stantec		Project Number :	Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200		Report To :	Kelly Brown
Long Beach , CA 90808		Reported :	06/21/2013

SUMMARY OF SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
1173-101-15	1301702-01	Soil	6/10/13 9:54	6/10/13 17:52
1173-101-24	1301702-02	Groundwater	6/10/13 10:55	6/10/13 17:52
1173-102-24.5	1301702-03	Groundwater	6/10/13 16:15	6/10/13 17:52
EB	1301702-04	Groundwater	6/10/13 15:30	6/10/13 17:52
TB	1301702-05	Water	6/10/13 0:00	6/10/13 17:52

CASE NARRATIVE

Sample Receiving/General Comments:

Documentation pertaining to additional analyses/change order available upon request.

Results were J-flagged. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical Comments for EPA 6010

Sample 1301702-02, there was not enough sample to redigest/reanalyze.

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-15

Lab ID: 1301702-01

Mercury by AA (Cold Vapor) EPA 7471

Analyst: VV

Analyte	Result (mg/kg)	PQL (mg/kg)	MDL (mg/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Mercury	ND	0.10	0.008	1	B3F0265	06/13/2013	06/13/13 13:25	

Diesel Range Organics by EPA 8015B

Analyst: CR

Analyte	Result (mg/kg)	PQL (mg/kg)	MDL (mg/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
DRO	**9.5**	5.0	5.0	5	B3F0238	06/12/2013	06/12/13 20:41	
ORO	**12**	5.0	5.0	5	B3F0238	06/12/2013	06/12/13 20:41	
Surrogate: p-Terphenyl	*72.7 %*		*33 - 147*		B3F0238	06/12/2013	*06/12/13 20:41*	

Polychlorinated Biphenyls by EPA 8082

Analyst: BB

Analyte	Result (ug/kg)	PQL (ug/kg)	MDL (ug/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Aroclor 1016	ND	16	2.6	1	B3F0214	06/11/2013	06/11/13 17:37	
Aroclor 1221	ND	16	2.6	1	B3F0214	06/11/2013	06/11/13 17:37	
Aroclor 1232	ND	16	2.6	1	B3F0214	06/11/2013	06/11/13 17:37	
Aroclor 1242	ND	16	2.6	1	B3F0214	06/11/2013	06/11/13 17:37	
Aroclor 1248	ND	16	2.6	1	B3F0214	06/11/2013	06/11/13 17:37	
Aroclor 1254	ND	16	2.6	1	B3F0214	06/11/2013	06/11/13 17:37	
Aroclor 1260	ND	16	2.6	1	B3F0214	06/11/2013	06/11/13 17:37	
Aroclor 1262	ND	16	2.6	1	B3F0214	06/11/2013	06/11/13 17:37	
Aroclor 1268	ND	16	2.6	1	B3F0214	06/11/2013	06/11/13 17:37	
Surrogate: Decachlorobiphenyl	*89.5 %*		*39 - 128*		B3F0214	06/11/2013	*06/11/13 17:37*	
Surrogate: Tetrachloro-m-xylene	*103 %*		*38 - 122*		B3F0214	06/11/2013	*06/11/13 17:37*	

Volatile Organic Compounds by EPA 8260

Analyst: TP

Analyte	Result (ug/kg)	PQL (ug/kg)	MDL (ug/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	5.0	1.0	1	B3F0220	06/12/2013	06/12/13 14:31	
1,1,1-Trichloroethane	ND	5.0	0.89	1	B3F0220	06/12/2013	06/12/13 14:31	
1,1,2,2-Tetrachloroethane	ND	5.0	2.2	1	B3F0220	06/12/2013	06/12/13 14:31	
1,1,2-Trichloroethane	ND	5.0	0.90	1	B3F0220	06/12/2013	06/12/13 14:31	
1,1-Dichloroethane	ND	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
1,1-Dichloroethene	ND	5.0	1.4	1	B3F0220	06/12/2013	06/12/13 14:31	
1,1-Dichloropropene	ND	5.0	0.91	1	B3F0220	06/12/2013	06/12/13 14:31	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-15
Lab ID: 1301702-01

Volatile Organic Compounds by EPA 8260 **Analyst: TP**

Analyte	Result (ug/kg)	PQL (ug/kg)	MDL (ug/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2,3-Trichloropropane	ND	5.0	1.0	1	B3F0220	06/12/2013	06/12/13 14:31	
1,2,3-Trichlorobenzene	ND	5.0	2.3	1	B3F0220	06/12/2013	06/12/13 14:31	
1,2,4-Trichlorobenzene	ND	5.0	1.4	1	B3F0220	06/12/2013	06/12/13 14:31	
1,2,4-Trimethylbenzene	**9.7**	5.0	0.83	1	B3F0220	06/12/2013	06/12/13 14:31	
1,2-Dibromo-3-chloropropane	ND	10	3.7	1	B3F0220	06/12/2013	06/12/13 14:31	
1,2-Dibromoethane	ND	5.0	0.60	1	B3F0220	06/12/2013	06/12/13 14:31	
1,2-Dichlorobenzene	ND	5.0	1.0	1	B3F0220	06/12/2013	06/12/13 14:31	
1,2-Dichloroethane	ND	5.0	1.2	1	B3F0220	06/12/2013	06/12/13 14:31	
1,2-Dichloropropane	ND	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
1,3,5-Trimethylbenzene	**3.5**	5.0	0.76	1	B3F0220	06/12/2013	06/12/13 14:31	J
1,3-Dichlorobenzene	ND	5.0	0.75	1	B3F0220	06/12/2013	06/12/13 14:31	
1,3-Dichloropropane	ND	5.0	0.55	1	B3F0220	06/12/2013	06/12/13 14:31	
1,4-Dichlorobenzene	ND	5.0	0.80	1	B3F0220	06/12/2013	06/12/13 14:31	
2,2-Dichloropropane	ND	5.0	1.4	1	B3F0220	06/12/2013	06/12/13 14:31	
2-Chlorotoluene	ND	5.0	0.92	1	B3F0220	06/12/2013	06/12/13 14:31	
4-Chlorotoluene	ND	5.0	0.92	1	B3F0220	06/12/2013	06/12/13 14:31	
4-Isopropyltoluene	ND	5.0	0.85	1	B3F0220	06/12/2013	06/12/13 14:31	
Benzene	**7.0**	5.0	1.0	1	B3F0220	06/12/2013	06/12/13 14:31	
Bromobenzene	ND	5.0	0.78	1	B3F0220	06/12/2013	06/12/13 14:31	
Bromochloromethane	ND	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
Bromodichloromethane	ND	5.0	0.79	1	B3F0220	06/12/2013	06/12/13 14:31	
Bromoform	ND	5.0	0.52	1	B3F0220	06/12/2013	06/12/13 14:31	
Bromomethane	ND	5.0	0.66	1	B3F0220	06/12/2013	06/12/13 14:31	
Carbon disulfide	ND	5.0	0.92	1	B3F0220	06/12/2013	06/12/13 14:31	
Carbon tetrachloride	ND	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
Chlorobenzene	ND	5.0	0.94	1	B3F0220	06/12/2013	06/12/13 14:31	
Chloroethane	ND	5.0	1.3	1	B3F0220	06/12/2013	06/12/13 14:31	
Chloroform	ND	5.0	1.0	1	B3F0220	06/12/2013	06/12/13 14:31	
Chloromethane	ND	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
cis-1,2-Dichloroethene	ND	5.0	0.84	1	B3F0220	06/12/2013	06/12/13 14:31	
cis-1,3-Dichloropropene	ND	5.0	0.77	1	B3F0220	06/12/2013	06/12/13 14:31	
Di-isopropyl ether	ND	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
Dibromochloromethane	ND	5.0	0.97	1	B3F0220	06/12/2013	06/12/13 14:31	
Dibromomethane	ND	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
Dichlorodifluoromethane	ND	5.0	1.0	1	B3F0220	06/12/2013	06/12/13 14:31	
Ethyl Acetate	ND	50	7.3	1	B3F0220	06/12/2013	06/12/13 14:31	
Ethyl Ether	ND	50	9.3	1	B3F0220	06/12/2013	06/12/13 14:31	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-15
Lab ID: 1301702-01

Volatile Organic Compounds by EPA 8260 **Analyst: TP**

Analyte	Result (ug/kg)	PQL (ug/kg)	MDL (ug/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Ethyl tert-butyl ether	ND	5.0	0.86	1	B3F0220	06/12/2013	06/12/13 14:31	
Ethylbenzene	**12**	5.0	0.80	1	B3F0220	06/12/2013	06/12/13 14:31	
Freon-113	ND	5.0	1.3	1	B3F0220	06/12/2013	06/12/13 14:31	
Hexachlorobutadiene	ND	5.0	1.4	1	B3F0220	06/12/2013	06/12/13 14:31	
Isopropylbenzene	**26**	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
m,p-Xylene	**37**	10	1.7	1	B3F0220	06/12/2013	06/12/13 14:31	
Methylene chloride	ND	5.0	0.60	1	B3F0220	06/12/2013	06/12/13 14:31	
MTBE	ND	5.0	0.98	1	B3F0220	06/12/2013	06/12/13 14:31	
n-Butylbenzene	ND	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
n-Propylbenzene	**1.9**	5.0	0.98	1	B3F0220	06/12/2013	06/12/13 14:31	J
Naphthalene	**5.2**	5.0	2.7	1	B3F0220	06/12/2013	06/12/13 14:31	
o-Xylene	**12**	5.0	0.64	1	B3F0220	06/12/2013	06/12/13 14:31	
sec-Butylbenzene	ND	5.0	1.0	1	B3F0220	06/12/2013	06/12/13 14:31	
Styrene	ND	5.0	0.55	1	B3F0220	06/12/2013	06/12/13 14:31	
tert-Amyl methyl ether	ND	5.0	0.73	1	B3F0220	06/12/2013	06/12/13 14:31	
tert-Butanol	ND	100	18	1	B3F0220	06/12/2013	06/12/13 14:31	
tert-Butylbenzene	ND	5.0	0.89	1	B3F0220	06/12/2013	06/12/13 14:31	
Tetrachloroethene	ND	5.0	0.62	1	B3F0220	06/12/2013	06/12/13 14:31	
Toluene	**3.0**	5.0	0.88	1	B3F0220	06/12/2013	06/12/13 14:31	J
trans-1,2-Dichloroethene	ND	5.0	1.2	1	B3F0220	06/12/2013	06/12/13 14:31	
trans-1,3-Dichloropropene	ND	5.0	1.1	1	B3F0220	06/12/2013	06/12/13 14:31	
Trichloroethene	ND	5.0	0.85	1	B3F0220	06/12/2013	06/12/13 14:31	
Trichlorofluoromethane	ND	5.0	1.0	1	B3F0220	06/12/2013	06/12/13 14:31	
Vinyl acetate	ND	50	8.2	1	B3F0220	06/12/2013	06/12/13 14:31	
Vinyl chloride	ND	5.0	0.75	1	B3F0220	06/12/2013	06/12/13 14:31	
Surrogate: 1,2-Dichloroethane-d4	*94.4 %*	*70 - 130*			B3F0220	06/12/2013	*06/12/13 14:31*	
Surrogate: 4-Bromofluorobenzene	*101 %*	*70 - 130*			B3F0220	06/12/2013	*06/12/13 14:31*	
Surrogate: Dibromofluoromethane	*104 %*	*70 - 130*			B3F0220	06/12/2013	*06/12/13 14:31*	
Surrogate: Toluene-d8	*103 %*	*70 - 130*			B3F0220	06/12/2013	*06/12/13 14:31*	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-15

Lab ID: 1301702-01

TPH as Gasoline by LUFT GCMS

Analyst: TP

Analyte	Result (mg/kg)	PQL (mg/kg)	MDL (mg/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Gasoline	**0.72**	1.0	0.72	1	B3F0220	06/12/2013	06/12/13 14:31	F11, J
Surrogate: 1,2-Dichloroethane-d4	*110 %*		*70 - 130*		B3F0220	06/12/2013	*06/12/13 14:31*	
Surrogate: 4-Bromofluorobenzene	*99.9 %*		*70 - 130*		B3F0220	06/12/2013	*06/12/13 14:31*	
Surrogate: Dibromofluoromethane	*103 %*		*70 - 130*		B3F0220	06/12/2013	*06/12/13 14:31*	
Surrogate: Toluene-d8	*93.5 %*		*70 - 130*		B3F0220	06/12/2013	*06/12/13 14:31*	

Semivolatile Organic Compounds by EPA 8270C

Analyst: MFR

Analyte	Result (ug/kg)	PQL (ug/kg)	MDL (ug/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2,4-Trichlorobenzene	ND	330	19	1	B3F0228	06/12/2013	06/12/13 14:03	
1,2-Dichlorobenzene	ND	330	27	1	B3F0228	06/12/2013	06/12/13 14:03	
1,3-Dichlorobenzene	ND	330	21	1	B3F0228	06/12/2013	06/12/13 14:03	
1,4-Dichlorobenzene	ND	330	19	1	B3F0228	06/12/2013	06/12/13 14:03	
2,4,5-Trichlorophenol	ND	330	21	1	B3F0228	06/12/2013	06/12/13 14:03	
2,4,6-Trichlorophenol	ND	330	130	1	B3F0228	06/12/2013	06/12/13 14:03	
2,4-Dichlorophenol	ND	1600	120	1	B3F0228	06/12/2013	06/12/13 14:03	
2,4-Dimethylphenol	ND	330	150	1	B3F0228	06/12/2013	06/12/13 14:03	
2,4-Dinitrophenol	ND	1600	310	1	B3F0228	06/12/2013	06/12/13 14:03	
2,4-Dinitrotoluene	ND	330	27	1	B3F0228	06/12/2013	06/12/13 14:03	
2,6-Dinitrotoluene	ND	330	21	1	B3F0228	06/12/2013	06/12/13 14:03	
2-Chloronaphthalene	ND	330	20	1	B3F0228	06/12/2013	06/12/13 14:03	
2-Chlorophenol	ND	330	140	1	B3F0228	06/12/2013	06/12/13 14:03	
2-Methylnaphthalene	ND	330	20	1	B3F0228	06/12/2013	06/12/13 14:03	
2-Methylphenol	ND	330	200	1	B3F0228	06/12/2013	06/12/13 14:03	
2-Nitroaniline	ND	1600	32	1	B3F0228	06/12/2013	06/12/13 14:03	
2-Nitrophenol	ND	330	130	1	B3F0228	06/12/2013	06/12/13 14:03	
3,3´-Dichlorobenzidine	ND	660	480	1	B3F0228	06/12/2013	06/12/13 14:03	
3-Nitroaniline	ND	1600	29	1	B3F0228	06/12/2013	06/12/13 14:03	
4,6-Dinitro-2-methyphenol	ND	1600	200	1	B3F0228	06/12/2013	06/12/13 14:03	
4-Bromophenyl-phenylether	ND	330	19	1	B3F0228	06/12/2013	06/12/13 14:03	
4-Chloro-3-methylphenol	ND	660	120	1	B3F0228	06/12/2013	06/12/13 14:03	
4-Chloroaniline	ND	660	36	1	B3F0228	06/12/2013	06/12/13 14:03	
4-Chlorophenyl-phenylether	ND	330	20	1	B3F0228	06/12/2013	06/12/13 14:03	
4-Methylphenol	ND	330	28	1	B3F0228	06/12/2013	06/12/13 14:03	
4-Nitroaniline	ND	1600	31	1	B3F0228	06/12/2013	06/12/13 14:03	
4-Nitrophenol	ND	330	150	1	B3F0228	06/12/2013	06/12/13 14:03	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-15

Lab ID: 1301702-01

Semivolatile Organic Compounds by EPA 8270C **Analyst: MFR**

Analyte	Result (ug/kg)	PQL (ug/kg)	MDL (ug/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Acenaphthene	ND	330	28	1	B3F0228	06/12/2013	06/12/13 14:03	
Acenaphthylene	ND	330	20	1	B3F0228	06/12/2013	06/12/13 14:03	
Anthracene	ND	330	22	1	B3F0228	06/12/2013	06/12/13 14:03	
Benzidine (M)	ND	1600	450	1	B3F0228	06/12/2013	06/12/13 14:03	
Benzo(a)anthracene	ND	330	25	1	B3F0228	06/12/2013	06/12/13 14:03	
Benzo(a)pyrene	ND	330	100	1	B3F0228	06/12/2013	06/12/13 14:03	
Benzo(b)fluoranthene	ND	330	21	1	B3F0228	06/12/2013	06/12/13 14:03	
Benzo(g,h,i)perylene	ND	330	21	1	B3F0228	06/12/2013	06/12/13 14:03	
Benzo(k)fluoranthene	ND	330	25	1	B3F0228	06/12/2013	06/12/13 14:03	
Benzoic acid	ND	1600	870	1	B3F0228	06/12/2013	06/12/13 14:03	
Benzyl alcohol	ND	660	37	1	B3F0228	06/12/2013	06/12/13 14:03	
bis(2-chloroethoxy)methane	ND	330	26	1	B3F0228	06/12/2013	06/12/13 14:03	
bis(2-Chloroethyl)ether	ND	330	84	1	B3F0228	06/12/2013	06/12/13 14:03	
bis(2-chloroisopropyl)ether	ND	330	96	1	B3F0228	06/12/2013	06/12/13 14:03	
bis(2-ethylhexyl)phthalate	ND	330	29	1	B3F0228	06/12/2013	06/12/13 14:03	
Butylbenzylphthalate	ND	330	27	1	B3F0228	06/12/2013	06/12/13 14:03	
Chrysene	ND	330	24	1	B3F0228	06/12/2013	06/12/13 14:03	
Di-n-butylphthalate	ND	330	23	1	B3F0228	06/12/2013	06/12/13 14:03	
Di-n-octylphthalate	ND	330	30	1	B3F0228	06/12/2013	06/12/13 14:03	
Dibenz(a,h)anthracene	ND	330	24	1	B3F0228	06/12/2013	06/12/13 14:03	
Dibenzofuran	ND	330	22	1	B3F0228	06/12/2013	06/12/13 14:03	
Diethyl phthalate	ND	330	22	1	B3F0228	06/12/2013	06/12/13 14:03	
Dimethyl phthalate	ND	330	23	1	B3F0228	06/12/2013	06/12/13 14:03	
Fluoranthene	ND	330	20	1	B3F0228	06/12/2013	06/12/13 14:03	
Fluorene	ND	330	23	1	B3F0228	06/12/2013	06/12/13 14:03	
Hexachlorobenzene	ND	330	22	1	B3F0228	06/12/2013	06/12/13 14:03	
Hexachlorobutadiene	ND	660	15	1	B3F0228	06/12/2013	06/12/13 14:03	
Hexachlorocyclopentadiene	ND	660	25	1	B3F0228	06/12/2013	06/12/13 14:03	
Hexachloroethane	ND	330	22	1	B3F0228	06/12/2013	06/12/13 14:03	
Indeno(1,2,3-cd)pyrene	ND	330	110	1	B3F0228	06/12/2013	06/12/13 14:03	
Isophorone	ND	330	31	1	B3F0228	06/12/2013	06/12/13 14:03	
N-Nitroso-di-n propylamine	ND	330	29	1	B3F0228	06/12/2013	06/12/13 14:03	
N-Nitrosodiphenylamine	ND	330	23	1	B3F0228	06/12/2013	06/12/13 14:03	
Naphthalene	ND	330	22	1	B3F0228	06/12/2013	06/12/13 14:03	
Nitrobenzene	ND	330	23	1	B3F0228	06/12/2013	06/12/13 14:03	
Pentachlorophenol	ND	1600	110	1	B3F0228	06/12/2013	06/12/13 14:03	
Phenanthrene	ND	330	23	1	B3F0228	06/12/2013	06/12/13 14:03	

Certificate of Analysis

Stantec		Project Number :	Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200		Report To :	Kelly Brown
Long Beach , CA 90808		Reported :	06/21/2013

Client Sample ID 1173-101-15

Lab ID: 1301702-01

Semivolatile Organic Compounds by EPA 8270C — **Analyst: MFR**

Analyte	Result (ug/kg)	PQL (ug/kg)	MDL (ug/kg)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Phenol	ND	330	150	1	B3F0228	06/12/2013	06/12/13 14:03	
Pyrene	ND	330	18	1	B3F0228	06/12/2013	06/12/13 14:03	
Pyridine	ND	1600	780	1	B3F0228	06/12/2013	06/12/13 14:03	
Surrogate: 1,2-Dichlorobenzene-d4	*96.0 %*	*48 - 113*			B3F0228	06/12/2013	*06/12/13 14:03*	
Surrogate: 2,4,6-Tribromophenol	*112 %*	*14 - 162*			B3F0228	06/12/2013	*06/12/13 14:03*	
Surrogate: 2-Chlorophenol-d4	*95.2 %*	*40 - 117*			B3F0228	06/12/2013	*06/12/13 14:03*	
Surrogate: 2-Fluorobiphenyl	*98.5 %*	*52 - 126*			B3F0228	06/12/2013	*06/12/13 14:03*	
Surrogate: 2-Fluorophenol	*95.4 %*	*26 - 124*			B3F0228	06/12/2013	*06/12/13 14:03*	
Surrogate: 4-Terphenyl-d14	*104 %*	*36 - 163*			B3F0228	06/12/2013	*06/12/13 14:03*	
Surrogate: Nitrobenzene-d5	*106 %*	*42 - 118*			B3F0228	06/12/2013	*06/12/13 14:03*	
Surrogate: Phenol-d5	*98.3 %*	*29 - 124*			B3F0228	06/12/2013	*06/12/13 14:03*	

pH by EPA 9045C — **Analyst: LA**

Analyte	Result (pH Units)	PQL (pH Units)	MDL (pH Units)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
pH	**8.5**	0.10	0.10	1	B3F0246	06/12/2013	06/13/13 07:47	

Certificate of Analysis

Stantec		Project Number :	Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200		Report To :	Kelly Brown
Long Beach , CA 90808		Reported :	06/21/2013

Client Sample ID 1173-101-24

Lab ID: 1301702-02

Total Suspended Solids (Residue, Non-Filtrable) by SM 2540D

Analyst: PT

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Residue, Suspended	**18000**	200	200	1	B3F0272	06/13/2013	06/13/13 09:06	

pH by SM 4500H+B

Analyst: RD

Analyte	Result (pH Units)	PQL (pH Units)	MDL (pH Units)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
pH	**7.2**	0.10	0.10	1	B3F0218	06/10/2013	06/10/13 00:00	H1

Dissolved Metals by ICP-AES EPA 6010B

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Antimony	**0.0098**	0.0062	0.0044	1	B3F0323	06/15/2013	06/17/13 09:18	
Arsenic	ND	0.012	0.0068	1	B3F0323	06/15/2013	06/17/13 09:18	
Barium	**1.1**	0.0038	0.0003	1	B3F0323	06/15/2013	06/17/13 09:18	
Beryllium	ND	0.0038	0.0003	1	B3F0323	06/15/2013	06/17/13 09:18	
Cadmium	ND	0.0038	0.0003	1	B3F0323	06/15/2013	06/17/13 09:18	
Chromium	**0.0047**	0.0038	0.0008	1	B3F0323	06/15/2013	06/17/13 09:18	
Cobalt	**0.0008**	0.0038	0.0005	1	B3F0323	06/15/2013	06/17/13 09:18	J
Copper	**0.020**	0.0062	0.0031	1	B3F0323	06/15/2013	06/17/13 09:18	
Lead	**0.0043**	0.0062	0.0028	1	B3F0323	06/15/2013	06/17/13 09:18	C, J
Molybdenum	**0.055**	0.0062	0.0031	1	B3F0323	06/15/2013	06/17/13 09:18	
Nickel	**0.0067**	0.0062	0.0011	1	B3F0323	06/15/2013	06/17/13 09:18	
Selenium	ND	0.012	0.0084	1	B3F0323	06/15/2013	06/17/13 09:18	
Silver	ND	0.0038	0.0023	1	B3F0323	06/15/2013	06/17/13 09:18	
Thallium	**0.021**	0.019	0.0057	1	B3F0323	06/15/2013	06/17/13 09:18	
Vanadium	**0.057**	0.0038	0.0024	1	B3F0323	06/15/2013	06/17/13 09:18	
Zinc	**0.045**	0.012	0.0051	1	B3F0323	06/15/2013	06/17/13 09:18	

Dissolved Mercury by AA (Cold Vapor) by EPA 7470

Analyst: VV

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Mercury	**0.03**	0.20	0.03	1	B3F0305	06/14/2013	06/14/13 15:51	J

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-24

Lab ID: 1301702-02

Diesel Range Organics by EPA 8015B

Analyst: CR

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
DRO	**140**	5.0	5.0	100	B3F0219	06/12/2013	06/12/13 16:30	
ORO	**16**	5.0	5.0	100	B3F0219	06/12/2013	06/12/13 16:30	
Surrogate: p-Terphenyl	*56.2 %*		*38 - 151*		B3F0219	06/12/2013	*06/12/13 16:30*	

Polychlorinated Biphenyls by EPA 8082

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Aroclor 1016	ND	0.62	0.09	1	B3F0249	06/12/2013	06/13/13 00:41	
Aroclor 1221	ND	1.2	0.09	1	B3F0249	06/12/2013	06/13/13 00:41	
Aroclor 1232	ND	0.62	0.09	1	B3F0249	06/12/2013	06/13/13 00:41	
Aroclor 1242	ND	0.62	0.09	1	B3F0249	06/12/2013	06/13/13 00:41	
Aroclor 1248	ND	0.62	0.09	1	B3F0249	06/12/2013	06/13/13 00:41	
Aroclor 1254	ND	0.62	0.09	1	B3F0249	06/12/2013	06/13/13 00:41	
Aroclor 1260	ND	0.62	0.09	1	B3F0249	06/12/2013	06/13/13 00:41	
Aroclor 1262	ND	0.62	0.09	1	B3F0249	06/12/2013	06/13/13 00:41	
Aroclor 1268	ND	0.62	0.09	1	B3F0249	06/12/2013	06/13/13 00:41	
Surrogate: Decachlorobiphenyl	*40.6 %*		*39 - 129*		B3F0249	06/12/2013	*06/13/13 00:41*	
Surrogate: Tetrachloro-m-xylene	*96.1 %*		*39 - 123*		B3F0249	06/12/2013	*06/13/13 00:41*	

Volatile Organic Compounds by EPA 8260

Analyst: SL

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	50	28	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,1,1-Trichloroethane	ND	50	25	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,1,2,2-Tetrachloroethane	ND	50	43	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,1,2-Trichloroethane	ND	50	31	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,1-Dichloroethane	ND	50	30	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,1-Dichloroethene	ND	50	33	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,1-Dichloropropene	ND	50	36	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,2,3-Trichloropropane	ND	50	20	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,2,3-Trichlorobenzene	ND	50	49	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,2,4-Trichlorobenzene	ND	50	32	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,2,4-Trimethylbenzene	**7200**	50	30	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,2-Dibromo-3-chloropropane	ND	50	40	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,2-Dibromoethane	ND	50	32	100	B3F0221	06/12/2013	06/12/13 16:23	D6

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-24

Lab ID: 1301702-02

Volatile Organic Compounds by EPA 8260 **Analyst: SL**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2-Dichlorobenzene	ND	50	44	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,2-Dichloroethane	ND	50	45	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,2-Dichloropropane	ND	50	25	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,3,5-Trimethylbenzene	**2100**	50	26	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,3-Dichlorobenzene	ND	50	37	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,3-Dichloropropane	ND	50	28	100	B3F0221	06/12/2013	06/12/13 16:23	D6
1,4-Dichlorobenzene	ND	50	34	100	B3F0221	06/12/2013	06/12/13 16:23	D6
2,2-Dichloropropane	ND	50	20	100	B3F0221	06/12/2013	06/12/13 16:23	D6
2-Chloroethyl vinyl ether	ND	50	27	100	B3F0221	06/12/2013	06/12/13 16:23	D6
2-Chlorotoluene	ND	50	32	100	B3F0221	06/12/2013	06/12/13 16:23	D6
4-Chlorotoluene	ND	50	38	100	B3F0221	06/12/2013	06/12/13 16:23	D6
4-Isopropyltoluene	**210**	50	28	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Benzene	**8400**	50	23	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Bromobenzene	ND	50	42	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Bromochloromethane	ND	50	29	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Bromodichloromethane	ND	50	20	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Bromoform	ND	50	37	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Bromomethane	ND	50	49	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Carbon disulfide	ND	100	30	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Carbon tetrachloride	ND	50	32	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Chlorobenzene	ND	50	19	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Chloroethane	ND	50	44	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Chloroform	ND	50	32	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Chloromethane	ND	50	34	100	B3F0221	06/12/2013	06/12/13 16:23	D6
cis-1,2-Dichloroethene	ND	50	32	100	B3F0221	06/12/2013	06/12/13 16:23	D6
cis-1,3-Dichloropropene	ND	50	18	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Di-isopropyl ether	ND	50	26	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Dibromochloromethane	ND	50	23	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Dibromomethane	ND	50	29	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Dichlorodifluoromethane	ND	50	37	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Ethyl Acetate	ND	1000	200	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Ethyl Ether	ND	1000	270	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Ethyl tert-butyl ether	ND	50	25	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Ethylbenzene	**4000**	50	17	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Freon-113	ND	50	39	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Hexachlorobutadiene	ND	50	23	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Isopropylbenzene	**920**	50	20	100	B3F0221	06/12/2013	06/12/13 16:23	D6

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-24

Lab ID: 1301702-02

Volatile Organic Compounds by EPA 8260 **Analyst: SL**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
m,p-Xylene	**14000**	100	43	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Methylene chloride	ND	100	30	100	B3F0221	06/12/2013	06/12/13 16:23	D6
MTBE	**80**	50	26	100	B3F0221	06/12/2013	06/12/13 16:23	D6
n-Butylbenzene	**490**	50	23	100	B3F0221	06/12/2013	06/12/13 16:23	D6
n-Propylbenzene	**820**	50	23	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Naphthalene	**2600**	50	35	100	B3F0221	06/12/2013	06/12/13 16:23	D6
o-Xylene	**6900**	50	23	100	B3F0221	06/12/2013	06/12/13 16:23	D6
sec-Butylbenzene	**180**	50	21	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Styrene	ND	50	26	100	B3F0221	06/12/2013	06/12/13 16:23	D6
tert-Amyl methyl ether	ND	50	17	100	B3F0221	06/12/2013	06/12/13 16:23	D6
tert-Butanol	**890**	1000	460	100	B3F0221	06/12/2013	06/12/13 16:23	D6, J
tert-Butylbenzene	ND	50	28	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Tetrachloroethene	ND	50	27	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Toluene	**15000**	250	100	500	B3F0221	06/12/2013	06/12/13 14:47	
trans-1,2-Dichloroethene	ND	50	31	100	B3F0221	06/12/2013	06/12/13 16:23	D6
trans-1,3-Dichloropropene	ND	50	21	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Trichloroethene	ND	50	35	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Trichlorofluoromethane	ND	50	41	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Vinyl acetate	ND	1000	180	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Vinyl chloride	ND	50	28	100	B3F0221	06/12/2013	06/12/13 16:23	D6
Surrogate: 1,2-Dichloroethane-d4	*89.0 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 16:23*	
Surrogate: 1,2-Dichloroethane-d4	*113 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 14:47*	
Surrogate: 4-Bromofluorobenzene	*98.6 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 14:47*	
Surrogate: 4-Bromofluorobenzene	*94.7 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 16:23*	
Surrogate: Dibromofluoromethane	*99.6 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 14:47*	
Surrogate: Dibromofluoromethane	*81.6 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 16:23*	
Surrogate: Toluene-d8	*92.1 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 16:23*	
Surrogate: Toluene-d8	*97.9 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 14:47*	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-24

Lab ID: 1301702-02

TPH as Gasoline by LUFT GCMS

Analyst: SL

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Gasoline	**500**	25	17	500	B3F0221	06/12/2013	06/12/13 14:47	D6, F11
Surrogate: 1,2-Dichloroethane-d4	*109 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 14:47*	
Surrogate: 4-Bromofluorobenzene	*109 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 14:47*	
Surrogate: Dibromofluoromethane	*105 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 14:47*	
Surrogate: Toluene-d8	*109 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 14:47*	

Semivolatile Organic Compounds by EPA 8270C

Analyst: MFR

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2,4-Trichlorobenzene	ND	100	5.3	10	B3F0198	06/11/2013	06/11/13 19:18	D2
1,2-Dichlorobenzene	ND	100	6.5	10	B3F0198	06/11/2013	06/11/13 19:18	D2
1,3-Dichlorobenzene	ND	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:18	D2
1,4-Dichlorobenzene	ND	100	6.6	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2,4,5-Trichlorophenol	ND	100	12	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2,4,6-Trichlorophenol	ND	100	30	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2,4-Dichlorophenol	ND	100	28	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2,4-Dimethylphenol	**770**	100	28	10	B3F0198	06/11/2013	06/11/13 19:18	
2,4-Dinitrophenol	ND	500	35	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2,4-Dinitrotoluene	ND	100	8.3	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2,6-Dinitrotoluene	ND	100	7.0	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2-Chloronaphthalene	ND	100	5.0	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2-Chlorophenol	ND	100	25	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2-Methylnaphthalene	**860**	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:18	
2-Methylphenol	ND	100	82	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2-Nitroaniline	ND	500	8.1	10	B3F0198	06/11/2013	06/11/13 19:18	D2
2-Nitrophenol	ND	100	30	10	B3F0198	06/11/2013	06/11/13 19:18	D2
3,3´-Dichlorobenzidine	ND	200	78	10	B3F0198	06/11/2013	06/11/13 19:18	D2
3-Nitroaniline	ND	500	7.4	10	B3F0198	06/11/2013	06/11/13 19:18	D2
4,6-Dinitro-2-methyphenol	ND	500	35	10	B3F0198	06/11/2013	06/11/13 19:18	D2
4-Bromophenyl-phenylether	ND	100	5.4	10	B3F0198	06/11/2013	06/11/13 19:18	D2
4-Chloro-3-methylphenol	ND	500	29	10	B3F0198	06/11/2013	06/11/13 19:18	D2
4-Chloroaniline	ND	200	4.9	10	B3F0198	06/11/2013	06/11/13 19:18	D2
4-Chlorophenyl-phenylether	ND	100	5.9	10	B3F0198	06/11/2013	06/11/13 19:18	D2
4-Methylphenol	ND	100	5.5	10	B3F0198	06/11/2013	06/11/13 19:18	D2
4-Nitroaniline	ND	200	7.6	10	B3F0198	06/11/2013	06/11/13 19:18	D2
4-Nitrophenol	ND	500	21	10	B3F0198	06/11/2013	06/11/13 19:18	D2

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-101-24

Lab ID: 1301702-02

Semivolatile Organic Compounds by EPA 8270C **Analyst: MFR**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Acenaphthene	**18**	100	7.2	10	B3F0198	06/11/2013	06/11/13 19:18	J, D2
Acenaphthylene	ND	100	5.2	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Anthracene	ND	100	5.4	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Benzidine (M)	ND	500	98	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Benzo(a)anthracene	ND	100	5.4	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Benzo(a)pyrene	ND	100	18	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Benzo(b)fluoranthene	ND	100	5.8	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Benzo(g,h,i)perylene	ND	100	7.6	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Benzo(k)fluoranthene	ND	100	6.2	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Benzoic acid	ND	500	320	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Benzyl alcohol	ND	200	5.1	10	B3F0198	06/11/2013	06/11/13 19:18	D2
bis(2-chloroethoxy)methane	ND	100	5.8	10	B3F0198	06/11/2013	06/11/13 19:18	D2
bis(2-Chloroethyl)ether	ND	100	21	10	B3F0198	06/11/2013	06/11/13 19:18	D2
bis(2-chloroisopropyl)ether	ND	100	25	10	B3F0198	06/11/2013	06/11/13 19:18	D2
bis(2-ethylhexyl)phthalate	ND	100	6.3	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Butylbenzylphthalate	ND	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Chrysene	ND	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Di-n-butylphthalate	ND	100	7.0	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Di-n-octylphthalate	ND	100	5.8	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Dibenz(a,h)anthracene	ND	100	7.2	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Dibenzofuran	ND	100	6.1	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Diethyl phthalate	ND	100	5.5	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Dimethyl phthalate	ND	100	6.3	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Fluoranthene	ND	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Fluorene	**16**	100	5.3	10	B3F0198	06/11/2013	06/11/13 19:18	D2, J
Hexachlorobenzene	ND	100	7.8	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Hexachlorobutadiene	ND	200	5.6	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Hexachlorocyclopentadiene	ND	100	6.7	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Hexachloroethane	ND	100	6.9	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Indeno(1,2,3-cd)pyrene	ND	100	15	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Isophorone	ND	100	6.0	10	B3F0198	06/11/2013	06/11/13 19:18	D2
N-Nitroso-di-n propylamine	ND	100	7.2	10	B3F0198	06/11/2013	06/11/13 19:18	D2
N-Nitrosodiphenylamine	ND	100	5.7	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Naphthalene	**860**	100	4.6	10	B3F0198	06/11/2013	06/11/13 19:18	
Nitrobenzene	ND	100	6.5	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Pentachlorophenol	ND	500	32	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Phenanthrene	**31**	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:18	D2, J

Certificate of Analysis

Stantec		Project Number :	Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200		Report To :	Kelly Brown
Long Beach , CA 90808		Reported :	06/21/2013

Client Sample ID 1173-101-24

Lab ID: 1301702-02

Semivolatile Organic Compounds by EPA 8270C **Analyst: MFR**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Phenol	ND	100	21	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Pyrene	ND	100	5.7	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Pyridine	ND	500	140	10	B3F0198	06/11/2013	06/11/13 19:18	D2
Surrogate: 1,2-Dichlorobenzene-d4	*71.3 %*	*36 - 117*			B3F0198	06/11/2013	*06/11/13 19:18*	
Surrogate: 2,4,6-Tribromophenol	*81.5 %*	*33 - 149*			B3F0198	06/11/2013	*06/11/13 19:18*	
Surrogate: 2-Chlorophenol-d4	*76.6 %*	*37 - 99*			B3F0198	06/11/2013	*06/11/13 19:18*	
Surrogate: 2-Fluorobiphenyl	*76.9 %*	*52 - 126*			B3F0198	06/11/2013	*06/11/13 19:18*	
Surrogate: 2-Fluorophenol	*163 %*	*17 - 69*			B3F0198	06/11/2013	*06/11/13 19:18*	S10
Surrogate: 4-Terphenyl-d14	*71.7 %*	*40 - 165*			B3F0198	06/11/2013	*06/11/13 19:18*	
Surrogate: Nitrobenzene-d5	*106 %*	*38 - 117*			B3F0198	06/11/2013	*06/11/13 19:18*	
Surrogate: Phenol-d5	*16.6 %*	*5 - 60*			B3F0198	06/11/2013	*06/11/13 19:18*	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-102-24.5

Lab ID: 1301702-03

Total Suspended Solids (Residue, Non-Filtrable) by SM 2540D

Analyst: PT

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Residue, Suspended	**16000**	200	200	1	B3F0272	06/13/2013	06/13/13 09:08	

pH by SM 4500H+B

Analyst: RD

Analyte	Result (pH Units)	PQL (pH Units)	MDL (pH Units)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
pH	**6.8**	0.10	0.10	1	B3F0218	06/10/2013	06/10/13 00:00	H1

Dissolved Metals by ICP-AES EPA 6010B

Analyst: AG

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Antimony	**0.0049**	0.0050	0.0035	1	B3F0323	06/15/2013	06/17/13 09:23	J
Arsenic	**0.042**	0.010	0.0054	1	B3F0323	06/15/2013	06/17/13 09:23	
Barium	**0.54**	0.0030	0.0002	1	B3F0323	06/15/2013	06/17/13 09:23	
Beryllium	ND	0.0030	0.0002	1	B3F0323	06/15/2013	06/17/13 09:23	
Cadmium	ND	0.0030	0.0002	1	B3F0323	06/15/2013	06/17/13 09:23	
Chromium	**0.0022**	0.0030	0.0006	1	B3F0323	06/15/2013	06/17/13 09:23	J
Cobalt	**0.0004**	0.0030	0.0004	1	B3F0323	06/15/2013	06/17/13 09:23	J
Copper	**0.013**	0.0050	0.0025	1	B3F0323	06/15/2013	06/17/13 09:23	
Lead	**0.046**	0.0050	0.0022	1	B3F0323	06/15/2013	06/17/13 09:23	
Molybdenum	**0.012**	0.0050	0.0025	1	B3F0323	06/15/2013	06/17/13 09:23	
Nickel	**0.0022**	0.0050	0.0009	1	B3F0323	06/15/2013	06/17/13 09:23	J
Selenium	ND	0.010	0.0067	1	B3F0323	06/15/2013	06/17/13 09:23	
Silver	ND	0.0030	0.0018	1	B3F0323	06/15/2013	06/17/13 09:23	
Thallium	**0.020**	0.015	0.0046	1	B3F0323	06/15/2013	06/17/13 09:23	
Vanadium	**0.0040**	0.0030	0.0019	1	B3F0323	06/15/2013	06/17/13 09:23	
Zinc	**0.061**	0.010	0.0041	1	B3F0323	06/15/2013	06/17/13 09:23	

Dissolved Mercury by AA (Cold Vapor) by EPA 7470

Analyst: VV

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Mercury	ND	0.20	0.03	1	B3F0305	06/14/2013	06/14/13 15:53	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-102-24.5

Lab ID: 1301702-03

Diesel Range Organics by EPA 8015B

Analyst: CR

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
DRO	**220**	5.0	5.0	100	B3F0219	06/12/2013	06/12/13 16:47	
ORO	**20**	5.0	5.0	100	B3F0219	06/12/2013	06/12/13 16:47	
Surrogate: p-Terphenyl	*73.8 %*		*38 - 151*		B3F0219	06/12/2013	*06/12/13 16:47*	

Polychlorinated Biphenyls by EPA 8082

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Aroclor 1016	ND	0.56	0.08	1	B3F0249	06/12/2013	06/13/13 01:08	
Aroclor 1221	ND	1.1	0.08	1	B3F0249	06/12/2013	06/13/13 01:08	
Aroclor 1232	ND	0.56	0.08	1	B3F0249	06/12/2013	06/13/13 01:08	
Aroclor 1242	ND	0.56	0.08	1	B3F0249	06/12/2013	06/13/13 01:08	
Aroclor 1248	ND	0.56	0.08	1	B3F0249	06/12/2013	06/13/13 01:08	
Aroclor 1254	ND	0.56	0.08	1	B3F0249	06/12/2013	06/13/13 01:08	
Aroclor 1260	ND	0.56	0.08	1	B3F0249	06/12/2013	06/13/13 01:08	
Aroclor 1262	ND	0.56	0.08	1	B3F0249	06/12/2013	06/13/13 01:08	
Aroclor 1268	ND	0.56	0.08	1	B3F0249	06/12/2013	06/13/13 01:08	
Surrogate: Decachlorobiphenyl	*45.3 %*		*39 - 129*		B3F0249	06/12/2013	*06/13/13 01:08*	
Surrogate: Tetrachloro-m-xylene	*51.4 %*		*39 - 123*		B3F0249	06/12/2013	*06/13/13 01:08*	

Volatile Organic Compounds by EPA 8260

Analyst: SL

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	10	5.6	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,1,1-Trichloroethane	ND	10	5.1	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,1,2,2-Tetrachloroethane	ND	10	8.6	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,1,2-Trichloroethane	ND	10	6.2	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,1-Dichloroethane	ND	10	6.1	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,1-Dichloroethene	ND	10	6.6	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,1-Dichloropropene	ND	10	7.2	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,2,3-Trichloropropane	ND	10	4.1	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,2,3-Trichlorobenzene	ND	10	9.9	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,2,4-Trichlorobenzene	ND	10	6.5	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,2,4-Trimethylbenzene	**4200**	100	59	200	B3F0221	06/12/2013	06/12/13 15:59	
1,2-Dibromo-3-chloropropane	ND	10	8.1	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,2-Dibromoethane	ND	10	6.4	20	B3F0221	06/12/2013	06/12/13 15:36	D6

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-102-24.5

Lab ID: 1301702-03

Volatile Organic Compounds by EPA 8260 **Analyst: SL**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2-Dichlorobenzene	ND	10	8.9	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,2-Dichloroethane	ND	10	9.0	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,2-Dichloropropane	ND	10	5.1	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,3,5-Trimethylbenzene	**1400**	10	5.3	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,3-Dichlorobenzene	ND	10	7.5	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,3-Dichloropropane	ND	10	5.7	20	B3F0221	06/12/2013	06/12/13 15:36	D6
1,4-Dichlorobenzene	ND	10	6.7	20	B3F0221	06/12/2013	06/12/13 15:36	D6
2,2-Dichloropropane	ND	10	4.1	20	B3F0221	06/12/2013	06/12/13 15:36	D6
2-Chloroethyl vinyl ether	ND	10	5.4	20	B3F0221	06/12/2013	06/12/13 15:36	D6
2-Chlorotoluene	ND	10	6.4	20	B3F0221	06/12/2013	06/12/13 15:36	D6
4-Chlorotoluene	ND	10	7.7	20	B3F0221	06/12/2013	06/12/13 15:36	D6
4-Isopropyltoluene	**200**	10	5.6	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Benzene	**5700**	100	45	200	B3F0221	06/12/2013	06/12/13 15:59	
Bromobenzene	ND	10	8.4	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Bromochloromethane	ND	10	5.7	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Bromodichloromethane	ND	10	3.9	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Bromoform	ND	10	7.5	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Bromomethane	ND	10	9.8	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Carbon disulfide	ND	20	5.9	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Carbon tetrachloride	ND	10	6.3	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Chlorobenzene	ND	10	3.8	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Chloroethane	ND	10	8.8	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Chloroform	ND	10	6.4	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Chloromethane	ND	10	6.8	20	B3F0221	06/12/2013	06/12/13 15:36	D6
cis-1,2-Dichloroethene	ND	10	6.4	20	B3F0221	06/12/2013	06/12/13 15:36	D6
cis-1,3-Dichloropropene	ND	10	3.6	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Di-isopropyl ether	ND	10	5.2	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Dibromochloromethane	ND	10	4.7	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Dibromomethane	ND	10	5.7	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Dichlorodifluoromethane	ND	10	7.5	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Ethyl Acetate	ND	200	40	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Ethyl Ether	ND	200	53	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Ethyl tert-butyl ether	ND	10	5.0	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Ethylbenzene	**1900**	10	3.4	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Freon-113	ND	10	7.8	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Hexachlorobutadiene	ND	10	4.7	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Isopropylbenzene	**960**	10	4.1	20	B3F0221	06/12/2013	06/12/13 15:36	D6

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-102-24.5

Lab ID: 1301702-03

Volatile Organic Compounds by EPA 8260 **Analyst: SL**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
m,p-Xylene	**7000**	200	87	200	B3F0221	06/12/2013	06/12/13 15:59	
Methylene chloride	ND	20	6.0	20	B3F0221	06/12/2013	06/12/13 15:36	D6
MTBE	ND	10	5.2	20	B3F0221	06/12/2013	06/12/13 15:36	D6
n-Butylbenzene	**390**	10	4.5	20	B3F0221	06/12/2013	06/12/13 15:36	D6
n-Propylbenzene	**610**	10	4.6	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Naphthalene	**1700**	10	7.0	20	B3F0221	06/12/2013	06/12/13 15:36	D6
o-Xylene	**120**	10	4.7	20	B3F0221	06/12/2013	06/12/13 15:36	D6
sec-Butylbenzene	**150**	10	4.1	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Styrene	ND	10	5.2	20	B3F0221	06/12/2013	06/12/13 15:36	D6
tert-Amyl methyl ether	ND	10	3.4	20	B3F0221	06/12/2013	06/12/13 15:36	D6
tert-Butanol	ND	200	93	20	B3F0221	06/12/2013	06/12/13 15:36	D6
tert-Butylbenzene	**18**	10	5.6	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Tetrachloroethene	ND	10	5.4	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Toluene	**180**	10	4.0	20	B3F0221	06/12/2013	06/12/13 15:36	D6
trans-1,2-Dichloroethene	ND	10	6.3	20	B3F0221	06/12/2013	06/12/13 15:36	D6
trans-1,3-Dichloropropene	ND	10	4.3	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Trichloroethene	ND	10	6.9	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Trichlorofluoromethane	ND	10	8.2	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Vinyl acetate	ND	200	35	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Vinyl chloride	ND	10	5.5	20	B3F0221	06/12/2013	06/12/13 15:36	D6
Surrogate: 1,2-Dichloroethane-d4	*84.2 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 15:59*	
Surrogate: 1,2-Dichloroethane-d4	*126 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 15:36*	
Surrogate: 4-Bromofluorobenzene	*96.7 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 15:59*	
Surrogate: 4-Bromofluorobenzene	*125 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 15:36*	
Surrogate: Dibromofluoromethane	*84.4 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 15:59*	
Surrogate: Dibromofluoromethane	*96.6 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 15:36*	
Surrogate: Toluene-d8	*98.0 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 15:36*	
Surrogate: Toluene-d8	*88.6 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 15:59*	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-102-24.5

Lab ID: 1301702-03

TPH as Gasoline by LUFT GCMS

Analyst: SL

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Gasoline	**170**	10	6.7	200	B3F0221	06/12/2013	06/12/13 15:59	F11, D6
Surrogate: 1,2-Dichloroethane-d4	*79.9 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 15:59*	
Surrogate: 4-Bromofluorobenzene	*104 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 15:59*	
Surrogate: Dibromofluoromethane	*89.5 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 15:59*	
Surrogate: Toluene-d8	*98.8 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 15:59*	

Semivolatile Organic Compounds by EPA 8270C

Analyst: MFR

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2,4-Trichlorobenzene	ND	100	5.3	10	B3F0198	06/11/2013	06/11/13 19:45	D2
1,2-Dichlorobenzene	ND	100	6.5	10	B3F0198	06/11/2013	06/11/13 19:45	D2
1,3-Dichlorobenzene	ND	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:45	D2
1,4-Dichlorobenzene	ND	100	6.6	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2,4,5-Trichlorophenol	ND	100	12	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2,4,6-Trichlorophenol	ND	100	30	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2,4-Dichlorophenol	ND	100	28	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2,4-Dimethylphenol	ND	100	28	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2,4-Dinitrophenol	ND	500	35	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2,4-Dinitrotoluene	ND	100	8.3	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2,6-Dinitrotoluene	ND	100	7.0	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2-Chloronaphthalene	ND	100	5.0	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2-Chlorophenol	ND	100	25	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2-Methylnaphthalene	**830**	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:45	
2-Methylphenol	ND	100	82	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2-Nitroaniline	ND	500	8.1	10	B3F0198	06/11/2013	06/11/13 19:45	D2
2-Nitrophenol	ND	100	30	10	B3F0198	06/11/2013	06/11/13 19:45	D2
3,3´-Dichlorobenzidine	ND	200	78	10	B3F0198	06/11/2013	06/11/13 19:45	D2
3-Nitroaniline	ND	500	7.4	10	B3F0198	06/11/2013	06/11/13 19:45	D2
4,6-Dinitro-2-methyphenol	ND	500	35	10	B3F0198	06/11/2013	06/11/13 19:45	D2
4-Bromophenyl-phenylether	ND	100	5.4	10	B3F0198	06/11/2013	06/11/13 19:45	D2
4-Chloro-3-methylphenol	ND	500	29	10	B3F0198	06/11/2013	06/11/13 19:45	D2
4-Chloroaniline	ND	200	4.9	10	B3F0198	06/11/2013	06/11/13 19:45	D2
4-Chlorophenyl-phenylether	ND	100	5.9	10	B3F0198	06/11/2013	06/11/13 19:45	D2
4-Methylphenol	ND	100	5.5	10	B3F0198	06/11/2013	06/11/13 19:45	D2
4-Nitroaniline	ND	200	7.6	10	B3F0198	06/11/2013	06/11/13 19:45	D2
4-Nitrophenol	ND	500	21	10	B3F0198	06/11/2013	06/11/13 19:45	D2

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID 1173-102-24.5

Lab ID: 1301702-03

Semivolatile Organic Compounds by EPA 8270C **Analyst: MFR**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Acenaphthene	**16**	100	7.2	10	B3F0198	06/11/2013	06/11/13 19:45	J, D2
Acenaphthylene	ND	100	5.2	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Anthracene	ND	100	5.4	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Benzidine (M)	ND	500	98	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Benzo(a)anthracene	ND	100	5.4	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Benzo(a)pyrene	ND	100	18	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Benzo(b)fluoranthene	ND	100	5.8	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Benzo(g,h,i)perylene	ND	100	7.6	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Benzo(k)fluoranthene	ND	100	6.2	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Benzoic acid	ND	500	320	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Benzyl alcohol	ND	200	5.1	10	B3F0198	06/11/2013	06/11/13 19:45	D2
bis(2-chloroethoxy)methane	ND	100	5.8	10	B3F0198	06/11/2013	06/11/13 19:45	D2
bis(2-Chloroethyl)ether	ND	100	21	10	B3F0198	06/11/2013	06/11/13 19:45	D2
bis(2-chloroisopropyl)ether	ND	100	25	10	B3F0198	06/11/2013	06/11/13 19:45	D2
bis(2-ethylhexyl)phthalate	ND	100	6.3	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Butylbenzylphthalate	ND	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Chrysene	ND	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Di-n-butylphthalate	ND	100	7.0	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Di-n-octylphthalate	ND	100	5.8	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Dibenz(a,h)anthracene	ND	100	7.2	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Dibenzofuran	ND	100	6.1	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Diethyl phthalate	ND	100	5.5	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Dimethyl phthalate	ND	100	6.3	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Fluoranthene	ND	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Fluorene	**15**	100	5.3	10	B3F0198	06/11/2013	06/11/13 19:45	J, D2
Hexachlorobenzene	ND	100	7.8	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Hexachlorobutadiene	ND	200	5.6	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Hexachlorocyclopentadiene	ND	100	6.7	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Hexachloroethane	ND	100	6.9	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Indeno(1,2,3-cd)pyrene	ND	100	15	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Isophorone	ND	100	6.0	10	B3F0198	06/11/2013	06/11/13 19:45	D2
N-Nitroso-di-n propylamine	ND	100	7.2	10	B3F0198	06/11/2013	06/11/13 19:45	D2
N-Nitrosodiphenylamine	ND	100	5.7	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Naphthalene	**1300**	100	4.6	10	B3F0198	06/11/2013	06/11/13 19:45	
Nitrobenzene	ND	100	6.5	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Pentachlorophenol	ND	500	32	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Phenanthrene	**30**	100	5.6	10	B3F0198	06/11/2013	06/11/13 19:45	J, D2

Certificate of Analysis

Stantec		Project Number :	Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200		Report To :	Kelly Brown
Long Beach , CA 90808		Reported :	06/21/2013

Client Sample ID 1173-102-24.5

Lab ID: 1301702-03

Semivolatile Organic Compounds by EPA 8270C **Analyst: MFR**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Phenol	ND	100	21	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Pyrene	ND	100	5.7	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Pyridine	ND	500	140	10	B3F0198	06/11/2013	06/11/13 19:45	D2
Surrogate: 1,2-Dichlorobenzene-d4	*72.3 %*	*36 - 117*			B3F0198	06/11/2013	*06/11/13 19:45*	
Surrogate: 2,4,6-Tribromophenol	*77.7 %*	*33 - 149*			B3F0198	06/11/2013	*06/11/13 19:45*	
Surrogate: 2-Chlorophenol-d4	*60.5 %*	*37 - 99*			B3F0198	06/11/2013	*06/11/13 19:45*	
Surrogate: 2-Fluorobiphenyl	*73.9 %*	*52 - 126*			B3F0198	06/11/2013	*06/11/13 19:45*	
Surrogate: 2-Fluorophenol	*71.3 %*	*17 - 69*			B3F0198	06/11/2013	*06/11/13 19:45*	S10
Surrogate: 4-Terphenyl-d14	*66.9 %*	*40 - 165*			B3F0198	06/11/2013	*06/11/13 19:45*	
Surrogate: Nitrobenzene-d5	*74.8 %*	*38 - 117*			B3F0198	06/11/2013	*06/11/13 19:45*	
Surrogate: Phenol-d5	*25.9 %*	*5 - 60*			B3F0198	06/11/2013	*06/11/13 19:45*	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID EB
Lab ID: 1301702-04

Total Suspended Solids (Residue, Non-Filtrable) by SM 2540D

Analyst: PT

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Residue, Suspended	ND	8.9	8.9	1	B3F0272	06/13/2013	06/13/13 09:10	

pH by SM 4500H+B

Analyst: RD

Analyte	Result (pH Units)	PQL (pH Units)	MDL (pH Units)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
pH	**7.9**	0.10	0.10	1	B3F0218	06/10/2013	06/10/13 00:00	H1

Diesel Range Organics by EPA 8015B

Analyst: CR

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
DRO	**0.15**	0.05	0.05	1	B3F0219	06/12/2013	06/12/13 15:39	
ORO	ND	0.05	0.05	1	B3F0219	06/12/2013	06/12/13 15:39	
Surrogate: p-Terphenyl	*86.6 %*		*38 - 151*		B3F0219	06/12/2013	*06/12/13 15:39*	

Polychlorinated Biphenyls by EPA 8082

Analyst: BB

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Aroclor 1016	ND	0.50	0.07	1	B3F0249	06/12/2013	06/12/13 23:46	
Aroclor 1221	ND	1.0	0.07	1	B3F0249	06/12/2013	06/12/13 23:46	
Aroclor 1232	ND	0.50	0.07	1	B3F0249	06/12/2013	06/12/13 23:46	
Aroclor 1242	ND	0.50	0.07	1	B3F0249	06/12/2013	06/12/13 23:46	
Aroclor 1248	ND	0.50	0.07	1	B3F0249	06/12/2013	06/12/13 23:46	
Aroclor 1254	ND	0.50	0.07	1	B3F0249	06/12/2013	06/12/13 23:46	
Aroclor 1260	ND	0.50	0.07	1	B3F0249	06/12/2013	06/12/13 23:46	
Aroclor 1262	ND	0.50	0.07	1	B3F0249	06/12/2013	06/12/13 23:46	
Aroclor 1268	ND	0.50	0.07	1	B3F0249	06/12/2013	06/12/13 23:46	
Surrogate: Decachlorobiphenyl	*106 %*		*39 - 129*		B3F0249	06/12/2013	*06/12/13 23:46*	
Surrogate: Tetrachloro-m-xylene	*90.4 %*		*39 - 123*		B3F0249	06/12/2013	*06/12/13 23:46*	

Volatile Organic Compounds by EPA 8260

Analyst: SL

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:59	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID EB

Lab ID: 1301702-04

Volatile Organic Compounds by EPA 8260 **Analyst: SL**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1-Trichloroethane	ND	0.50	0.25	1	B3F0221	06/12/2013	06/12/13 13:59	
1,1,2,2-Tetrachloroethane	ND	0.50	0.43	1	B3F0221	06/12/2013	06/12/13 13:59	
1,1,2-Trichloroethane	ND	0.50	0.31	1	B3F0221	06/12/2013	06/12/13 13:59	
1,1-Dichloroethane	ND	0.50	0.30	1	B3F0221	06/12/2013	06/12/13 13:59	
1,1-Dichloroethene	ND	0.50	0.33	1	B3F0221	06/12/2013	06/12/13 13:59	
1,1-Dichloropropene	ND	0.50	0.36	1	B3F0221	06/12/2013	06/12/13 13:59	
1,2,3-Trichloropropane	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:59	
1,2,3-Trichlorobenzene	ND	0.50	0.49	1	B3F0221	06/12/2013	06/12/13 13:59	
1,2,4-Trichlorobenzene	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:59	
1,2,4-Trimethylbenzene	ND	0.50	0.30	1	B3F0221	06/12/2013	06/12/13 13:59	
1,2-Dibromo-3-chloropropane	ND	0.50	0.40	1	B3F0221	06/12/2013	06/12/13 13:59	
1,2-Dibromoethane	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:59	
1,2-Dichlorobenzene	ND	0.50	0.44	1	B3F0221	06/12/2013	06/12/13 13:59	
1,2-Dichloroethane	ND	0.50	0.45	1	B3F0221	06/12/2013	06/12/13 13:59	
1,2-Dichloropropane	ND	0.50	0.25	1	B3F0221	06/12/2013	06/12/13 13:59	
1,3,5-Trimethylbenzene	ND	0.50	0.26	1	B3F0221	06/12/2013	06/12/13 13:59	
1,3-Dichlorobenzene	ND	0.50	0.37	1	B3F0221	06/12/2013	06/12/13 13:59	
1,3-Dichloropropane	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:59	
1,4-Dichlorobenzene	ND	0.50	0.34	1	B3F0221	06/12/2013	06/12/13 13:59	
2,2-Dichloropropane	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:59	
2-Chloroethyl vinyl ether	ND	0.50	0.27	1	B3F0221	06/12/2013	06/12/13 13:59	
2-Chlorotoluene	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:59	
4-Chlorotoluene	ND	0.50	0.38	1	B3F0221	06/12/2013	06/12/13 13:59	
4-Isopropyltoluene	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:59	
Benzene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:59	
Bromobenzene	ND	0.50	0.42	1	B3F0221	06/12/2013	06/12/13 13:59	
Bromochloromethane	ND	0.50	0.29	1	B3F0221	06/12/2013	06/12/13 13:59	
Bromodichloromethane	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:59	
Bromoform	ND	0.50	0.37	1	B3F0221	06/12/2013	06/12/13 13:59	
Bromomethane	ND	0.50	0.49	1	B3F0221	06/12/2013	06/12/13 13:59	
Carbon disulfide	ND	1.0	0.30	1	B3F0221	06/12/2013	06/12/13 13:59	
Carbon tetrachloride	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:59	
Chlorobenzene	ND	0.50	0.19	1	B3F0221	06/12/2013	06/12/13 13:59	
Chloroethane	ND	0.50	0.44	1	B3F0221	06/12/2013	06/12/13 13:59	
Chloroform	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:59	
Chloromethane	ND	0.50	0.34	1	B3F0221	06/12/2013	06/12/13 13:59	
cis-1,2-Dichloroethene	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:59	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID EB
Lab ID: 1301702-04

Volatile Organic Compounds by EPA 8260 **Analyst: SL**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
cis-1,3-Dichloropropene	ND	0.50	0.18	1	B3F0221	06/12/2013	06/12/13 13:59	
Di-isopropyl ether	ND	0.50	0.26	1	B3F0221	06/12/2013	06/12/13 13:59	
Dibromochloromethane	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:59	
Dibromomethane	ND	0.50	0.29	1	B3F0221	06/12/2013	06/12/13 13:59	
Dichlorodifluoromethane	ND	0.50	0.37	1	B3F0221	06/12/2013	06/12/13 13:59	
Ethyl Acetate	ND	10	2.0	1	B3F0221	06/12/2013	06/12/13 13:59	
Ethyl Ether	ND	10	2.7	1	B3F0221	06/12/2013	06/12/13 13:59	
Ethyl tert-butyl ether	ND	0.50	0.25	1	B3F0221	06/12/2013	06/12/13 13:59	
Ethylbenzene	ND	0.50	0.17	1	B3F0221	06/12/2013	06/12/13 13:59	
Freon-113	ND	0.50	0.39	1	B3F0221	06/12/2013	06/12/13 13:59	
Hexachlorobutadiene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:59	
Isopropylbenzene	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:59	
m,p-Xylene	ND	1.0	0.43	1	B3F0221	06/12/2013	06/12/13 13:59	
Methylene chloride	ND	1.0	0.30	1	B3F0221	06/12/2013	06/12/13 13:59	
MTBE	ND	0.50	0.26	1	B3F0221	06/12/2013	06/12/13 13:59	
n-Butylbenzene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:59	
n-Propylbenzene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:59	
Naphthalene	ND	0.50	0.35	1	B3F0221	06/12/2013	06/12/13 13:59	
o-Xylene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:59	
sec-Butylbenzene	ND	0.50	0.21	1	B3F0221	06/12/2013	06/12/13 13:59	
Styrene	ND	0.50	0.26	1	B3F0221	06/12/2013	06/12/13 13:59	
tert-Amyl methyl ether	ND	0.50	0.17	1	B3F0221	06/12/2013	06/12/13 13:59	
tert-Butanol	ND	10	4.6	1	B3F0221	06/12/2013	06/12/13 13:59	
tert-Butylbenzene	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:59	
Tetrachloroethene	ND	0.50	0.27	1	B3F0221	06/12/2013	06/12/13 13:59	
Toluene	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:59	
trans-1,2-Dichloroethene	ND	0.50	0.31	1	B3F0221	06/12/2013	06/12/13 13:59	
trans-1,3-Dichloropropene	ND	0.50	0.21	1	B3F0221	06/12/2013	06/12/13 13:59	
Trichloroethene	ND	0.50	0.35	1	B3F0221	06/12/2013	06/12/13 13:59	
Trichlorofluoromethane	ND	0.50	0.41	1	B3F0221	06/12/2013	06/12/13 13:59	
Vinyl acetate	ND	10	1.8	1	B3F0221	06/12/2013	06/12/13 13:59	
Vinyl chloride	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:59	
Surrogate: 1,2-Dichloroethane-d4	*103 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:59*	
Surrogate: 4-Bromofluorobenzene	*87.6 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:59*	
Surrogate: Dibromofluoromethane	*93.3 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:59*	
Surrogate: Toluene-d8	*83.9 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:59*	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID EB

Lab ID: 1301702-04

TPH as Gasoline by LUFT GCMS — **Analyst: SL**

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Gasoline	ND	0.05	0.03	1	B3F0221	06/12/2013	06/12/13 13:59	
Surrogate: 1,2-Dichloroethane-d4	*98.2 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:59*	
Surrogate: 4-Bromofluorobenzene	*93.6 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:59*	
Surrogate: Dibromofluoromethane	*98.8 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:59*	
Surrogate: Toluene-d8	*94.1 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:59*	

Semivolatile Organic Compounds by EPA 8270C — **Analyst: MFR**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,2,4-Trichlorobenzene	ND	10	0.53	1	B3F0198	06/11/2013	06/11/13 16:40	
1,2-Dichlorobenzene	ND	10	0.65	1	B3F0198	06/11/2013	06/11/13 16:40	
1,3-Dichlorobenzene	ND	10	0.56	1	B3F0198	06/11/2013	06/11/13 16:40	
1,4-Dichlorobenzene	ND	10	0.66	1	B3F0198	06/11/2013	06/11/13 16:40	
2,4,5-Trichlorophenol	ND	10	1.2	1	B3F0198	06/11/2013	06/11/13 16:40	
2,4,6-Trichlorophenol	ND	10	3.0	1	B3F0198	06/11/2013	06/11/13 16:40	
2,4-Dichlorophenol	ND	10	2.8	1	B3F0198	06/11/2013	06/11/13 16:40	
2,4-Dimethylphenol	ND	10	2.8	1	B3F0198	06/11/2013	06/11/13 16:40	
2,4-Dinitrophenol	ND	50	3.5	1	B3F0198	06/11/2013	06/11/13 16:40	
2,4-Dinitrotoluene	ND	10	0.83	1	B3F0198	06/11/2013	06/11/13 16:40	
2,6-Dinitrotoluene	ND	10	0.70	1	B3F0198	06/11/2013	06/11/13 16:40	
2-Chloronaphthalene	ND	10	0.50	1	B3F0198	06/11/2013	06/11/13 16:40	
2-Chlorophenol	ND	10	2.5	1	B3F0198	06/11/2013	06/11/13 16:40	
2-Methylnaphthalene	ND	10	0.56	1	B3F0198	06/11/2013	06/11/13 16:40	
2-Methylphenol	ND	10	8.2	1	B3F0198	06/11/2013	06/11/13 16:40	
2-Nitroaniline	ND	50	0.81	1	B3F0198	06/11/2013	06/11/13 16:40	
2-Nitrophenol	ND	10	3.0	1	B3F0198	06/11/2013	06/11/13 16:40	
3,3´-Dichlorobenzidine	ND	20	7.8	1	B3F0198	06/11/2013	06/11/13 16:40	
3-Nitroaniline	ND	50	0.74	1	B3F0198	06/11/2013	06/11/13 16:40	
4,6-Dinitro-2-methyphenol	ND	50	3.5	1	B3F0198	06/11/2013	06/11/13 16:40	
4-Bromophenyl-phenylether	ND	10	0.54	1	B3F0198	06/11/2013	06/11/13 16:40	
4-Chloro-3-methylphenol	ND	50	2.9	1	B3F0198	06/11/2013	06/11/13 16:40	
4-Chloroaniline	ND	20	0.49	1	B3F0198	06/11/2013	06/11/13 16:40	
4-Chlorophenyl-phenylether	ND	10	0.59	1	B3F0198	06/11/2013	06/11/13 16:40	
4-Methylphenol	ND	10	0.55	1	B3F0198	06/11/2013	06/11/13 16:40	
4-Nitroaniline	ND	20	0.76	1	B3F0198	06/11/2013	06/11/13 16:40	
4-Nitrophenol	ND	50	2.1	1	B3F0198	06/11/2013	06/11/13 16:40	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID EB

Lab ID: 1301702-04

Semivolatile Organic Compounds by EPA 8270C **Analyst: MFR**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Acenaphthene	ND	10	0.72	1	B3F0198	06/11/2013	06/11/13 16:40	
Acenaphthylene	ND	10	0.52	1	B3F0198	06/11/2013	06/11/13 16:40	
Anthracene	ND	10	0.54	1	B3F0198	06/11/2013	06/11/13 16:40	
Benzidine (M)	ND	50	9.8	1	B3F0198	06/11/2013	06/11/13 16:40	
Benzo(a)anthracene	ND	10	0.54	1	B3F0198	06/11/2013	06/11/13 16:40	
Benzo(a)pyrene	ND	10	1.8	1	B3F0198	06/11/2013	06/11/13 16:40	
Benzo(b)fluoranthene	ND	10	0.58	1	B3F0198	06/11/2013	06/11/13 16:40	
Benzo(g,h,i)perylene	ND	10	0.76	1	B3F0198	06/11/2013	06/11/13 16:40	
Benzo(k)fluoranthene	ND	10	0.62	1	B3F0198	06/11/2013	06/11/13 16:40	
Benzoic acid	ND	50	32	1	B3F0198	06/11/2013	06/11/13 16:40	
Benzyl alcohol	ND	20	0.51	1	B3F0198	06/11/2013	06/11/13 16:40	
bis(2-chloroethoxy)methane	ND	10	0.58	1	B3F0198	06/11/2013	06/11/13 16:40	
bis(2-Chloroethyl)ether	ND	10	2.1	1	B3F0198	06/11/2013	06/11/13 16:40	
bis(2-chloroisopropyl)ether	ND	10	2.5	1	B3F0198	06/11/2013	06/11/13 16:40	
bis(2-ethylhexyl)phthalate	ND	10	0.63	1	B3F0198	06/11/2013	06/11/13 16:40	
Butylbenzylphthalate	ND	10	0.56	1	B3F0198	06/11/2013	06/11/13 16:40	
Chrysene	ND	10	0.56	1	B3F0198	06/11/2013	06/11/13 16:40	
Di-n-butylphthalate	ND	10	0.70	1	B3F0198	06/11/2013	06/11/13 16:40	
Di-n-octylphthalate	ND	10	0.58	1	B3F0198	06/11/2013	06/11/13 16:40	
Dibenz(a,h)anthracene	ND	10	0.72	1	B3F0198	06/11/2013	06/11/13 16:40	
Dibenzofuran	ND	10	0.61	1	B3F0198	06/11/2013	06/11/13 16:40	
Diethyl phthalate	ND	10	0.55	1	B3F0198	06/11/2013	06/11/13 16:40	
Dimethyl phthalate	ND	10	0.63	1	B3F0198	06/11/2013	06/11/13 16:40	
Fluoranthene	ND	10	0.56	1	B3F0198	06/11/2013	06/11/13 16:40	
Fluorene	ND	10	0.53	1	B3F0198	06/11/2013	06/11/13 16:40	
Hexachlorobenzene	ND	10	0.78	1	B3F0198	06/11/2013	06/11/13 16:40	
Hexachlorobutadiene	ND	20	0.56	1	B3F0198	06/11/2013	06/11/13 16:40	
Hexachlorocyclopentadiene	ND	10	0.67	1	B3F0198	06/11/2013	06/11/13 16:40	
Hexachloroethane	ND	10	0.69	1	B3F0198	06/11/2013	06/11/13 16:40	
Indeno(1,2,3-cd)pyrene	ND	10	1.5	1	B3F0198	06/11/2013	06/11/13 16:40	
Isophorone	ND	10	0.60	1	B3F0198	06/11/2013	06/11/13 16:40	
N-Nitroso-di-n propylamine	ND	10	0.72	1	B3F0198	06/11/2013	06/11/13 16:40	
N-Nitrosodiphenylamine	ND	10	0.57	1	B3F0198	06/11/2013	06/11/13 16:40	
Naphthalene	ND	10	0.46	1	B3F0198	06/11/2013	06/11/13 16:40	
Nitrobenzene	ND	10	0.65	1	B3F0198	06/11/2013	06/11/13 16:40	
Pentachlorophenol	ND	50	3.2	1	B3F0198	06/11/2013	06/11/13 16:40	
Phenanthrene	ND	10	0.56	1	B3F0198	06/11/2013	06/11/13 16:40	

Certificate of Analysis

Stantec		Project Number :	Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200		Report To :	Kelly Brown
Long Beach , CA 90808		Reported :	06/21/2013

Client Sample ID EB

Lab ID: 1301702-04

Semivolatile Organic Compounds by EPA 8270C **Analyst: MFR**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Phenol	ND	10	2.1	1	B3F0198	06/11/2013	06/11/13 16:40	
Pyrene	ND	10	0.57	1	B3F0198	06/11/2013	06/11/13 16:40	
Pyridine	ND	50	14	1	B3F0198	06/11/2013	06/11/13 16:40	
Surrogate: 1,2-Dichlorobenzene-d4	*80.2 %*	*36 - 117*			B3F0198	06/11/2013	*06/11/13 16:40*	
Surrogate: 2,4,6-Tribromophenol	*93.3 %*	*33 - 149*			B3F0198	06/11/2013	*06/11/13 16:40*	
Surrogate: 2-Chlorophenol-d4	*70.0 %*	*37 - 99*			B3F0198	06/11/2013	*06/11/13 16:40*	
Surrogate: 2-Fluorobiphenyl	*84.1 %*	*52 - 126*			B3F0198	06/11/2013	*06/11/13 16:40*	
Surrogate: 2-Fluorophenol	*43.8 %*	*17 - 69*			B3F0198	06/11/2013	*06/11/13 16:40*	
Surrogate: 4-Terphenyl-d14	*90.7 %*	*40 - 165*			B3F0198	06/11/2013	*06/11/13 16:40*	
Surrogate: Nitrobenzene-d5	*87.6 %*	*38 - 117*			B3F0198	06/11/2013	*06/11/13 16:40*	
Surrogate: Phenol-d5	*33.2 %*	*5 - 60*			B3F0198	06/11/2013	*06/11/13 16:40*	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID TB

Lab ID: 1301702-05

Volatile Organic Compounds by EPA 8260 **Analyst: SL**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
1,1,1,2-Tetrachloroethane	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:36	
1,1,1-Trichloroethane	ND	0.50	0.25	1	B3F0221	06/12/2013	06/12/13 13:36	
1,1,2,2-Tetrachloroethane	ND	0.50	0.43	1	B3F0221	06/12/2013	06/12/13 13:36	
1,1,2-Trichloroethane	ND	0.50	0.31	1	B3F0221	06/12/2013	06/12/13 13:36	
1,1-Dichloroethane	ND	0.50	0.30	1	B3F0221	06/12/2013	06/12/13 13:36	
1,1-Dichloroethene	ND	0.50	0.33	1	B3F0221	06/12/2013	06/12/13 13:36	
1,1-Dichloropropene	ND	0.50	0.36	1	B3F0221	06/12/2013	06/12/13 13:36	
1,2,3-Trichloropropane	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:36	
1,2,3-Trichlorobenzene	ND	0.50	0.49	1	B3F0221	06/12/2013	06/12/13 13:36	
1,2,4-Trichlorobenzene	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:36	
1,2,4-Trimethylbenzene	ND	0.50	0.30	1	B3F0221	06/12/2013	06/12/13 13:36	
1,2-Dibromo-3-chloropropane	ND	0.50	0.40	1	B3F0221	06/12/2013	06/12/13 13:36	
1,2-Dibromoethane	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:36	
1,2-Dichlorobenzene	ND	0.50	0.44	1	B3F0221	06/12/2013	06/12/13 13:36	
1,2-Dichloroethane	ND	0.50	0.45	1	B3F0221	06/12/2013	06/12/13 13:36	
1,2-Dichloropropane	ND	0.50	0.25	1	B3F0221	06/12/2013	06/12/13 13:36	
1,3,5-Trimethylbenzene	ND	0.50	0.26	1	B3F0221	06/12/2013	06/12/13 13:36	
1,3-Dichlorobenzene	ND	0.50	0.37	1	B3F0221	06/12/2013	06/12/13 13:36	
1,3-Dichloropropane	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:36	
1,4-Dichlorobenzene	ND	0.50	0.34	1	B3F0221	06/12/2013	06/12/13 13:36	
2,2-Dichloropropane	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:36	
2-Chloroethyl vinyl ether	ND	0.50	0.27	1	B3F0221	06/12/2013	06/12/13 13:36	
2-Chlorotoluene	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:36	
4-Chlorotoluene	ND	0.50	0.38	1	B3F0221	06/12/2013	06/12/13 13:36	
4-Isopropyltoluene	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:36	
Benzene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:36	
Bromobenzene	ND	0.50	0.42	1	B3F0221	06/12/2013	06/12/13 13:36	
Bromochloromethane	ND	0.50	0.29	1	B3F0221	06/12/2013	06/12/13 13:36	
Bromodichloromethane	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:36	
Bromoform	ND	0.50	0.37	1	B3F0221	06/12/2013	06/12/13 13:36	
Bromomethane	ND	0.50	0.49	1	B3F0221	06/12/2013	06/12/13 13:36	
Carbon disulfide	ND	1.0	0.30	1	B3F0221	06/12/2013	06/12/13 13:36	
Carbon tetrachloride	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:36	
Chlorobenzene	ND	0.50	0.19	1	B3F0221	06/12/2013	06/12/13 13:36	
Chloroethane	ND	0.50	0.44	1	B3F0221	06/12/2013	06/12/13 13:36	
Chloroform	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:36	
Chloromethane	ND	0.50	0.34	1	B3F0221	06/12/2013	06/12/13 13:36	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID TB
Lab ID: 1301702-05

Volatile Organic Compounds by EPA 8260 **Analyst: SL**

Analyte	Result (ug/L)	PQL (ug/L)	MDL (ug/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
cis-1,2-Dichloroethene	ND	0.50	0.32	1	B3F0221	06/12/2013	06/12/13 13:36	
cis-1,3-Dichloropropene	ND	0.50	0.18	1	B3F0221	06/12/2013	06/12/13 13:36	
Di-isopropyl ether	ND	0.50	0.26	1	B3F0221	06/12/2013	06/12/13 13:36	
Dibromochloromethane	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:36	
Dibromomethane	ND	0.50	0.29	1	B3F0221	06/12/2013	06/12/13 13:36	
Dichlorodifluoromethane	ND	0.50	0.37	1	B3F0221	06/12/2013	06/12/13 13:36	
Ethyl Acetate	ND	10	2.0	1	B3F0221	06/12/2013	06/12/13 13:36	
Ethyl Ether	ND	10	2.7	1	B3F0221	06/12/2013	06/12/13 13:36	
Ethyl tert-butyl ether	ND	0.50	0.25	1	B3F0221	06/12/2013	06/12/13 13:36	
Ethylbenzene	ND	0.50	0.17	1	B3F0221	06/12/2013	06/12/13 13:36	
Freon-113	ND	0.50	0.39	1	B3F0221	06/12/2013	06/12/13 13:36	
Hexachlorobutadiene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:36	
Isopropylbenzene	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:36	
m,p-Xylene	ND	1.0	0.43	1	B3F0221	06/12/2013	06/12/13 13:36	
Methylene chloride	**0.79**	1.0	0.30	1	B3F0221	06/12/2013	06/12/13 13:36	J
MTBE	ND	0.50	0.26	1	B3F0221	06/12/2013	06/12/13 13:36	
n-Butylbenzene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:36	
n-Propylbenzene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:36	
Naphthalene	ND	0.50	0.35	1	B3F0221	06/12/2013	06/12/13 13:36	
o-Xylene	ND	0.50	0.23	1	B3F0221	06/12/2013	06/12/13 13:36	
sec-Butylbenzene	ND	0.50	0.21	1	B3F0221	06/12/2013	06/12/13 13:36	
Styrene	ND	0.50	0.26	1	B3F0221	06/12/2013	06/12/13 13:36	
tert-Amyl methyl ether	ND	0.50	0.17	1	B3F0221	06/12/2013	06/12/13 13:36	
tert-Butanol	ND	10	4.6	1	B3F0221	06/12/2013	06/12/13 13:36	
tert-Butylbenzene	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:36	
Tetrachloroethene	ND	0.50	0.27	1	B3F0221	06/12/2013	06/12/13 13:36	
Toluene	ND	0.50	0.20	1	B3F0221	06/12/2013	06/12/13 13:36	
trans-1,2-Dichloroethene	ND	0.50	0.31	1	B3F0221	06/12/2013	06/12/13 13:36	
trans-1,3-Dichloropropene	ND	0.50	0.21	1	B3F0221	06/12/2013	06/12/13 13:36	
Trichloroethene	ND	0.50	0.35	1	B3F0221	06/12/2013	06/12/13 13:36	
Trichlorofluoromethane	ND	0.50	0.41	1	B3F0221	06/12/2013	06/12/13 13:36	
Vinyl acetate	ND	10	1.8	1	B3F0221	06/12/2013	06/12/13 13:36	
Vinyl chloride	ND	0.50	0.28	1	B3F0221	06/12/2013	06/12/13 13:36	
Surrogate: 1,2-Dichloroethane-d4	*109 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 13:36*	
Surrogate: 4-Bromofluorobenzene	*92.4 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 13:36*	
Surrogate: Dibromofluoromethane	*97.4 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 13:36*	
Surrogate: Toluene-d8	*88.6 %*	*70 - 130*			B3F0221	06/12/2013	*06/12/13 13:36*	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Client Sample ID TB

Lab ID: 1301702-05

TPH as Gasoline by LUFT GCMS **Analyst: SL**

Analyte	Result (mg/L)	PQL (mg/L)	MDL (mg/L)	Dilution	Batch	Prepared	Date/Time Analyzed	Notes
Gasoline	ND	0.05	0.03	1	B3F0221	06/12/2013	06/12/13 13:36	
Surrogate: 1,2-Dichloroethane-d4	*103 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:36*	
Surrogate: 4-Bromofluorobenzene	*97.7 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:36*	
Surrogate: Dibromofluoromethane	*103 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:36*	
Surrogate: Toluene-d8	*98.9 %*		*70 - 130*		B3F0221	06/12/2013	*06/12/13 13:36*	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

QUALITY CONTROL SECTION

Total Suspended Solids (Residue, Non-Filtrable) by SM 2540D - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0272 - No_Prep_WC_1									
Blank (B3F0272-BLK1)				Prepared: 6/13/2013 Analyzed: 6/13/2013					
Residue, Suspended	ND	10			NR				
LCS (B3F0272-BS1)				Prepared: 6/13/2013 Analyzed: 6/13/2013					
Residue, Suspended	96.0000	10	96.6000		99.4	80 - 120			
Duplicate (B3F0272-DUP1)		**Source: 1301726-08**		Prepared: 6/13/2013 Analyzed: 6/13/2013					
Residue, Suspended	184.000	10		185.000	NR		0.542	10	

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

pH by SM 4500H+B - Quality Control

Analyte	Result (pH Units)	PQL (pH Units)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0218 - No Prep-Sample Control									
Duplicate (B3F0218-DUP1)		**Source: 1301702-02**		Prepared: 6/10/2013 Analyzed: 6/10/2013					
pH	7.17000	0.10		7.16000	NR		0.140	10	H1

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Dissolved Metals by ICP-AES EPA 6010B - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0323 - EPA 3010A									
Blank (B3F0323-BLK1)				Prepared: 6/15/2013 Analyzed: 6/17/2013					
Antimony	ND	0.0050			NR				
Arsenic	ND	0.010			NR				
Barium	ND	0.0030			NR				
Beryllium	ND	0.0030			NR				
Cadmium	ND	0.0030			NR				
Chromium	ND	0.0030			NR				
Cobalt	ND	0.0030			NR				
Copper	ND	0.0050			NR				
Lead	0.004000	0.0050			NR				J
Molybdenum	ND	0.0050			NR				
Nickel	ND	0.0050			NR				
Selenium	ND	0.010			NR				
Silver	ND	0.0030			NR				
Thallium	ND	0.015			NR				
Vanadium	ND	0.0030			NR				
Zinc	ND	0.010			NR				
LCS (B3F0323-BS1)				Prepared: 6/15/2013 Analyzed: 6/17/2013					
Antimony	1.03744	0.0050	1.00000		104	80 - 120			
Arsenic	0.998663	0.010	1.00000		99.9	80 - 120			
Barium	1.00613	0.0030	1.00000		101	80 - 120			
Beryllium	1.08731	0.0030	1.00000		109	80 - 120			
Cadmium	1.00592	0.0030	1.00000		101	80 - 120			
Chromium	1.03750	0.0030	1.00000		104	80 - 120			
Cobalt	1.03754	0.0030	1.00000		104	80 - 120			
Copper	1.05550	0.0050	1.00000		106	80 - 120			
Lead	1.04350	0.0050	1.00000		104	80 - 120			
Molybdenum	1.04745	0.0050	1.00000		105	80 - 120			
Nickel	1.02353	0.0050	1.00000		102	80 - 120			
Selenium	0.971521	0.010	1.00000		97.2	80 - 120			
Silver	1.00878	0.0030	1.00000		101	80 - 120			
Thallium	1.09662	0.015	1.00000		110	80 - 120			
Vanadium	1.03053	0.0030	1.00000		103	80 - 120			
Zinc	1.06170	0.010	1.00000		106	80 - 120			
LCS Dup (B3F0323-BSD1)				Prepared: 6/15/2013 Analyzed: 6/17/2013					
Antimony	1.05686	0.0050	1.00000		106	80 - 120	1.85	20	
Arsenic	1.00796	0.010	1.00000		101	80 - 120	0.926	20	
Barium	1.01853	0.0030	1.00000		102	80 - 120	1.22	20	
Beryllium	1.08495	0.0030	1.00000		108	80 - 120	0.218	20	
Cadmium	1.01642	0.0030	1.00000		102	80 - 120	1.04	20	
Chromium	1.04040	0.0030	1.00000		104	80 - 120	0.280	20	

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Dissolved Metals by ICP-AES EPA 6010B - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0323 - EPA 3010A (continued)									
LCS Dup (B3F0323-BSD1) - Continued				Prepared: 6/15/2013 Analyzed: 6/17/2013					
Cobalt	1.04721	0.0030	1.00000		105	80 - 120	0.927	20	
Copper	1.06162	0.0050	1.00000		106	80 - 120	0.578	20	
Lead	1.05420	0.0050	1.00000		105	80 - 120	1.02	20	
Molybdenum	1.05790	0.0050	1.00000		106	80 - 120	0.993	20	
Nickel	1.03011	0.0050	1.00000		103	80 - 120	0.640	20	
Selenium	0.990385	0.010	1.00000		99.0	80 - 120	1.92	20	
Silver	1.01200	0.0030	1.00000		101	80 - 120	0.319	20	
Thallium	1.09972	0.015	1.00000		110	80 - 120	0.282	20	
Vanadium	1.03686	0.0030	1.00000		104	80 - 120	0.612	20	
Zinc	1.07155	0.010	1.00000		107	80 - 120	0.923	20	
Duplicate (B3F0323-DUP1)		**Source: 1301702-02**		Prepared: 6/15/2013 Analyzed: 6/17/2013					
Antimony	0.004538	0.0062		0.009792	NR		73.3	20	J, R
Arsenic	0.011582	0.012		ND	NR			20	J
Barium	1.01120	0.0038		1.07684	NR		6.29	20	
Beryllium	ND	0.0038		ND	NR			20	
Cadmium	ND	0.0038		ND	NR			20	
Chromium	0.003241	0.0038		0.004747	NR		37.7	20	J, R
Cobalt	0.000562	0.0038		0.000796	NR		34.6	20	R, J
Copper	0.019047	0.0062		0.020076	NR		5.26	20	
Lead	ND	0.0062		0.004305	NR			20	
Molybdenum	0.053096	0.0062		0.054678	NR		2.94	20	
Nickel	0.006215	0.0062		0.006666	NR		7.00	20	J
Selenium	ND	0.012		ND	NR			20	
Silver	ND	0.0038		ND	NR			20	
Thallium	0.023827	0.019		0.021173	NR		11.8	20	
Vanadium	0.053497	0.0038		0.056665	NR		5.75	20	
Zinc	0.035684	0.012		0.044990	NR		23.1	20	R

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Mercury by AA (Cold Vapor) EPA 7471 - Quality Control

Analyte	Result (mg/kg)	PQL (mg/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0265 - EPA 7471									
Blank (B3F0265-BLK1)				Prepared: 6/13/2013 Analyzed: 6/13/2013					
Mercury	ND	0.10			NR				
LCS (B3F0265-BS1)				Prepared: 6/13/2013 Analyzed: 6/13/2013					
Mercury	0.878287	0.10	0.833333		105	80 - 120			
Duplicate (B3F0265-DUP1)		**Source: 1301683-01**		Prepared: 6/13/2013 Analyzed: 6/13/2013					
Mercury	0.182646	0.10		0.181728	NR		0.504	20	
Matrix Spike (B3F0265-MS1)		**Source: 1301683-01**		Prepared: 6/13/2013 Analyzed: 6/13/2013					
Mercury	1.16286	0.10	0.833333	0.181728	118	70 - 130			
Matrix Spike Dup (B3F0265-MSD1)		**Source: 1301683-01**		Prepared: 6/13/2013 Analyzed: 6/13/2013					
Mercury	1.15810	0.10	0.833333	0.181728	117	70 - 130	0.411	20	
Post Spike (B3F0265-PS1)		**Source: 1301683-01**		Prepared: 6/13/2013 Analyzed: 6/13/2013					
Mercury	0.007990		5.00000E-3	0.002181	116	70 - 130			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Dissolved Mercury by AA (Cold Vapor) by EPA 7470 - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0305 - EPA 245.1/7470									
Blank (B3F0305-BLK1)				Prepared: 6/14/2013 Analyzed: 6/14/2013					
Mercury	ND	0.20			NR				
LCS (B3F0305-BS1)				Prepared: 6/14/2013 Analyzed: 6/14/2013					
Mercury	10.5976	0.20	10.0000		106	80 - 120			
LCS Dup (B3F0305-BSD1)				Prepared: 6/14/2013 Analyzed: 6/14/2013					
Mercury	10.4046	0.20	10.0000		104	80 - 120	1.84	20	
Post Spike (B3F0305-PS1)		**Source: 1301702-03**		Prepared: 6/14/2013 Analyzed: 6/14/2013					
Mercury	5.01814		5.00000	-0.010930	101	70 - 130			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Diesel Range Organics by EPA 8015B - Quality Control

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0219 - GCSEMI_DRO									
Blank (B3F0219-BLK1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
DRO	ND	0.05			NR				
ORO	ND	0.05			NR				
Surrogate: p-Terphenyl	*0.07310*		*8.00000E-2*		*91.4*	*38 - 151*			
LCS (B3F0219-BS1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
DRO	0.857690	0.05	1.00000		85.8	50 - 121			
Surrogate: p-Terphenyl	*0.06305*		*8.00000E-2*		*78.8*	*38 - 151*			
LCS Dup (B3F0219-BSD1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
DRO	0.873750	0.05	1.00000		87.4	50 - 121	1.86	20	
Surrogate: p-Terphenyl	*0.07306*		*8.00000E-2*		*91.3*	*38 - 151*			
Batch B3F0238 - GCSEMI_DRO_SOIL_LL									
Blank (B3F0238-BLK1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
DRO	ND	1.0			NR				
ORO	ND	1.0			NR				
Surrogate: p-Terphenyl	*2.727*		*2.66667*		*102*	*33 - 147*			
LCS (B3F0238-BS1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
DRO	33.1897	1.0	33.3333		99.6	43 - 120			
Surrogate: p-Terphenyl	*2.839*		*2.66667*		*106*	*33 - 147*			
Duplicate (B3F0238-DUP1)		**Source: 1301702-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
DRO	7.23000	5.0		9.50833	NR		27.2	20	R
Surrogate: p-Terphenyl	*2.045*		*2.66667*		*76.7*	*33 - 147*			
Matrix Spike (B3F0238-MS1)		**Source: 1301702-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
DRO	36.4067	5.0	33.3333	9.50833	80.7	17 - 112			
Surrogate: p-Terphenyl	*2.405*		*2.66667*		*90.2*	*33 - 147*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Diesel Range Organics by EPA 8015B - Quality Control (cont'd)

Analyte	Result (mg/kg)	PQL (mg/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0238 - GCSEMI_DRO_SOIL_LL (continued)									
Matrix Spike Dup (B3F0238-MSD1)		**Source: 1301702-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
DRO	31.0083	5.0	33.3333	9.50833	64.5	17 - 112	16.0	20	
Surrogate: p-Terphenyl	*2.095*		*2.66667*		*78.6*	*33 - 147*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Polychlorinated Biphenyls by EPA 8082 - Quality Control

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0214 - GCSEMI_PCB/PEST									
Blank (B3F0214-BLK1)				Prepared: 6/11/2013 Analyzed: 6/11/2013					
Aroclor 1016	ND	16			NR				
Aroclor 1221	ND	16			NR				
Aroclor 1232	ND	16			NR				
Aroclor 1242	ND	16			NR				
Aroclor 1248	ND	16			NR				
Aroclor 1254	ND	16			NR				
Aroclor 1260	ND	16			NR				
Aroclor 1262	ND	16			NR				
Aroclor 1268	ND	16			NR				
Surrogate: Decachlorobiphenyl	*13.14*		*16.6667*		*78.8*	*39 - 128*			
Surrogate: Tetrachloro-m-xylene	*16.00*		*16.6667*		*96.0*	*38 - 122*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Polychlorinated Biphenyls by EPA 8082 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0214 - GCSEMI_PCB/PEST (continued)									
LCS (B3F0214-BS1)				Prepared: 6/11/2013 Analyzed: 6/11/2013					
Aroclor 1016	144.548	16	166.667		86.7	64 - 100			
Aroclor 1260	140.856	16	166.667		84.5	68 - 100			
Surrogate: Decachlorobiphenyl	*13.55*		*16.6667*		*81.3*	*39 - 128*			
Surrogate: Tetrachloro-m-xylene	*15.97*		*16.6667*		*95.8*	*38 - 122*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Polychlorinated Biphenyls by EPA 8082 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0214 - GCSEMI_PCB/PEST (continued)									
Duplicate (B3F0214-DUP1)		**Source: 1301702-01**		Prepared: 6/11/2013 Analyzed: 6/11/2013					
Aroclor 1016	ND	16		ND	NR			20	
Aroclor 1260	ND	16		ND	NR			20	
Surrogate: Decachlorobiphenyl	*14.28*		*16.6667*		*85.7*	*39 - 128*			
Surrogate: Tetrachloro-m-xylene	*16.39*		*16.6667*		*98.3*	*38 - 122*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Polychlorinated Biphenyls by EPA 8082 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0214 - GCSEMI_PCB/PEST (continued)									
Matrix Spike (B3F0214-MS1)		**Source: 1301710-09**		Prepared: 6/11/2013 Analyzed: 6/11/2013					
Aroclor 1016	155.814	16	166.667	ND	93.5	48 - 126			
Aroclor 1260	158.800	16	166.667	ND	95.3	46 - 130			
Surrogate: Decachlorobiphenyl	*15.82*		*16.6667*		*94.9*	*39 - 128*			
Surrogate: Tetrachloro-m-xylene	*17.19*		*16.6667*		*103*	*38 - 122*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Polychlorinated Biphenyls by EPA 8082 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0214 - GCSEMI_PCB/PEST (continued)									
Matrix Spike Dup (B3F0214-MSD1)		**Source: 1301710-09**		Prepared: 6/11/2013 Analyzed: 6/11/2013					
Aroclor 1016	153.164	16	166.667	ND	91.9	48 - 126	1.72	20	
Aroclor 1260	154.871	16	166.667	ND	92.9	46 - 130	2.51	20	
Surrogate: Decachlorobiphenyl	*15.81*		*16.6667*		*94.9*	*39 - 128*			
Surrogate: Tetrachloro-m-xylene	*16.99*		*16.6667*		*102*	*38 - 122*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Polychlorinated Biphenyls by EPA 8082 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0249 - GCSEMI_PCB/PEST									
Blank (B3F0249-BLK1)					Prepared: 6/12/2013 Analyzed: 6/12/2013				
Aroclor 1016	ND	0.50			NR				
Aroclor 1221	ND	1.0			NR				
Aroclor 1232	ND	0.50			NR				
Aroclor 1242	ND	0.50			NR				
Aroclor 1248	ND	0.50			NR				
Aroclor 1254	ND	0.50			NR				
Aroclor 1260	ND	0.50			NR				
Aroclor 1262	ND	0.50			NR				
Aroclor 1268	ND	0.50			NR				
Surrogate: Decachlorobiphenyl	*0.4716*		*0.500000*		*94.3*	*39 - 129*			
Surrogate: Tetrachloro-m-xylene	*0.4704*		*0.500000*		*94.1*	*39 - 123*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Polychlorinated Biphenyls by EPA 8082 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0249 - GCSEMI_PCB/PEST (continued)									
LCS (B3F0249-BS1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
Aroclor 1016	4.18328	0.50	5.00000		83.7	64 - 102			
Aroclor 1260	4.42300	0.50	5.00000		88.5	68 - 100			
Surrogate: Decachlorobiphenyl	*0.4729*		*0.500000*		*94.6*	*39 - 129*			
Surrogate: Tetrachloro-m-xylene	*0.4541*		*0.500000*		*90.8*	*39 - 123*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Polychlorinated Biphenyls by EPA 8082 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0249 - GCSEMI_PCB/PEST (continued)									
LCS Dup (B3F0249-BSD1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
Aroclor 1016	4.18287	0.50	5.00000		83.7	64 - 102	0.00980	20	
Aroclor 1260	4.37900	0.50	5.00000		87.6	68 - 100	1.00	20	
Surrogate: Decachlorobiphenyl	*0.4700*		*0.500000*		*94.0*	*39 - 129*			
Surrogate: Tetrachloro-m-xylene	*0.4562*		*0.500000*		*91.2*	*39 - 123*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS									
Blank (B3F0220-BLK1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1,1,2-Tetrachloroethane	ND	5.0			NR				
1,1,1-Trichloroethane	ND	5.0			NR				
1,1,2,2-Tetrachloroethane	ND	5.0			NR				
1,1,2-Trichloroethane	ND	5.0			NR				
1,1-Dichloroethane	ND	5.0			NR				
1,1-Dichloroethene	ND	5.0			NR				
1,1-Dichloropropene	ND	5.0			NR				
1,2,3-Trichloropropane	ND	5.0			NR				
1,2,3-Trichlorobenzene	ND	5.0			NR				
1,2,4-Trichlorobenzene	ND	5.0			NR				
1,2,4-Trimethylbenzene	ND	5.0			NR				
1,2-Dibromo-3-chloropropane	ND	10			NR				
1,2-Dibromoethane	ND	5.0			NR				
1,2-Dichlorobenzene	ND	5.0			NR				
1,2-Dichloroethane	ND	5.0			NR				
1,2-Dichloropropane	ND	5.0			NR				
1,3,5-Trimethylbenzene	ND	5.0			NR				
1,3-Dichlorobenzene	ND	5.0			NR				
1,3-Dichloropropane	ND	5.0			NR				
1,4-Dichlorobenzene	ND	5.0			NR				
2,2-Dichloropropane	ND	5.0			NR				
2-Chlorotoluene	ND	5.0			NR				
4-Chlorotoluene	ND	5.0			NR				
4-Isopropyltoluene	ND	5.0			NR				
Benzene	ND	5.0			NR				
Bromobenzene	ND	5.0			NR				
Bromochloromethane	ND	5.0			NR				
Bromodichloromethane	ND	5.0			NR				
Bromoform	ND	5.0			NR				
Bromomethane	ND	5.0			NR				
Carbon disulfide	ND	5.0			NR				
Carbon tetrachloride	ND	5.0			NR				
Chlorobenzene	ND	5.0			NR				
Chloroethane	ND	5.0			NR				
Chloroform	ND	5.0			NR				
Chloromethane	ND	5.0			NR				
cis-1,2-Dichloroethene	ND	5.0			NR				
cis-1,3-Dichloropropene	ND	5.0			NR				
Di-isopropyl ether	ND	5.0			NR				
Dibromochloromethane	ND	5.0			NR				
Dibromomethane	ND	5.0			NR				

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
Blank (B3F0220-BLK1) - Continued				Prepared: 6/12/2013 Analyzed: 6/12/2013					
Dichlorodifluoromethane	ND	5.0			NR				
Ethyl Acetate	ND	50			NR				
Ethyl Ether	ND	50			NR				
Ethyl tert-butyl ether	ND	5.0			NR				
Ethylbenzene	ND	5.0			NR				
Freon-113	ND	5.0			NR				
Hexachlorobutadiene	ND	5.0			NR				
Isopropylbenzene	ND	5.0			NR				
m,p-Xylene	ND	10			NR				
Methylene chloride	ND	5.0			NR				
MTBE	ND	5.0			NR				
n-Butylbenzene	ND	5.0			NR				
n-Propylbenzene	ND	5.0			NR				
Naphthalene	ND	5.0			NR				
o-Xylene	ND	5.0			NR				
sec-Butylbenzene	ND	5.0			NR				
Styrene	ND	5.0			NR				
tert-Amyl methyl ether	ND	5.0			NR				
tert-Butanol	ND	100			NR				
tert-Butylbenzene	ND	5.0			NR				
Tetrachloroethene	ND	5.0			NR				
Toluene	ND	5.0			NR				
trans-1,2-Dichloroethene	ND	5.0			NR				
trans-1,3-Dichloropropene	ND	5.0			NR				
Trichloroethene	ND	5.0			NR				
Trichlorofluoromethane	ND	5.0			NR				
Vinyl acetate	ND	50			NR				
Vinyl chloride	ND	5.0			NR				
Surrogate: 1,2-Dichloroethane-d4	*41.65*		*50.0000*		*83.3*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*47.97*		*50.0000*		*95.9*	*70 - 130*			
Surrogate: Dibromofluoromethane	*49.73*		*50.0000*		*99.5*	*70 - 130*			
Surrogate: Toluene-d8	*53.61*		*50.0000*		*107*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
LCS (B3F0220-BS1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1-Dichloroethene	45.3500	5.0	50.0000		90.7	70 - 130			
Benzene	103.010	5.0	100.000		103	70 - 130			
Chlorobenzene	50.9500	5.0	50.0000		102	70 - 130			
MTBE	49.7200	5.0	50.0000		99.4	70 - 130			
Toluene	104.850	5.0	100.000		105	70 - 130			
Trichloroethene	51.3600	5.0	50.0000		103	70 - 130			
Surrogate: 1,2-Dichloroethane-d4	*47.74*		*50.0000*		*95.5*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*50.06*		*50.0000*		*100*	*70 - 130*			
Surrogate: Dibromofluoromethane	*49.44*		*50.0000*		*98.9*	*70 - 130*			
Surrogate: Toluene-d8	*54.18*		*50.0000*		*108*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
LCS Dup (B3F0220-BSD1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1-Dichloroethene	47.0600	5.0	50.0000		94.1	70 - 130	3.70	20	
Benzene	104.940	5.0	100.000		105	70 - 130	1.86	20	
Chlorobenzene	50.8100	5.0	50.0000		102	70 - 130	0.275	20	
MTBE	49.7600	5.0	50.0000		99.5	70 - 130	0.0804	20	
Toluene	105.960	5.0	100.000		106	70 - 130	1.05	20	
Trichloroethene	52.7000	5.0	50.0000		105	70 - 130	2.58	20	
Surrogate: 1,2-Dichloroethane-d4	*48.84*		*50.0000*		*97.7*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*50.03*		*50.0000*		*100*	*70 - 130*			
Surrogate: Dibromofluoromethane	*51.93*		*50.0000*		*104*	*70 - 130*			
Surrogate: Toluene-d8	*55.00*		*50.0000*		*110*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
Duplicate (B3F0220-DUP1)		**Source: 1301688-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1-Dichloroethene	ND	5.0		ND	NR			20	
Benzene	ND	5.0		ND	NR			20	
Chlorobenzene	ND	5.0		ND	NR			20	
MTBE	ND	5.0		ND	NR			20	
Toluene	ND	5.0		ND	NR			20	
Trichloroethene	ND	5.0		ND	NR			20	
Surrogate: 1,2-Dichloroethane-d4	*47.19*		*50.0000*		*94.4*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*48.96*		*50.0000*		*97.9*	*70 - 130*			
Surrogate: Dibromofluoromethane	*53.01*		*50.0000*		*106*	*70 - 130*			
Surrogate: Toluene-d8	*50.71*		*50.0000*		*101*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
Matrix Spike (B3F0220-MS1)		**Source: 1301688-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1-Dichloroethene	44.6400	5.0	50.0000	ND	89.3	70 - 130			
Benzene	97.1700	5.0	100.000	ND	97.2	70 - 130			
Chlorobenzene	47.9500	5.0	50.0000	ND	95.9	70 - 130			
MTBE	46.2400	5.0	50.0000	ND	92.5	70 - 130			
Toluene	100.060	5.0	100.000	ND	100	70 - 130			
Trichloroethene	49.2500	5.0	50.0000	ND	98.5	70 - 130			
Surrogate: 1,2-Dichloroethane-d4	*47.68*		*50.0000*		*95.4*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*50.14*		*50.0000*		*100*	*70 - 130*			
Surrogate: Dibromofluoromethane	*50.19*		*50.0000*		*100*	*70 - 130*			
Surrogate: Toluene-d8	*54.18*		*50.0000*		*108*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
Matrix Spike Dup (B3F0220-MSD1)		**Source: 1301688-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1-Dichloroethene	47.6000	5.0	50.0000	ND	95.2	70 - 130	6.42	20	
Benzene	98.3300	5.0	100.000	ND	98.3	70 - 130	1.19	20	
Chlorobenzene	46.7300	5.0	50.0000	ND	93.5	70 - 130	2.58	20	
MTBE	43.7600	5.0	50.0000	ND	87.5	70 - 130	5.51	20	
Toluene	102.330	5.0	100.000	ND	102	70 - 130	2.24	20	
Trichloroethene	50.1800	5.0	50.0000	ND	100	70 - 130	1.87	20	
Surrogate: 1,2-Dichloroethane-d4	*46.21*		*50.0000*		*92.4*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*48.96*		*50.0000*		*97.9*	*70 - 130*			
Surrogate: Dibromofluoromethane	*50.13*		*50.0000*		*100*	*70 - 130*			
Surrogate: Toluene-d8	*55.36*		*50.0000*		*111*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0221 - MSVOAW_LL									
Blank (B3F0221-BLK1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1,1,2-Tetrachloroethane	ND	0.50			NR				
1,1,1-Trichloroethane	ND	0.50			NR				
1,1,2,2-Tetrachloroethane	ND	0.50			NR				
1,1,2-Trichloroethane	ND	0.50			NR				
1,1-Dichloroethane	ND	0.50			NR				
1,1-Dichloroethene	ND	0.50			NR				
1,1-Dichloropropene	ND	0.50			NR				
1,2,3-Trichloropropane	ND	0.50			NR				
1,2,3-Trichlorobenzene	ND	0.50			NR				
1,2,4-Trichlorobenzene	ND	0.50			NR				
1,2,4-Trimethylbenzene	ND	0.50			NR				
1,2-Dibromo-3-chloropropane	ND	0.50			NR				
1,2-Dibromoethane	ND	0.50			NR				
1,2-Dichlorobenzene	ND	0.50			NR				
1,2-Dichloroethane	ND	0.50			NR				
1,2-Dichloropropane	ND	0.50			NR				
1,3,5-Trimethylbenzene	ND	0.50			NR				
1,3-Dichlorobenzene	ND	0.50			NR				
1,3-Dichloropropane	ND	0.50			NR				
1,4-Dichlorobenzene	ND	0.50			NR				
2,2-Dichloropropane	ND	0.50			NR				
2-Chloroethyl vinyl ether	ND	0.50			NR				
2-Chlorotoluene	ND	0.50			NR				
4-Chlorotoluene	ND	0.50			NR				
4-Isopropyltoluene	ND	0.50			NR				
Benzene	ND	0.50			NR				
Bromobenzene	ND	0.50			NR				
Bromochloromethane	ND	0.50			NR				
Bromodichloromethane	ND	0.50			NR				
Bromoform	ND	0.50			NR				
Bromomethane	ND	0.50			NR				
Carbon disulfide	ND	1.0			NR				
Carbon tetrachloride	ND	0.50			NR				
Chlorobenzene	ND	0.50			NR				
Chloroethane	ND	0.50			NR				
Chloroform	ND	0.50			NR				
Chloromethane	ND	0.50			NR				
cis-1,2-Dichloroethene	ND	0.50			NR				
cis-1,3-Dichloropropene	ND	0.50			NR				
Di-isopropyl ether	ND	0.50			NR				
Dibromochloromethane	ND	0.50			NR				

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0221 - MSVOAW_LL (continued)									
Blank (B3F0221-BLK1) - Continued				Prepared: 6/12/2013 Analyzed: 6/12/2013					
Dibromomethane	ND	0.50			NR				
Dichlorodifluoromethane	ND	0.50			NR				
Ethyl Acetate	ND	10			NR				
Ethyl Ether	ND	10			NR				
Ethyl tert-butyl ether	ND	0.50			NR				
Ethylbenzene	ND	0.50			NR				
Freon-113	ND	0.50			NR				
Hexachlorobutadiene	ND	0.50			NR				
Isopropylbenzene	ND	0.50			NR				
m,p-Xylene	ND	1.0			NR				
Methylene chloride	ND	1.0			NR				
MTBE	ND	0.50			NR				
n-Butylbenzene	ND	0.50			NR				
n-Propylbenzene	ND	0.50			NR				
Naphthalene	ND	0.50			NR				
o-Xylene	ND	0.50			NR				
sec-Butylbenzene	ND	0.50			NR				
Styrene	ND	0.50			NR				
tert-Amyl methyl ether	ND	0.50			NR				
tert-Butanol	ND	10			NR				
tert-Butylbenzene	ND	0.50			NR				
Tetrachloroethene	ND	0.50			NR				
Toluene	ND	0.50			NR				
trans-1,2-Dichloroethene	ND	0.50			NR				
trans-1,3-Dichloropropene	ND	0.50			NR				
Trichloroethene	ND	0.50			NR				
Trichlorofluoromethane	ND	0.50			NR				
Vinyl acetate	ND	10			NR				
Vinyl chloride	ND	0.50			NR				
Surrogate: 1,2-Dichloroethane-d4	*25.77*		*25.0000*		*103*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*23.65*		*25.0000*		*94.6*	*70 - 130*			
Surrogate: Dibromofluoromethane	*23.96*		*25.0000*		*95.8*	*70 - 130*			
Surrogate: Toluene-d8	*22.12*		*25.0000*		*88.5*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0221 - MSVOAW_LL (continued)									
LCS (B3F0221-BS1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1-Dichloroethene	16.8900		20.0000		84.4	70 - 130			
Benzene	34.4200		40.0000		86.0	70 - 130			
Chlorobenzene	17.8200		20.0000		89.1	70 - 130			
MTBE	20.7900		20.0000		104	70 - 130			
Toluene	36.9300		40.0000		92.3	70 - 130			
Trichloroethene	17.3200		20.0000		86.6	70 - 130			
Surrogate: 1,2-Dichloroethane-d4	*24.18*		*25.0000*		*96.7*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*23.98*		*25.0000*		*95.9*	*70 - 130*			
Surrogate: Dibromofluoromethane	*23.00*		*25.0000*		*92.0*	*70 - 130*			
Surrogate: Toluene-d8	*22.21*		*25.0000*		*88.8*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0221 - MSVOAW_LL (continued)									
LCS Dup (B3F0221-BSD1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1-Dichloroethene	17.3500		20.0000		86.8	70 - 130	2.69	20	
Benzene	34.5100		40.0000		86.3	70 - 130	0.261	20	
Chlorobenzene	17.9400		20.0000		89.7	70 - 130	0.671	20	
MTBE	20.6800		20.0000		103	70 - 130	0.531	20	
Toluene	36.5700		40.0000		91.4	70 - 130	0.980	20	
Trichloroethene	18.0800		20.0000		90.4	70 - 130	4.29	20	
Surrogate: 1,2-Dichloroethane-d4	*23.86*		*25.0000*		*95.4*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*23.82*		*25.0000*		*95.3*	*70 - 130*			
Surrogate: Dibromofluoromethane	*22.87*		*25.0000*		*91.5*	*70 - 130*			
Surrogate: Toluene-d8	*22.01*		*25.0000*		*88.0*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Volatile Organic Compounds by EPA 8260 - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0221 - MSVOAW_LL (continued)									
Duplicate (B3F0221-DUP1)		**Source: 1301702-04**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,1-Dichloroethene	ND	0.50		ND	NR			20	
Benzene	ND	0.50		ND	NR			20	
Chlorobenzene	ND	0.50		ND	NR			20	
MTBE	ND	0.50		ND	NR			20	
Toluene	ND	0.50		ND	NR			20	
Trichloroethene	ND	0.50		ND	NR			20	
Surrogate: 1,2-Dichloroethane-d4	*25.79*		*25.0000*		*103*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*22.19*		*25.0000*		*88.8*	*70 - 130*			
Surrogate: Dibromofluoromethane	*23.97*		*25.0000*		*95.9*	*70 - 130*			
Surrogate: Toluene-d8	*20.79*		*25.0000*		*83.2*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control

Analyte	Result (mg/kg)	PQL (mg/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS									
Blank (B3F0220-BLK1)			Prepared: 6/12/2013 Analyzed: 6/12/2013						
Gasoline	ND	1.0			NR				
Surrogate: 1,2-Dichloroethane-d4	*48.35*		*50.0000*		*96.7*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*46.69*		*50.0000*		*93.4*	*70 - 130*			
Surrogate: Dibromofluoromethane	*49.13*		*50.0000*		*98.3*	*70 - 130*			
Surrogate: Toluene-d8	*48.50*		*50.0000*		*97.0*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control (cont'd)

Analyte	Result (mg/kg)	PQL (mg/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
LCS (B3F0220-BS2)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
Gasoline	5.37789	1.0	5.00000		108	70 - 130			
Surrogate: 1,2-Dichloroethane-d4	*56.65*		*50.0000*		*113*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*50.64*		*50.0000*		*101*	*70 - 130*			
Surrogate: Dibromofluoromethane	*48.44*		*50.0000*		*96.9*	*70 - 130*			
Surrogate: Toluene-d8	*49.31*		*50.0000*		*98.6*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control (cont'd)

Analyte	Result (mg/kg)	PQL (mg/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
LCS Dup (B3F0220-BSD2)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
Gasoline	5.24987	1.0	5.00000		105	70 - 130	2.41	20	
Surrogate: 1,2-Dichloroethane-d4	*53.72*		*50.0000*		*107*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*50.74*		*50.0000*		*101*	*70 - 130*			
Surrogate: Dibromofluoromethane	*45.24*		*50.0000*		*90.5*	*70 - 130*			
Surrogate: Toluene-d8	*49.31*		*50.0000*		*98.6*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control (cont'd)

Analyte	Result (mg/kg)	PQL (mg/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
Duplicate (B3F0220-DUP1)		**Source: 1301688-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
Gasoline	ND	1.0		ND	NR			20	
Surrogate: 1,2-Dichloroethane-d4	*47.19*		*50.0000*		*94.4*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*48.96*		*50.0000*		*97.9*	*70 - 130*			
Surrogate: Dibromofluoromethane	*53.01*		*50.0000*		*106*	*70 - 130*			
Surrogate: Toluene-d8	*50.71*		*50.0000*		*101*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control (cont'd)

Analyte	Result (mg/kg)	PQL (mg/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
Matrix Spike (B3F0220-MS2)		**Source: 1301688-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
Gasoline	4.94490	1.0	5.00000	ND	98.9	46 - 135			
Surrogate: 1,2-Dichloroethane-d4	*57.07*		*50.0000*		*114*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*49.79*		*50.0000*		*99.6*	*70 - 130*			
Surrogate: Dibromofluoromethane	*47.25*		*50.0000*		*94.5*	*70 - 130*			
Surrogate: Toluene-d8	*48.87*		*50.0000*		*97.7*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control (cont'd)

Analyte	Result (mg/kg)	PQL (mg/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0220 - MSVOAS (continued)									
Matrix Spike Dup (B3F0220-MSD2)		**Source: 1301688-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
Gasoline	4.77526	1.0	5.00000	ND	95.5	46 - 135	3.49	20	
Surrogate: 1,2-Dichloroethane-d4	*52.61*		*50.0000*		*105*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*49.19*		*50.0000*		*98.4*	*70 - 130*			
Surrogate: Dibromofluoromethane	*45.80*		*50.0000*		*91.6*	*70 - 130*			
Surrogate: Toluene-d8	*48.95*		*50.0000*		*97.9*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0221 - MSVOAW_LL									
Blank (B3F0221-BLK2)			Prepared: 6/12/2013 Analyzed: 6/12/2013						
Gasoline	ND	0.05			NR				
Surrogate: 1,2-Dichloroethane-d4	*24.33*		*25.0000*		*97.3*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*24.90*		*25.0000*		*99.6*	*70 - 130*			
Surrogate: Dibromofluoromethane	*25.17*		*25.0000*		*101*	*70 - 130*			
Surrogate: Toluene-d8	*24.74*		*25.0000*		*99.0*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0221 - MSVOAW_LL (continued)									
LCS (B3F0221-BS2)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
Gasoline	910.000		1000.00		91.0	70 - 130			
Surrogate: 1,2-Dichloroethane-d4	*23.01*		*25.0000*		*92.0*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*25.04*		*25.0000*		*100*	*70 - 130*			
Surrogate: Dibromofluoromethane	*23.79*		*25.0000*		*95.2*	*70 - 130*			
Surrogate: Toluene-d8	*25.20*		*25.0000*		*101*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0221 - MSVOAW_LL (continued)									
LCS Dup (B3F0221-BSD2)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
Gasoline	940.000		1000.00		94.0	70 - 130	3.24	20	
Surrogate: 1,2-Dichloroethane-d4	*22.81*		*25.0000*		*91.2*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*24.15*		*25.0000*		*96.6*	*70 - 130*			
Surrogate: Dibromofluoromethane	*23.29*		*25.0000*		*93.2*	*70 - 130*			
Surrogate: Toluene-d8	*25.07*		*25.0000*		*100*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

TPH as Gasoline by LUFT GCMS - Quality Control (cont'd)

Analyte	Result (mg/L)	PQL (mg/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0221 - MSVOAW_LL (continued)									
Duplicate (B3F0221-DUP2)			**Source: 1301702-04**		Prepared: 6/12/2013 Analyzed: 6/12/2013				
Gasoline	ND	0.05		ND	NR			20	
Surrogate: 1,2-Dichloroethane-d4	*24.64*		*25.0000*		*98.6*	*70 - 130*			
Surrogate: 4-Bromofluorobenzene	*23.64*		*25.0000*		*94.6*	*70 - 130*			
Surrogate: Dibromofluoromethane	*25.23*		*25.0000*		*101*	*70 - 130*			
Surrogate: Toluene-d8	*23.18*		*25.0000*		*92.7*	*70 - 130*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0198 - MSSEMI									
Blank (B3F0198-BLK1)				Prepared: 6/11/2013 Analyzed: 6/11/2013					
1,2,4-Trichlorobenzene	ND	10			NR				
1,2-Dichlorobenzene	ND	10			NR				
1,3-Dichlorobenzene	ND	10			NR				
1,4-Dichlorobenzene	ND	10			NR				
2,4,5-Trichlorophenol	ND	10			NR				
2,4,6-Trichlorophenol	ND	10			NR				
2,4-Dichlorophenol	ND	10			NR				
2,4-Dimethylphenol	ND	10			NR				
2,4-Dinitrophenol	ND	50			NR				
2,4-Dinitrotoluene	ND	10			NR				
2,6-Dinitrotoluene	ND	10			NR				
2-Chloronaphthalene	ND	10			NR				
2-Chlorophenol	ND	10			NR				
2-Methylnaphthalene	ND	10			NR				
2-Methylphenol	ND	10			NR				
2-Nitroaniline	ND	50			NR				
2-Nitrophenol	ND	10			NR				
3,3´-Dichlorobenzidine	ND	20			NR				
3-Nitroaniline	ND	50			NR				
4,6-Dinitro-2-methyphenol	ND	50			NR				
4-Bromophenyl-phenylether	ND	10			NR				
4-Chloro-3-methylphenol	ND	50			NR				
4-Chloroaniline	ND	20			NR				
4-Chlorophenyl-phenylether	ND	10			NR				
4-Methylphenol	ND	10			NR				
4-Nitroaniline	ND	20			NR				
4-Nitrophenol	ND	50			NR				
Acenaphthene	ND	10			NR				
Acenaphthylene	ND	10			NR				
Anthracene	ND	10			NR				
Benzidine (M)	ND	50			NR				
Benzo(a)anthracene	ND	10			NR				
Benzo(a)pyrene	ND	10			NR				
Benzo(b)fluoranthene	ND	10			NR				
Benzo(g,h,i)perylene	ND	10			NR				
Benzo(k)fluoranthene	ND	10			NR				
Benzoic acid	ND	50			NR				
Benzyl alcohol	ND	20			NR				
bis(2-chloroethoxy)methane	ND	10			NR				
bis(2-Chloroethyl)ether	ND	10			NR				
bis(2-chloroisopropyl)ether	ND	10			NR				

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0198 - MSSEMI (continued)									
Blank (B3F0198-BLK1) - Continued				Prepared: 6/11/2013 Analyzed: 6/11/2013					
bis(2-ethylhexyl)phthalate	ND	10			NR				
Butylbenzylphthalate	ND	10			NR				
Chrysene	ND	10			NR				
Di-n-butylphthalate	ND	10			NR				
Di-n-octylphthalate	ND	10			NR				
Dibenz(a,h)anthracene	ND	10			NR				
Dibenzofuran	ND	10			NR				
Diethyl phthalate	ND	10			NR				
Dimethyl phthalate	ND	10			NR				
Fluoranthene	ND	10			NR				
Fluorene	ND	10			NR				
Hexachlorobenzene	ND	10			NR				
Hexachlorobutadiene	ND	20			NR				
Hexachlorocyclopentadiene	ND	10			NR				
Hexachloroethane	ND	10			NR				
Indeno(1,2,3-cd)pyrene	ND	10			NR				
Isophorone	ND	10			NR				
N-Nitroso-di-n propylamine	ND	10			NR				
N-Nitrosodiphenylamine	ND	10			NR				
Naphthalene	ND	10			NR				
Nitrobenzene	ND	10			NR				
Pentachlorophenol	ND	50			NR				
Phenanthrene	ND	10			NR				
Phenol	ND	10			NR				
Pyrene	ND	10			NR				
Pyridine	ND	50			NR				
Surrogate: 1,2-Dichlorobenzene-d4	*89.29*		*100.000*		*89.3*	*36 - 117*			
Surrogate: 2,4,6-Tribromophenol	*97.06*		*100.000*		*97.1*	*33 - 149*			
Surrogate: 2-Chlorophenol-d4	*76.75*		*100.000*		*76.8*	*37 - 99*			
Surrogate: 2-Fluorobiphenyl	*100.1*		*100.000*		*100*	*52 - 126*			
Surrogate: 2-Fluorophenol	*47.62*		*100.000*		*47.6*	*17 - 69*			
Surrogate: 4-Terphenyl-d14	*102.6*		*100.000*		*103*	*40 - 165*			
Surrogate: Nitrobenzene-d5	*89.67*		*100.000*		*89.7*	*38 - 117*			
Surrogate: Phenol-d5	*34.56*		*100.000*		*34.6*	*5 - 60*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0198 - MSSEMI (continued)									
LCS (B3F0198-BS1)				Prepared: 6/11/2013 Analyzed: 6/11/2013					
1,2,4-Trichlorobenzene	88.9600	10	100.000		89.0	61 - 108			
1,4-Dichlorobenzene	83.2800	10	100.000		83.3	54 - 98			
2,4-Dinitrotoluene	116.750	10	100.000		117	79 - 130			
2-Chlorophenol	78.9900	10	100.000		79.0	54 - 91			
4-Chloro-3-methylphenol	96.1400	50	100.000		96.1	75 - 109			
4-Nitrophenol	45.3400	50	100.000		45.3	31 - 69			J
Acenaphthene	107.060	10	100.000		107	76 - 118			
N-Nitroso-di-n propylamine	105.590	10	100.000		106	52 - 119			
Pentachlorophenol	91.6700	50	100.000		91.7	74 - 128			
Phenol	39.7400	10	100.000		39.7	23 - 49			
Pyrene	120.340	10	100.000		120	75 - 135			
Surrogate: 1,2-Dichlorobenzene-d4	*79.72*		*100.000*		*79.7*	*36 - 117*			
Surrogate: 2,4,6-Tribromophenol	*102.2*		*100.000*		*102*	*33 - 149*			
Surrogate: 2-Chlorophenol-d4	*75.98*		*100.000*		*76.0*	*37 - 99*			
Surrogate: 2-Fluorobiphenyl	*96.48*		*100.000*		*96.5*	*52 - 126*			
Surrogate: 2-Fluorophenol	*44.31*		*100.000*		*44.3*	*17 - 69*			
Surrogate: 4-Terphenyl-d14	*99.96*		*100.000*		*100*	*40 - 165*			
Surrogate: Nitrobenzene-d5	*88.27*		*100.000*		*88.3*	*38 - 117*			
Surrogate: Phenol-d5	*38.60*		*100.000*		*38.6*	*5 - 60*			

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0198 - MSSEMI (continued)									
LCS Dup (B3F0198-BSD1)				Prepared: 6/11/2013 Analyzed: 6/11/2013					
1,2,4-Trichlorobenzene	90.8300	10	100.000		90.8	61 - 108	2.08	20	
1,4-Dichlorobenzene	83.5700	10	100.000		83.6	54 - 98	0.348	20	
2,4-Dinitrotoluene	119.470	10	100.000		119	79 - 130	2.30	20	
2-Chlorophenol	80.4600	10	100.000		80.5	54 - 91	1.84	20	
4-Chloro-3-methylphenol	98.4900	50	100.000		98.5	75 - 109	2.41	20	
4-Nitrophenol	47.4300	50	100.000		47.4	31 - 69	4.51	20	J
Acenaphthene	110.540	10	100.000		111	76 - 118	3.20	20	
N-Nitroso-di-n propylamine	108.990	10	100.000		109	52 - 119	3.17	20	
Pentachlorophenol	96.6900	50	100.000		96.7	74 - 128	5.33	20	
Phenol	40.4000	10	100.000		40.4	23 - 49	1.65	20	
Pyrene	123.490	10	100.000		123	75 - 135	2.58	20	
Surrogate: 1,2-Dichlorobenzene-d4	*76.74*		*100.000*		*76.7*	*36 - 117*			
Surrogate: 2,4,6-Tribromophenol	*102.6*		*100.000*		*103*	*33 - 149*			
Surrogate: 2-Chlorophenol-d4	*74.44*		*100.000*		*74.4*	*37 - 99*			
Surrogate: 2-Fluorobiphenyl	*94.90*		*100.000*		*94.9*	*52 - 126*			
Surrogate: 2-Fluorophenol	*44.74*		*100.000*		*44.7*	*17 - 69*			
Surrogate: 4-Terphenyl-d14	*98.95*		*100.000*		*99.0*	*40 - 165*			
Surrogate: Nitrobenzene-d5	*87.07*		*100.000*		*87.1*	*38 - 117*			
Surrogate: Phenol-d5	*37.53*		*100.000*		*37.5*	*5 - 60*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/L)	PQL (ug/L)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0228 - MSSEMI									
Blank (B3F0228-BLK1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,2,4-Trichlorobenzene	ND	330			NR				
1,2-Dichlorobenzene	ND	330			NR				
1,3-Dichlorobenzene	ND	330			NR				
1,4-Dichlorobenzene	ND	330			NR				
2,4,5-Trichlorophenol	ND	330			NR				
2,4,6-Trichlorophenol	ND	330			NR				
2,4-Dichlorophenol	ND	1600			NR				
2,4-Dimethylphenol	ND	330			NR				
2,4-Dinitrophenol	ND	1600			NR				
2,4-Dinitrotoluene	ND	330			NR				
2,6-Dinitrotoluene	ND	330			NR				
2-Chloronaphthalene	ND	330			NR				
2-Chlorophenol	ND	330			NR				
2-Methylnaphthalene	ND	330			NR				
2-Methylphenol	ND	330			NR				
2-Nitroaniline	ND	1600			NR				
2-Nitrophenol	ND	330			NR				
3,3´-Dichlorobenzidine	ND	660			NR				
3-Nitroaniline	ND	1600			NR				
4,6-Dinitro-2-methyphenol	ND	1600			NR				
4-Bromophenyl-phenylether	ND	330			NR				
4-Chloro-3-methylphenol	ND	660			NR				
4-Chloroaniline	ND	660			NR				
4-Chlorophenyl-phenylether	ND	330			NR				
4-Methylphenol	ND	330			NR				
4-Nitroaniline	ND	1600			NR				
4-Nitrophenol	ND	330			NR				
Acenaphthene	ND	330			NR				
Acenaphthylene	ND	330			NR				
Anthracene	ND	330			NR				
Benzidine (M)	ND	1600			NR				
Benzo(a)anthracene	ND	330			NR				
Benzo(a)pyrene	ND	330			NR				
Benzo(b)fluoranthene	ND	330			NR				
Benzo(g,h,i)perylene	ND	330			NR				
Benzo(k)fluoranthene	ND	330			NR				
Benzoic acid	ND	1600			NR				
Benzyl alcohol	ND	660			NR				
bis(2-chloroethoxy)methane	ND	330			NR				
bis(2-Chloroethyl)ether	ND	330			NR				
bis(2-chloroisopropyl)ether	ND	330			NR				

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0228 - MSSEMI (continued)									
Blank (B3F0228-BLK1) - Continued				Prepared: 6/12/2013 Analyzed: 6/12/2013					
bis(2-ethylhexyl)phthalate	ND	330			NR				
Butylbenzylphthalate	ND	330			NR				
Chrysene	ND	330			NR				
Di-n-butylphthalate	ND	330			NR				
Di-n-octylphthalate	ND	330			NR				
Dibenz(a,h)anthracene	ND	330			NR				
Dibenzofuran	ND	330			NR				
Diethyl phthalate	ND	330			NR				
Dimethyl phthalate	ND	330			NR				
Fluoranthene	ND	330			NR				
Fluorene	ND	330			NR				
Hexachlorobenzene	ND	330			NR				
Hexachlorobutadiene	ND	660			NR				
Hexachlorocyclopentadiene	ND	660			NR				
Hexachloroethane	ND	330			NR				
Indeno(1,2,3-cd)pyrene	ND	330			NR				
Isophorone	ND	330			NR				
N-Nitroso-di-n propylamine	ND	330			NR				
N-Nitrosodiphenylamine	ND	330			NR				
Naphthalene	ND	330			NR				
Nitrobenzene	ND	330			NR				
Pentachlorophenol	ND	1600			NR				
Phenanthrene	ND	330			NR				
Phenol	ND	330			NR				
Pyrene	ND	330			NR				
Pyridine	ND	1600			NR				
Surrogate: 1,2-Dichlorobenzene-d4	*2857*		*3333.33*		*85.7*	*48 - 113*			
Surrogate: 2,4,6-Tribromophenol	*3240*		*3333.33*		*97.2*	*14 - 162*			
Surrogate: 2-Chlorophenol-d4	*2816*		*3333.33*		*84.5*	*40 - 117*			
Surrogate: 2-Fluorobiphenyl	*3038*		*3333.33*		*91.1*	*52 - 126*			
Surrogate: 2-Fluorophenol	*2831*		*3333.33*		*84.9*	*26 - 124*			
Surrogate: 4-Terphenyl-d14	*3208*		*3333.33*		*96.2*	*36 - 163*			
Surrogate: Nitrobenzene-d5	*3221*		*3333.33*		*96.6*	*42 - 118*			
Surrogate: Phenol-d5	*2965*		*3333.33*		*88.9*	*29 - 124*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0228 - MSSEMI (continued)									
LCS (B3F0228-BS1)				Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,2,4-Trichlorobenzene	2759.33	330	3333.33		82.8	62 - 101			
1,4-Dichlorobenzene	2355.67	330	3333.33		70.7	58 - 93			
2,4-Dinitrotoluene	3494.67	330	3333.33		105	67 - 133			
2-Chlorophenol	2496.67	330	3333.33		74.9	63 - 100			
4-Chloro-3-methylphenol	3229.67	660	3333.33		96.9	70 - 120			
4-Nitrophenol	3254.67	330	3333.33		97.6	55 - 137			
Acenaphthene	3010.33	330	3333.33		90.3	73 - 112			
N-Nitroso-di-n propylamine	3025.67	330	3333.33		90.8	56 - 114			
Pentachlorophenol	3172.33	1600	3333.33		95.2	61 - 125			
Phenol	2731.67	330	3333.33		82.0	61 - 106			
Pyrene	3456.67	330	3333.33		104	66 - 122			
Surrogate: 1,2-Dichlorobenzene-d4	*2366*		*3333.33*		*71.0*	*48 - 113*			
Surrogate: 2,4,6-Tribromophenol	*3277*		*3333.33*		*98.3*	*14 - 162*			
Surrogate: 2-Chlorophenol-d4	*2417*		*3333.33*		*72.5*	*40 - 117*			
Surrogate: 2-Fluorobiphenyl	*2762*		*3333.33*		*82.9*	*52 - 126*			
Surrogate: 2-Fluorophenol	*2297*		*3333.33*		*68.9*	*26 - 124*			
Surrogate: 4-Terphenyl-d14	*2776*		*3333.33*		*83.3*	*36 - 163*			
Surrogate: Nitrobenzene-d5	*2750*		*3333.33*		*82.5*	*42 - 118*			
Surrogate: Phenol-d5	*2538*		*3333.33*		*76.1*	*29 - 124*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0228 - MSSEMI (continued)									
Duplicate (B3F0228-DUP1)		**Source: 1301702-01**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,2,4-Trichlorobenzene	ND	330		ND	NR			20	
1,4-Dichlorobenzene	ND	330		ND	NR			20	
2,4-Dinitrotoluene	ND	330		ND	NR			20	
2-Chlorophenol	ND	330		ND	NR			20	
4-Chloro-3-methylphenol	ND	660		ND	NR			20	
4-Nitrophenol	ND	330		ND	NR			20	
Acenaphthene	ND	330		ND	NR			20	
N-Nitroso-di-n propylamine	ND	330		ND	NR			20	
Pentachlorophenol	ND	1600		ND	NR			20	
Phenol	ND	330		ND	NR			20	
Pyrene	ND	330		ND	NR			20	
Surrogate: 1,2-Dichlorobenzene-d4	*2908*		*3333.33*		*87.2*	*48 - 113*			
Surrogate: 2,4,6-Tribromophenol	*3499*		*3333.33*		*105*	*14 - 162*			
Surrogate: 2-Chlorophenol-d4	*2837*		*3333.33*		*85.1*	*40 - 117*			
Surrogate: 2-Fluorobiphenyl	*2999*		*3333.33*		*90.0*	*52 - 126*			
Surrogate: 2-Fluorophenol	*2905*		*3333.33*		*87.2*	*26 - 124*			
Surrogate: 4-Terphenyl-d14	*3198*		*3333.33*		*95.9*	*36 - 163*			
Surrogate: Nitrobenzene-d5	*3187*		*3333.33*		*95.6*	*42 - 118*			
Surrogate: Phenol-d5	*2936*		*3333.33*		*88.1*	*29 - 124*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0228 - MSSEMI (continued)									
Matrix Spike (B3F0228-MS1)		**Source: 1301675-04**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,2,4-Trichlorobenzene	3371.67	330	3333.33	ND	101	52 - 111			
1,4-Dichlorobenzene	2975.67	330	3333.33	ND	89.3	47 - 101			
2,4-Dinitrotoluene	4167.67	330	3333.33	ND	125	66 - 134			
2-Chlorophenol	3159.67	330	3333.33	ND	94.8	55 - 107			
4-Chloro-3-methylphenol	3772.00	660	3333.33	ND	113	64 - 129			
4-Nitrophenol	3782.33	330	3333.33	ND	113	56 - 144			
Acenaphthene	3605.00	330	3333.33	ND	108	63 - 121			
N-Nitroso-di-n propylamine	3690.67	330	3333.33	ND	111	45 - 123			
Pentachlorophenol	3670.33	1600	3333.33	ND	110	51 - 144			
Phenol	3435.00	330	3333.33	ND	103	50 - 116			
Pyrene	4040.00	330	3333.33	ND	121	65 - 127			
Surrogate: 1,2-Dichlorobenzene-d4	*2893*		*3333.33*		*86.8*	*48 - 113*			
Surrogate: 2,4,6-Tribromophenol	*3581*		*3333.33*		*107*	*14 - 162*			
Surrogate: 2-Chlorophenol-d4	*2876*		*3333.33*		*86.3*	*40 - 117*			
Surrogate: 2-Fluorobiphenyl	*3131*		*3333.33*		*93.9*	*52 - 126*			
Surrogate: 2-Fluorophenol	*2726*		*3333.33*		*81.8*	*26 - 124*			
Surrogate: 4-Terphenyl-d14	*3074*		*3333.33*		*92.2*	*36 - 163*			
Surrogate: Nitrobenzene-d5	*3173*		*3333.33*		*95.2*	*42 - 118*			
Surrogate: Phenol-d5	*3091*		*3333.33*		*92.7*	*29 - 124*			

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

Semivolatile Organic Compounds by EPA 8270C - Quality Control (cont'd)

Analyte	Result (ug/kg)	PQL (ug/kg)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0228 - MSSEMI (continued)									
Matrix Spike Dup (B3F0228-MSD1)		**Source: 1301675-04**		Prepared: 6/12/2013 Analyzed: 6/12/2013					
1,2,4-Trichlorobenzene	3226.00	330	3333.33	ND	96.8	52 - 111	4.42	20	
1,4-Dichlorobenzene	2887.67	330	3333.33	ND	86.6	47 - 101	3.00	20	
2,4-Dinitrotoluene	3961.33	330	3333.33	ND	119	66 - 134	5.08	20	
2-Chlorophenol	3070.33	330	3333.33	ND	92.1	55 - 107	2.87	20	
4-Chloro-3-methylphenol	3674.00	660	3333.33	ND	110	64 - 129	2.63	20	
4-Nitrophenol	3663.33	330	3333.33	ND	110	56 - 144	3.20	20	
Acenaphthene	3452.67	330	3333.33	ND	104	63 - 121	4.32	20	
N-Nitroso-di-n propylamine	3572.67	330	3333.33	ND	107	45 - 123	3.25	20	
Pentachlorophenol	3535.33	1600	3333.33	ND	106	51 - 144	3.75	20	
Phenol	3332.00	330	3333.33	ND	100	50 - 116	3.04	20	
Pyrene	3845.33	330	3333.33	ND	115	65 - 127	4.94	20	
Surrogate: 1,2-Dichlorobenzene-d4	*2798*		*3333.33*		*84.0*	*48 - 113*			
Surrogate: 2,4,6-Tribromophenol	*3485*		*3333.33*		*105*	*14 - 162*			
Surrogate: 2-Chlorophenol-d4	*2750*		*3333.33*		*82.5*	*40 - 117*			
Surrogate: 2-Fluorobiphenyl	*3022*		*3333.33*		*90.7*	*52 - 126*			
Surrogate: 2-Fluorophenol	*2694*		*3333.33*		*80.8*	*26 - 124*			
Surrogate: 4-Terphenyl-d14	*2949*		*3333.33*		*88.5*	*36 - 163*			
Surrogate: Nitrobenzene-d5	*3075*		*3333.33*		*92.2*	*42 - 118*			
Surrogate: Phenol-d5	*3033*		*3333.33*		*91.0*	*29 - 124*			

Certificate of Analysis

Stantec	Project Number : Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200	Report To : Kelly Brown
Long Beach , CA 90808	Reported : 06/21/2013

pH by EPA 9045C - Quality Control

Analyte	Result (pH Units)	PQL (pH Units)	Spike Level	Source Result	% Rec	% Rec Limits	RPD	RPD Limit	Notes
Batch B3F0246 - Prep_WC_1_S									
Duplicate (B3F0246-DUP1)		**Source: 1301717-09**		Prepared: 6/12/2013 Analyzed: 6/13/2013					
pH	8.06000	0.10		8.13000	NR		0.865	20	

Certificate of Analysis

Stantec		Project Number :	Wilmington-PCH Dominguez, 185832004
3777 Worsham Avenue, Ste. 200		Report To :	Kelly Brown
Long Beach , CA 90808		Reported :	06/21/2013

Notes and Definitions

S10	Surrogate recovery outside of laboratory acceptance limit possibly due to matrix interference.
R	RPD value outside acceptance criteria. Calculation is based on raw values.
J	Analyte detected below the Practical Quantitation Limit but above or equal to the Method Detection Limit. Result is an estimated concentration.
H1	Sample was received past holding time.
F11	Sample contains hydrocarbons within the gasoline range that do not match the gasoline pattern. Quantitation was based on a gasoline standard.
D6	Sample required dilution due to high concentration of target analyte.
D2	Sample required dilution due to high concentration of non-target analyte.
C	Possible laboratory contamination.
ND	Analyte not detected at or above reporting limit
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
NR	Not Reported
RPD	Relative Percent Difference
CA1	CA-NELAP (CDPH)
CA2	CA-ELAP (CDPH)
OR1	OR-NELAP (OSPHL)
TX1	TX-NELAP (TCEQ)

Notes:
(1) The reported MDL and PQL are based on prep ratio variation and analytical dilution.
(2) The suffix [2C] of specific analytes signifies that the reported result is taken from the instrument's second column.

CHAIN OF CUSTODY RECORD

ADVANCED TECHNOLOGY LABORATORIES
3275 Walnut Ave., Signal Hill, CA 90755
Tel: (562) 989-4045 • Fax: (562) 989-4040

P.O.#: _____ Quote #: _____

As the authorized agent of the below named company, I hereby purchase testing services from ATL as dictated below and guarantee payment in full.

Submitter (Print):

Signature:

Submitter - Please complete all SHADED areas and include QUOTE # above to ensure proper invoicing.

FOR LABORATORY USE ONLY:

Method of Transport: ☒ Client ☐ ATL ☐ FedEx ☐ OnTrac ☐ GSO ☐ Other:

Sample Condition Upon Receipt

1. CHILLED	Y ☒ N ☐	4. SEALED	Y ☐ N ☐
2. HEADSPACE (VOA)	Y ☐ N ☐	5. # OF SPLS MATCH COC	Y ☐ N ☐
3. CONTAINER INTACT	Y ☐ N ☐	6. PRESERVED	Y ☐ N ☐

Client: Stantec Consulting
Attn: Kelly Brown
Address: 3777 Worsham #200
City: Long Beach State: CA Zip Code: 90808
TEL: 562-354-2638
FAX: 562-354-2669

Project Name: Wilmington - PCH Dominguez Project #: 185832004
Sampler: (Printed Name) Cathy Sanford (Signature) Cathy Sanford

Relinquished by: (Signature and Printed Name)	Cathy Sanford Cathy Sanford	Date: 6/10/2013	Time: 5:52 pm	Received by: (Signature and Printed Name)	FEDEX	Date: 06/10/13	Time: 1752
Relinquished by: (Signature and Printed Name)		Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:
Relinquished by: (Signature and Printed Name)		Date:	Time:	Received by: (Signature and Printed Name)		Date:	Time:

Bill To:
Attn: Kelly Brown E-mail: Kelly.braun@stantec.com
Company: Stantec
Address: 3777 Worsham Ave #200
City: Long Beach State: CA Zip: 90808

Send Report To:
Attn: Kelly Brown E-mail:
Company: Stantec
Addrress:
City: State: Zip:

Special Instructions/Comments:
3 day turn around.
OK to run w/headspace
Quote# R13E101

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all Samples and Hardcopy will be disposed Forty-five(45) days after generation of report - electronic copies retained for five(5) years.
Storage Fees (applies when storage is requested):
■ Sample : Forty-five(45) Days Complimentary - $2.00 / sample / mo thereafter.
Hardcopy Reports $17.50 per report.

CIRCLE or Write IN Analyses Needed

CIRCLE APPROPRIATE MATRIX

ITEM	BUSINESS HOURS 8:30 am to 5:30 pm Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8260-624 (Volatiles)	8015B (GRO) / TPH	TO-15 / TO-14 / TO-3 / RSK-175	8270B-625(BNA) / 8015B(DRO)	8081 OrgCl / 8015B(HCID)	8082 PCBs	6010B-200.7 CAM Metals	6010B/6020 Metals	6020B-200.8-1640 Metals	7199-218.6 (Hex. Chromium)	300(Anions) / 314 (Perchlorate)	9045C pH	SOIL/SEDIMENT/SLUDGE	SOLIDS/WIPES/FILTERS	WATER/DRINKING/GROUND	AQUEOUS/LAYERED-OIL	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
1	1301702 -1	1173-101-15	6/10/13	9:54																		8			
2	-2	1173-101-24	"	10:55																		8			
3	-3	1173-102-24.5	"	16:15																		8			
4	-4	EB	"	15:30																		8			
5	-5	TB	NA	NA																		2			
6																									
7																									
8																									
9																									
10																									

QA/QC: RTNE ☐ CT ☐ Legal ☐ SWRCB ☐ Logcode____ OTHER____

☐ Samples Submitted AFTER 3:30 PM, are considered received the following business day at 8:30 AM.

Weekend, Holiday, Off Hours Work ASK for QUOTE

Container Types: 1=Tube 2=VOA 3=Liter 4=Pint 5=Jar 6=Tedlar 7= Canister

Material: 1=Glass 2=Plastic 3=Metal

Preservatives: 1=HCl, 2=HNO_3 3=H_2SO_4 4=4°C 5=$Zn(Ac)_2$ 6=NaOH 7=$NA_2S_2O_4$

TAT 0	TAT 1	TAT 2	TAT 3	TAT 4	TAT 5	TAT 10
300% SURCHARGE SAME BUSINESS DAY IF RCV'D BY 9:00 AM	100% SURCHARGE NEXT BUSINESS DAY 5:30 PM	50% SURCHARGE 2ND BUSINESS DAY 5:30 PM	30% SURCHARGE 3RD BUSINESS DAY 5:30 PM	20% SURCHARGE 4TH BUSINESS DAY 5:30 PM	NO SURCHARGE 5 -7 BUSINESS DAYS 5:30 PM	10% DISCOUNT 10th BUSINESS DAY 5:30 PM

For RUSH TCLP/STLC, add 2 days to respective TAT.

Subcon. TAT is 10-15 business days, Dioxin and Furans 21 business days.

APPENDIX D
RWQCB SOIL SCREENING LEVEL TABLE 4-1

Table 4-1: Maximum Soil Screening Levels (mg/kg) for TPH and BTEX above Drinking Water Aquifers

	Distance Above Groundwater	Carbon Range		
TPH		C4-C12	C13-C22	C23-C32
	>150 feet	1,000	10,000	50,000
	20-150 feet	500	1,000	10,000
	<20 feet	100	100	1,000

	Distance Above Groundwater	Lithology			
BTEX		Gravel	Sand	Silt	Clay
	150 feet	B=0.044 T=2 E=8 X=23	B=0.077 T=4 E=17 X=48	B=0.165 T=9 E=34 X=93	B=0.8 T=43 E=170 X=465
	80 feet	B=0.022 T=1 E=4 X=11	B=0.033 T=2 E=7 X=20	B=0.066 T=4 E=15 X=40	B=0.34 T=18 E=73 X=200
	20 feet	B=0.011 T=0.15 E=0.7 X=1.75	B=0.011 T=0.3 E=0.7 X=1.75	B=0.011 T=0.45 E=2 X=5.3	B=0.044 T=2.3 E=9 X=24.5

- TPH = Total petroleum hydrocarbons.
- BTEX = benzene, toluene, ethylbenzene, and xylenes, respectively. MCLs (ppm): B=0.001, T=0.15, E=0.7, X=1.75.
- MTBE (methyl tertiary butyl ether) must be included in BTEX analyses.
- BTEX screening concentrations determined per the attenuation factor method as described in RWQCB Guidance for VOC Impacted Sites (March 1996), with a natural degradation factor of 11 for benzene. Table values for BTEX can be linearly interpolated between distance above groundwater and are proportional to fraction of each lithological thickness.
- Values in Table 4-1 are for soils above drinking water aquifers. All groundwaters are considered as drinking water resources unless exempted by one of the criteria as defined under SWRCB Resolution 88-63 (TDS>3000 mg/L, or deliverability <200 gal/day, or existing contamination that cannot be reasonably treated). Regional Board staff will make a determination of potential water use at a particular site considering water quality objectives and beneficial uses. For non-drinking water aquifers, regardless of depth, TPH for ">150 feet" category in the table should be used; BTEX screening levels are set at 100 times respective MCLs as preliminary levels determined to be protective of human health and the environment.
- Distance above groundwater must be measured from the highest anticipated water level. Lithology is based on the USCS scale.
- For BTEX, each component is not to exceed the specified screening level.
- For TPH, the total allowable for each carbon range is not to be exceeded. In areas of naturally-occurring hydrocarbons, Regional Board staff will make allowance for TPH levels.
- BTEX to be analyzed by EPA Method 8020 or EPA Method 8260 (usually for confirmation).
- TPH to be analyzed by EPA Methods 418.1 plus 8015 (Modified). Ranges of TPH to be analyzed by GC/MS carbon range methods (EPA Method 8260) or EPA Method 8015 (Modified).