

APPENDIX C

Phase I ESA

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Former Stauffer Chemical Company Facility
2112 East 223rd Street
Carson, California 90745

November 22, 2019



AVOCET
ENVIRONMENTAL, INC.

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Former Stauffer Chemical Company Facility
2112 East 223rd Street
Carson, California 90745

November 22, 2019

PREPARED FOR

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Project No. 1362.005





November 22, 2019

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Phase I Environmental Site Assessment
Former Stauffer Chemical Company Facility
2112 East 223rd Street
Carson, California 90745

Dear Mr. Accame:

This report documents a Phase I Environmental Site Assessment for the approximately 14-acre former Stauffer Chemical Company property at 2112 East 223rd Street in Carson, California. If you have any questions about the report or require additional information, please do not hesitate to contact the undersigned at (949) 296-0977 Ext. 102 or at pmiller@avocetenv.com. As always, Avocet Environmental, Inc. appreciates the opportunity to be of service to Panattoni Development Company, Inc.

Respectfully submitted,

AVOCET ENVIRONMENTAL, INC.

A handwritten signature in black ink, appearing to read "Philip Miller", is written over a horizontal line.

Philip Miller, P.E.
Principal

PM:sh
Enclosure

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Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page i
November 22, 2019

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	iv
LIST OF FIGURES	iv
LIST OF ABBREVIATIONS AND ACRONYMS	v
EXECUTIVE SUMMARY	ES-1
SUMMARY OF SITE HISTORY AND OPERATIONS	ES-1
SITE SETTING	ES-3
RECOGNIZED ENVIRONMENTAL CONDITIONS (RECs)	ES-3
CONTROLLED RECs (CRECs)	ES-4
HISTORICAL RECs (HRECs)	ES-4
OTHER ENVIRONMENTAL FEATURES (OEFs)	ES-5
1.0 INTRODUCTION	1
1.1 OVERVIEW	1
1.1.1 Facility History and Operations	1
1.1.2 Subsurface Investigation and Remediation	2
1.2 PHASE I ESA OBJECTIVES	5
1.3 APPROACH	5
1.4 LIMITATIONS	6
1.5 REPORT ORGANIZATION	6
2.0 SOURCES OF INFORMATION	8
2.1 TOPOGRAPHIC MAPS	8
2.2 AERIAL PHOTOGRAPHS	8
2.3 FIRE INSURANCE MAPS	8
2.4 CITY DIRECTORIES	8
2.5 WALKOVER SURVEY AND COMMUNICATIONS WITH OWNER	8
2.6 GOVERNMENT DATABASES	9
2.7 SITE-SPECIFIC ENVIRONMENTAL REPORTS	9
2.8 INFORMATION FROM LOCAL AND STATE AGENCIES	9
2.9 OIL AND GAS RECORDS	11
2.10 RADON GAS RECORDS	11
3.0 BACKGROUND AND REGIONAL INFORMATION	12
3.1 SURFACE WATER AND DRAINAGE	12
3.2 PHYSIOGRAPHIC SETTING	12
3.3 REGIONAL GEOLOGY	12
3.4 REGIONAL HYDROGEOLOGY	13
3.5 LOCAL HYDROSTRATIGRAPHY	14
3.6 OIL AND GAS WELLS	16
3.7 RADON GAS	17

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page ii
November 22, 2019

	<u>Page</u>
4.0 SITE HISTORY AND CURRENT CONDITION	18
4.1 SITE HISTORY	18
4.1.1 Predevelopment History, 1896 - <1958	18
4.1.2 PVC Manufacturing, 1958 to 1982	20
4.1.3 Post Stauffer Land Use, 1982 – Present	21
4.2 CURRENT SITE CONDITIONS	22
4.3 KNOWN RELEASES AND ENVIRONMENTAL FEATURES	23
4.4 OTHER ASTM E1527-13 FEATURES	24
5.0 PREVIOUS INVESTIGATIONS AND REMEDIATION	25
5.1 INITIAL SOIL INVESTIGATION, CONVERSE, 1982	25
5.2 PRE-DEMOLITION INVESTIGATION, BROWN & CALDWELL, 1986	25
5.3 UST REMOVALS, OHM, OCTOBER 1993	26
5.4 PHASE I REMEDIAL INVESTIGATION, ENSR, 1995	27
5.5 SOIL OU REMEDIATION, 1997 - 2011	28
5.6 ADDITIONAL GROUNDWATER ASSESSMENT, 1995 - 2006	31
5.7 GROUNDWATER REMEDIATION, 2011 – PRESENT	31
6.0 ADJOINING AND NEARBY PROPERTIES	34
6.1 DATABASE LISTINGS	34
6.2 TARGET PROPERTY LISTINGS	34
6.3 ADJOINING PROPERTIES TO THE NORTH	36
6.3.1 Cruise America Facility, 2233 East 223 rd Street	36
6.3.2 WIN Chevrolet/Hyundai, 2201 East 223 rd Street	37
6.3.3 Honda, 2055 East 223 rd Street	38
6.3.4 LACoFD Fire Station #127, 2049 East 223 rd Street	38
6.4 ADJOINING PROPERTIES TO THE SOUTH	39
6.4.1 Marathon Refinery	39
6.4.2 PolyOne Facility, 2104 East 223 rd Street	40
6.4.3 Former Johns Manville Property, 2420 East 223 rd Street	40
6.5 ADJOINING PROPERTIES TO THE EAST	41
6.5.1 Carson Industrial LLC Property, 2254 East 223 rd Street	41
6.5.2 ARCO Polypropylene, LLC, 2420 East 223 rd Street	42
6.6 SOLUTIA PROPERTY TO THE WEST	42
6.7 OFFSITE DATABASE LISTINGS	43
6.7.1 Niklor Chemical Co., 2060 East 220 th Street	44
6.7.2 Rainbow, 21119 Wilmington Avenue, Carson	44
7.0 SUMMARY AND CONCLUSIONS	46
7.1 RECOGNIZED ENVIRONMENTAL CONDITIONS	46
7.2 CONTROLLED RECOGNIZED ENVIRONMENTAL CONDITIONS	46
7.3 HISTORICAL RECs (HRECs):	47
7.4 OTHER ENVIRONMENTAL FEATURES (OEFs)	48
REFERENCES	50

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page iii
November 22, 2019

Page

TABLES

FIGURES

- APPENDIX A: CONSENT AGREEMENT AND IMMINENT AND SUBSTANTIAL ENDANGERMENT ORDER, JUNE 27, 1994**
- APPENDIX B: SUMMARY OF SITE ENVIRONMENTAL CONDITIONS, AECOM, JANUARY 2011**
- APPENDIX C: LAND USE COVENANT AND AGREEMENT, RECORDED SEPTEMBER 4, 2013**
- APPENDIX D: DTSC REMEDIAL ACTION CERTIFICATION FORM**
- APPENDIX E: FIGURES FROM 1ST SEMI-ANNUAL MONITORING REPORT, GROUP DELTA, SEPTEMBER 2019**
- APPENDIX F: HISTORICAL TOPOGRAPHIC MAPS**
- APPENDIX G: HISTORICAL AERIAL PHOTOGRAPHS**
- APPENDIX H: CERTIFIED SANBORN® MAP REPORT**
- APPENDIX I: THE EDR-CITY DIRECTORY ABSTRACT**
- APPENDIX J: SITE PHOTOGRAPHS**
- APPENDIX K: EDR RADIUS MAP™ REPORT WITH GEOCHECK®**

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page iv
November 22, 2019

LIST OF TABLES

<u>Table No.</u>	<u>Title</u>
1	EDR Database Listings

LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>
1	Location Map
2	Vicinity Map
3	Former Facility Plan
4	Former VLE System Layout
5	Residual 1,2-DCA in Soil
6	Residual VC in Soil
7	EISB System Layout
8	Site Features

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page v
November 22, 2019

LIST OF ABBREVIATIONS AND ACRONYMS

AOC	area of concern
ARCO	Atlantic Richfield Company
AST	aboveground storage tank
ASTM	ASTM International
bgs	below ground surface
CalEPA	California Environmental Protection Agency
CDPH	California Department of Public Health
CDWR	California Department of Water Resources
CPT	cone penetrometer test
CREC	controlled REC
1,2-DCA	1,2-dichloroethane
1,1-DCE	1,1-dichloroethylene
DNAPL	dense nonaqueous-phase liquid
DOGGR	California Division of Oil, Gas, and Geothermal Resources
DTSC	California Department of Toxic Substances Control
EAI	Environmental Audit, Inc.
EDC	ethylene dichloride
EDR	Environmental Data Resources, Inc.
EISB	enhanced <i>in-situ</i> anaerobic bioremediation
ELCR	estimated lifetime cancer risk
ENSR	ENSR Consulting and Engineering
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
EVO	emulsified vegetable oil
gpm	gallon per minute
HHRA	human health risk assessment
HREC	historical recognized environmental condition
ISTD	<i>in-situ</i> thermal destruction
LACoDPH	Los Angeles County Department of Public Health
LACoDPW	Los Angeles County Department of Public Works
LACoFD	Los Angeles County Fire Department
LACoSD	Sanitation Districts of Los Angeles County
LARWQCB	California Regional Water Quality Control Board, Los Angeles Region
LNAPL	light nonaqueous-phase liquid
LTCP	low threat closure policy
LUC	land use covenant
mg/kg	milligram per kilogram
mg/L	milligram per liter
MNA	monitored natural attenuation
msl	mean sea level
MTBE	methyl <i>tert</i> -butyl ether

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page vi
November 22, 2019

NFA	no further action
OEF	other environmental feature
OHM	OHM Remediation Services Corporation
OU	operable unit
PCE	tetrachloroethylene
pCi/L	picocuries per liter
PVC	polyvinyl chloride
RAP	remedial action plan
RBC	risk-based concentration
REC	recognized environmental condition
RSL	Regional Screening Level
SMC	Stauffer Management Company, LLC
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TCE	trichloroethylene
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TPH-g	total petroleum hydrocarbons as gasoline
TRPH	total recoverable petroleum hydrocarbons
µg/L	microgram per liter
USGS	U.S. Geological Survey
UST	underground storage tank
VC	vinyl chloride
VCM	vinyl chloride monomer
VLE	vapor liquid extraction
VOC	volatile organic compound
WDR	Waste Discharge Requirement

EXECUTIVE SUMMARY

This report documents a Phase I environmental site assessment (ESA) for the approximately 14-acre¹ Stauffer Management Company LLC (SMC) property at 2212 East 223rd Street in Carson, California (the site). Between 1959 and 1982, the now vacant site was a polyvinyl chloride (PVC) manufacturing facility (the facility) operated by American Chemical Company and Stauffer Chemical Company (Stauffer). As a result of PVC manufacturing operations, soil and groundwater beneath the site are contaminated with volatile organic compounds (VOCs) and the site is subject to a consent order with the California Department of Toxic Substances Control (DTSC). Soil remediation at the former Stauffer facility has been completed, although significant residual contamination remains at depth, and groundwater remediation is ongoing. Because of the residual soil contamination, the site is “deed-restricted” through a land use covenant (LUC).

Avocet Environmental, Inc. (Avocet) conducted this Phase I ESA in general accordance with the scope and limitations of ASTM International (ASTM) Standard E1527-13 while recognizing that the site is contaminated, is subject to the DTSC consent order and a LUC, but is “mature” in having undergone approximately 37 years of subsurface investigation and remediation. Moreover, the Phase I ESA recognizes that Stauffer’s successor in interest is responsible for soil and groundwater contamination related to its former operations and the potential future consequences thereof. This report updates and supersedes Avocet’s February 16, 2014 draft Phase I ESA report for the subject site.

SUMMARY OF SITE HISTORY AND OPERATIONS

The approximately 14-acre SMC property was first developed in 1958 by American Chemical Company as a PVC manufacturing facility. Prior to 1958, the property and much of the surrounding area had been agricultural. American Chemical Company was a joint venture between Stauffer and ARCO, although Stauffer purchased ARCO’s interest in 1974 and thereafter was the sole owner/operator until PVC manufacturing operations ceased in 1982. American Chemical Company and Stauffer produced PVC resin utilizing ethylene chloride, ethylene dichloride (EDC, aka 1,2-dichloroethane or 1,2-DCA) and vinyl chloride monomer (VCM) as manufacturing intermediates. The original manufacturing plant was located in the southwest corner of the SMC property, in what became known as Area 1, with the remainder (Area 2) occupied by office and support buildings or vacant. In 1961, 1964, and 1971, the plant was expanded eastward, eventually occupying all of the SMC property. In 1978, Stauffer expanded the plant again into the adjoining former Coon Trust property (Area 3) to the east. In addition to numerous aboveground storage tanks (ASTs) for raw materials, intermediary and finished products, and waste products, the SMC property featured three underground storage tanks (USTs) in which leaded gasoline and waste oil were stored. All three of these USTs were permanently closed by removal in 1993 and are covered by a “no further action” (NFA) letter

¹ The acreages and measurements provided in this report are approximate only and have not been independently verified by Avocet unless specifically indicated otherwise.

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page ES-2
November 22, 2019

issued by the Los Angeles County Department of Public Works (LACoDPW). The facility also included wastewater treatment facilities in which wastewater, and later surface water runoff, was treated prior to discharge to the sanitary sewer system. Avocet has not been able to determine the type (e.g., tiered permit) and status (e.g., active or closed with no outstanding obligations) of the permit under which treated wastewater was discharged to the sanitary sewer. In 1982, Stauffer ceased manufacturing PVC resin and, over the next few years, demolished and removed its former infrastructure “to grade,” leaving foundations and other subsurface features, including pipelines, in place. No use has been made of the SMC property since Stauffer terminated PVC manufacturing operations in 1982.

American Chemical Company and Stauffer manufacturing operations resulted in very significant impacts to vadose zone soil and groundwater. The principal contaminants include 1,2-DCA, vinyl chloride (VC), and trichloroethylene. Consistent with the concentration of manufacturing infrastructure, most of the soil impacts were beneath the SMC property; however, migration in the subsurface resulted in localized vadose zone impacts beneath the adjoining former Coon Trust property. The highest contaminant concentrations in groundwater were in the uppermost water-bearing zone, dubbed Unit A, but groundwater in three deeper water-bearing zones has also been impacted. Laterally, contaminants in groundwater have migrated from the SMC property beneath neighboring properties, many of which have their own groundwater contamination issues, and beneath the former Coon Trust property. After characterizing subsurface conditions, SMC remediated vadose zone soil using high-vacuum vapor liquid extraction (VLE) between 1998 and 2011. In its 13 years of operation, the VLE system is estimated to have removed 300,810 pounds of contaminant mass from the subsurface; however, significant residual contamination remains in fine-grained, saturated soils between 25 and 35 feet below ground surface (bgs), mostly beneath the central process area in Area 2. Soil VOC concentrations in the upper 15 feet of the vadose zone were below the target cleanup levels at the end of the VLE remediation effort. Residual 1,2-DCA and VC isoconcentrations in soil at different depth intervals, as interpreted by AECOM (Appendix B), are presented in Figures 5 and 6, respectively. Because of the residual contamination in soil between 25 and 35 feet bgs, the SMC property has been deed-restricted via a recorded LUC. The LUC for the SMC property prohibits residential and sensitive land uses and requires vapor barriers beneath new buildings unless DTSC accepts “analysis” that indicates they are unnecessary. After the LUC for the SMC property was recorded, DTSC certified the soil remediation effort.

Groundwater remediation using enhanced *in-situ* bioremediation (EISB) was initiated at the former Stauffer facility in 2011 and is ongoing. EISB involves extracting contaminated groundwater from wells along the hydraulically downgradient (western) boundary of the SMC property, amending it with electron donors and nutrients, and then reinjecting it via hydraulically upgradient injection wells located along the northern and eastern boundary of the subject site and the eastern boundary of the adjoining City of Carson property. It is noted that extracted groundwater is not treated to remove VOCs prior to being reinjected. It is further noted that the easement recorded to accommodate the EISB infrastructure will be required until remediation is completed. The duration of the EISB effort is not known but will probably be at least five years.

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page ES-3
November 22, 2019

SITE SETTING

Selected information pertaining to the site's physical setting and hydrogeological setting is as follows:

- The site is located south of the “Dominguez Gap” between Dominguez Hill, immediately to the northwest, and Bixby Knolls and Signal Hill to the southeast. Located in the West Coast (groundwater) Basin, the site is underlain by the Bellflower aquitard and several deeper aquifers, including the Gaspur aquifer which occurs within the ancestral channel of the Los Angeles River to the east. Groundwater beneath the site is encountered in the Bellflower or surficial aquifer at around 20 feet bgs but the first aquifer, dubbed Unit A, is encountered at around 35 feet bgs. Groundwater flow in Unit A is to the southwest, although this gradient has been locally impacted by the ongoing EISB groundwater remediation effort. As it is typically of poor quality from a general water quality perspective and available in limited quantities only, no direct beneficial use is made of groundwater in the surficial aquitard and in Unit A.
- The site is surrounded by oil fields but is not located within the administrative boundary of any of them, and the closest “prospect” or “wildcat” well was located approximately 3,900 feet to the west. As such, it is unlikely that the site has been impacted by oil/gas drilling or production. Moreover, as the site is not inside the administrative boundary of an oil field, a combustible gas assessment is not required as a precursor to redevelopment.
- Naturally occurring radon levels in the site vicinity are expected to be very low and within regulatory agency criteria.

RECOGNIZED ENVIRONMENTAL CONDITIONS (RECs)

ASTM (2013) defines RECs as:

“... the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.”

ASTM (2013) goes on to define *de minimis* as:

“... a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.”

Based on the subject Phase I ESA, Avocet has identified a single REC at the site as follows:

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page ES-4
November 22, 2019

- **REC 1 – Groundwater Contamination.** Groundwater in Units A, B, and C beneath the site has been impacted by 1,2-DCA, VC, and other VOCs. Groundwater remediation was initiated in October 2011 but is expected to require at least five years before cleanup goals in Unit A are achieved. As groundwater in Unit A has no direct beneficial uses, the cleanup goals are based on exposure via inhalation of VOC vapors at the ground surface. It is noted in this regard that soil vapor conditions beneath the SMC property have not been assessed since 1995, although the LUC (Appendix C), among other things, requires vapor barriers beneath new buildings unless DTSC accepts “analysis” that indicates they are unnecessary. As groundwater contamination beneath the site has not yet been addressed to DTSC’s satisfaction, and as the LUC for the site was triggered by residual soil contamination (as opposed to groundwater contamination), Avocet does not believe groundwater contamination is an HREC or a CREC.

CONTROLLED RECs (CRECs)

ASTM (2013) defines CRECs as a REC:

“ . . . resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls). ”

Based on the subject Phase I ESA, Avocet has identified a single CREC at the site as follows:

- **CREC 2 – Soil Contamination at 25 to 35 Feet bgs.** Contaminants attributed to releases at the site are present in saturated, low permeability soil between 25 and 35 feet bgs. VLE was not effective in removing VOCs from soil in this vertical interval, which is now being addressed as part of the groundwater remedy. Residual soil contamination between 25 and 35 feet bgs (Figures 5 and 6) resulted in a LUC being recorded for the SMC property. As residual soil contamination between 25 and 35 feet bgs is addressed by the LUC, it is considered a CREC rather than a REC or HREC.

HISTORICAL RECs (HRECs)

ASTM defines HRECs as:

“ . . . a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls). ”

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page ES-5
November 22, 2019

Based on the subject Phase I ESA, Avocet has identified two HRECs at the site as follows:

- **HREC 3 – Soil Contamination at 0 to 15 Feet bgs.** As noted above, contaminants attributed to releases at the site have impacted the surficial aquitard above Unit A as well as groundwater in Unit A and deeper water-bearing zones. To the extent they impacted the upper 15 feet of the unsaturated vadose zone, contaminants in this vertical interval have been addressed by VLE, and DTSC has certified that remediation in that interval is complete. As such, VOC impacts in the upper 15 feet of the unsaturated vadose zone beneath the site are considered an HREC.
- **HREC 4 – Former USTs.** Stauffer operated three single-walled steel USTs in the northwest corner of the subject site: 500- and 2,000-gallon USTs for leaded gasoline and a 500-gallon UST for waste oil. It is not clear when the three USTs were installed but the waste oil UST was taken out of service in 1978 and the gasoline USTs were taken out of service in 1982. In 1993, all three single-wall USTs were permanently closed by removal. Impacted soil was encountered during the removal of the USTs and “over-excavated.” A total of 12 soil matrix samples were collected from beneath the three USTs and the associated piping systems and dispensers and analyzed for a variety of fuel hydrocarbon constituents. None of the soil samples contained fuel hydrocarbons, and on June 29, 1994, the LACoDPW issued an NFA letter for the three USTs.

OTHER ENVIRONMENTAL FEATURES (OEFs)

OEFs are potential environmental features or conditions that do not meet the definition of a REC, CREC, or HREC but which may warrant mention in the context of acquiring and redeveloping the site. Based on the subject Phase I ESA, Avocet has identified three OEFs at the site, as follows:

- **OEF 5 – Subsurface Piping and Other Infrastructure.** In the years that followed the cessation of manufacturing operations in 1982, SMC demolished and removed buildings and aboveground infrastructure “to grade,” meaning that subsurface infrastructure, including pipelines and possibly sumps and vaults, was left in place. AECOM personnel are unaware whether the pipelines were systematically drained and flushed prior to being abandoned but have reported that pipelines encountered when trenching for remediation system piping did not contain liquids. It would be prudent to assume that subsurface piping and possibly other infrastructure will be encountered during site redevelopment and will have to be addressed appropriately.
- **OEF 6 – Consent Agreement.** The site is subject to continued DTSC oversight pursuant to the Consent Agreement entered in 1994 (Appendix A).
- **OEF 7 – Land Use Covenant.** The LUC (Appendix B) restricts how the SMC property can be used. Assuming Panattoni is not contemplating anything other

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page ES-6
November 22, 2019

than commercial/industrial redevelopment, the Prohibited Uses (Article 4.01) and Prohibited Activities (Article 4.03) should not apply. However, the articles pertaining to soil management, new construction, and non-interference with the EISB system and associated monitoring wells may apply. With respect to soil management (Article 4.02), DTSC requires a Soil Management Plan if soil at or below 15 feet bgs is to be disturbed. Article 4.04 of the LUC requires that new buildings feature vapor barrier *“unless analysis is provided to indicate vapor barriers are unnecessary as approved by the Department”* (i.e., DTSC). As previously noted, Avocet interprets the non-interference clause (Article 4.05) as requiring future landowners to seek DTSC’s approval to replace any remediation or monitoring infrastructure damaged or destroyed during redevelopment.

1.0 INTRODUCTION

This report documents a Phase I environmental site assessment (ESA) for the approximately 14-acre² property at 2212 East 223rd Street in Carson, California (the site). Between 1959 and 1982, the now-vacant site was a polyvinyl chloride (PVC) manufacturing facility (the facility) operated by American Chemical Company and Stauffer Chemical Company (Stauffer). As a result of PVC manufacturing operations, soil and groundwater beneath the site are contaminated with volatile organic compounds (VOCs). Soil remediation at the former Stauffer facility has been completed, although significant residual contamination remains at depth, and groundwater remediation is ongoing. Because of the residual soil contamination, the site is “deed-restricted” through a land use covenant (LUC).

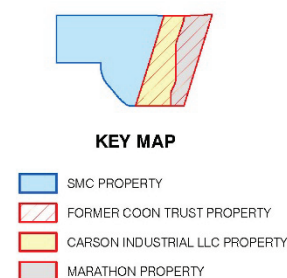
Avocet Environmental, Inc. (Avocet) conducted this Phase I ESA on behalf of Panattoni Development Company, Inc. (Panattoni), one of whose affiliates is considering purchasing the site. The Phase I ESA was conducted in general accordance with the scope and limitations of ASTM International (ASTM) Standard E1527-13 while recognizing that the site is contaminated, is subject to regulatory agency requirements and a LUC, but is “mature” in having undergone approximately 37 years of subsurface investigation and remediation. Moreover, the Phase I ESA recognizes that Stauffer’s successor in interest is responsible for soil and groundwater contamination related to its former operations and the potential future consequences thereof. This report updates and supersedes Avocet’s February 16, 2014 draft Phase I ESA report for the subject site.

1.1 OVERVIEW

This section provides a high-level overview of the facility’s history with emphasis on subsurface environmental conditions and the remediation thereof to provide context for the remainder of this Phase I ESA.

1.1.1 Facility History and Operations

The former Stauffer facility is located on the south side of East 223rd Street, between Wilmington Avenue and Alameda Street, at the north end of a large industrial area dominated by oil refineries, petrochemical plants, and other heavy industries. The facility location is shown in Figure 1, and a vicinity map identifying neighboring properties is presented in Figure 2. The former facility occupied two adjoining parcels of land comprising a total of 25 acres. The western 14 acres (the subject property) were owned by Stauffer and the eastern 11 acres (the former Coon Trust property) were owned by the estate of I donna Coon and leased to Atlantic Richfield Company (ARCO). In 1959, American Chemical Company, a joint venture between Stauffer and ARCO, began manufacturing PVC resin at the



² The acreages and measurements provided in this report are approximate only and have not been independently verified by Avocet unless specifically indicated otherwise.

subject site with ethylene chloride, ethylene dichloride (EDC, aka 1,2-dichloroethane or 1,2-DCA) and vinyl chloride monomer (VCM) as manufacturing intermediates. Prior to being occupied by the American Chemical Company, the site had been agricultural. The original manufacturing plant was in the southwest corner of the subject property, in what became known as Area 1, with the remainder (Area 2) occupied by office and support buildings or vacant. In 1961, 1964, and 1971, the plant was expanded eastward, eventually occupying all of the subject property. In 1978, Stauffer began leasing the former Coon Trust property (Area 3) and expanded the plant again, although this last expansion involved very few manufacturing and/or product storage facilities. Rather, Stauffer utilized the former Coon Trust property primarily for warehousing. The layout of the former Stauffer facility prior to the cessation of PVC manufacturing is shown in Figure 3.

In 1974, Stauffer acquired ARCO's interest in the joint venture and continued operations until 1982, at which time manufacturing ceased. By 1985, Stauffer had demolished the former manufacturing infrastructure at the facility "to grade" and the few buildings that were left have since been removed. Avocet understands that building pads, other foundations, subsurface piping, and possibly other subsurface infrastructure remain in place. In 1987, Atkemix Thirty Seven Inc., a subsidiary of Stauffer Management Company, became the owner of the western 14 acres of the former facility after Stauffer (i.e., the Stauffer Chemical Company) was sold to Rhone-Poulenc, Inc. In December 2000, Stauffer Management Company and Atkemix Thirty Seven Inc. merged, resulting in the formation of the Stauffer Management Company LLC (SMC), the current owner of the subject western 14 acres. The City of Carson acquired the 11-acre Coon Trust property in October 2003. In 2008, ARCO purchased the eastern 6 acres of the former Coon Trust property from the City of Carson, combined it with the adjoining parcel to the east, and redeveloped it with an office building and related support and recreational facilities. The office building is now occupied by Marathon and the property also serves as an entrance to the Marathon (formerly ARCO) refinery located to the south (Figure 2). In July 2019, Carson Industrial LLC purchased the western 5 acres of the former Coon Trust property from the City of Carson. Avocet understands that Carson Industrial LLC plans to pave the western 5 acres of the former Coon Trust property and lease it to Marathon for employee parking.

1.1.2 Subsurface Investigation and Remediation

Stauffer began investigating subsurface environmental conditions beneath the Stauffer facility in 1982, at or around the time manufacturing operations ceased. The California Department of Toxic Substances Control (DTSC) began providing oversight in 1986, and in 1994, DTSC and Stauffer entered into a "Consent Agreement and Imminent and Substantial Endangerment Order" (Docket No. HSA 93/94-005) that governed facility investigation and remediation. So far as Avocet is aware, the Consent Agreement (Appendix A) has been amended but is still in effect. Stauffer's investigations showed that soil and groundwater beneath the former facility were contaminated by 1,2-DCA, vinyl chloride (VC), and other chlorinated solvents used in former manufacturing operations. In brief, soil was impacted in localized "hot spots," believed to coincide with former process areas, with VOC concentrations generally increasing with depth (AECOM, May 2011). The highest VOC concentrations in soil were in a roughly 7-acre portion

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 3
November 22, 2019

of Area 2, referred to as the former central process area, on the subject SMC property. For remediation purposes, DTSC decided to address subsurface contamination via two “operable units” (OUs), a Soil OU and a Groundwater OU. The Soil OU extended to approximately 35 feet below ground surface (bgs) and includes unsaturated and saturated sediments in the “surficial aquitard” that overlies the Groundwater OU.

After soil vapor extraction in the Soil OU proved ineffective, SMC initiated vadose zone soil remediation in December 1998 using a high-vacuum vapor and liquid extraction (VLE) system. The VLE system was designed to mitigate VOC impacts in unsaturated and saturated soil to 35 feet bgs throughout the approximately 7-acre source area. Initially (Stage 1), the VLE system involved extraction from 16 “multi-phase” extraction wells. In 2000, the VLE system was expanded (Stage 2) to include 90 additional multi-phase extraction wells. In 2007 and 2008, the effectiveness of the VLE system was “enhanced” using compressed nitrogen to pneumatically “fracture” saturated, low-permeability, fine-grained soil between 25 and 35 feet bgs. A number of the “fracking” borings were converted to serve as additional VLE wells. By the time VLE was terminated in November 2011, an estimated 300,810 pounds of VOCs had been removed from the subsurface over 13 years of operation (DTSC, October 15, 2013). The layout of the former VLE system is shown in Figure 4.

On completion of the VLE remediation effort, residual VOC concentrations in unsaturated soil between the ground surface and 15 feet bgs were below the DTSC-approved risk-based concentrations (RBCs) established in a human health risk assessment (HHRA). Residual 1,2-DCA and VC isoconcentrations in soil at different depth intervals, as interpreted by AECOM, are presented in Figures 5 and 6, respectively. Because the fine-grained soil between 25 and 35 feet bgs was saturated, VLE was not as effective and residual VOC concentrations remained above inhalation-based RBCs. As a result, the saturated sediments between 25 and 35 feet bgs were “transferred” to the Groundwater OU and SMC recorded a LUC for the SMC property (SMC, September 4, 2013), which prohibits certain “sensitive” land uses and requires vapor barriers beneath new buildings unless DTSC accepts “analysis” that indicates they are unnecessary. After the LUC was recorded, DTSC “certified” that soil remediation at the former Stauffer facility was complete (DTSC, October 15, 2013). A summary of environmental conditions at the former Stauffer facility, prepared in 2011 by AECOM, SMC’s former consultant, is included as Appendix B to this report. A copy of the September 4, 2013 LUC for the subject SMC property is included in Appendix C, and a copy of DTSC’s October 15, 2013 certification of the Soil OU is included in Appendix D.

In the Groundwater OU, groundwater in four relatively discrete water-bearing zones (Units A through D) has been impacted, primarily by 1,2-DCA, VC, and trichloroethylene (TCE). AECOM has estimated (AECOM, May 2011) that approximately 87 percent of the subsurface VOC mass is comprised of 1,2-DCA, making it the principal contaminant in terms of concentration and lateral and vertical extent. Dissolved VOCs in groundwater extend offsite to the north, south, and west of the SMC property, and also to the east onto the Carson Industrial LLC property. Unit A, interpreted as being the lower part of the Bellflower aquitard or the upper portion of the Gaspar aquifer, contains the highest VOC concentrations, with generally decreasing concentrations in deeper water-bearing zones. Pre-remediation isoconcentrations for

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 4
November 22, 2019

selected VOCs in the various water-bearing zones are included in Appendix B. The groundwater remedy selected for the facility includes institutional controls and enhanced *in-situ* anaerobic bioremediation (EISB). The institutional controls are outlined in the September 4, 2013 LUC (Appendix C).

The EISB system, which became operational in October 2011, is designed to remediate VOC impacts to groundwater within the three uppermost groundwater-bearing units. The original system involved extracting groundwater from 16 wells located along the hydraulically downgradient (western) facility boundary, amending it with an electron donor (ethanol), and then injecting the amended groundwater into 25 hydraulically upgradient wells: 18 along the northern and eastern boundaries of the SMC property and 7 along the eastern boundary of the adjoining Carson Industrial LLC property. Avocet notes that the extracted groundwater is not treated to remove VOCs prior to being reinjected. Of the 16 original extraction wells, 7 were screened in Unit A, 5 in Unit B, and 4 in Unit C. Of the 25 original injection wells, 11 were screened in Unit A, 8 in Unit B, and 6 in Unit C. The original recirculation rates for Units A, B, and C were approximately 57 gallons per minute (gpm), 92 gpm, and 98 gpm, respectively (AECOM, February 26, 2013).

To optimize performance and address recalcitrant hotspots, the EISB system has been modified several times since remediation began in 2011. Modifications have included converting monitoring wells to injection or extraction wells, installing new extraction and injection wells, converting extraction wells to injection wells and vice versa, and taking extraction or injection wells offline. Also, EISB in Unit C was suspended in February 2015 for rebound monitoring purposes. Limited EISB was resumed in Unit C between August and December 2018 but has since been suspended again. As of April 2019, the EISB system and related monitoring wells were as follows:

Onsite EISB and Monitoring Wells as of April 2019					
Water-Bearing Zone	Extraction		Injection		Monitoring
	Active	Inactive	Active	Inactive	
Unit A	9	3	13	7	7
Unit B	6	0	12	2	7
Unit C	1	2	2	6	8
Unit D	0	0	0	0	5
Unit E	0	0	0	0	1

Notes: (1) In Unit B, 4 of the 12 injection wells are for emulsified vegetable oil (EVO) only
(2) In Unit C, the active injection and extraction wells are for EVO only

On September 27, 2019, Group Delta proposed additional modifications to address residual source area contamination in Unit A around Wells MW-7A and MW-10A (Group Delta, September 27, 2019). The modifications involve hydraulic fracturing of the aquitard and the injection of EVO via a series of closely spaced direct-push injection borings around Wells MW-7A and MW-10A. Group Delta also proposed to convert two Unit B extraction wells (Wells EX-1B and EX-4B) to injection wells. DTSC approved Group Delta's proposed modifications for implementation via email on October 9, 2019 and Avocet understands that the modifications will be made before the end of 2019. The layout of the current EISB system is

shown in Figure 7 and figures showing Group Delta's interpretation of groundwater conditions at the site, as reported in its first semi-annual groundwater monitoring report for 2019 (Group Delta, September 30, 2019), are included in Appendix E.

1.2 PHASE I ESA OBJECTIVES

Given that the subsurface environment beneath the site has been contaminated and is being remediated by SMC, which Avocet understands will remain responsible for Stauffer-related soil and groundwater contamination, the emphasis of the Phase I ESA is on current conditions and the adequacy of the protective measures implemented to date. Specific objectives of the Phase I ESA are:

- Document the history of the site in the context of the use, storage, handling, and disposal of potentially hazardous substances.
- Review and evaluate available information related to the investigation and remediation of known subsurface impacts.
- Assess the possible presence of previously unidentified hazardous substances that could be present in the subsurface as a result of their past use, storage, handling, or disposal within or near the site.
- Identify "recognized environmental conditions" (RECs), historical RECs (HRECs), and "controlled" RECs (CRECs) as defined in ASTM Standard E1527-13 (ASTM, 2013).
- Identify "other environmental features" (OEFs), defined for Phase I ESA purposes as conditions that do not meet the definition of a REC, HREC, or CREC but which may warrant mention in a comprehensive Phase I ESA.

1.3 APPROACH

The subject Phase I ESA was conducted in general accordance with the requirements of ASTM Standard E1527-13 (ASTM, 2013) and included:

- A review of relevant background information, including the history of the site and adjacent properties, past land use, and regional hydrogeologic conditions.
- A review of aerial photographs, topographic maps, and environmental records pertaining to the site.
- Interviews with AECOM and Group Delta, SMC's former and current consultants, respectively, regarding current and past operations at the site and subsurface environmental conditions.

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 6
November 22, 2019

- A walkover survey of the site on November 18, 2013 for Avocet's original Phase I ESA and another walkover survey on September 19, 2019 specifically for the subject Phase I ESA.
- A review of potential offsite sources of contamination that could adversely impact the subsurface environment beneath the site, including a search of regulatory agency databases and visual surveys of adjoining properties.

The format of this Phase I ESA report is different from that suggested by ASTM; however, all of the elements required by ASTM E1527-13 are included or otherwise addressed.

1.4 LIMITATIONS

This Phase I ESA was performed in general accordance with the scope and limitations of ASTM E1527-13 (ASTM, 2013) and the standard of care customary in the environmental consulting industry as of the date of this report. The conclusions in this Phase I ESA report, including the identification of RECs, CRECs, HRECs, and OEFs are based on the information available to Avocet from the sources cited; however, Avocet makes no warranty regarding the accuracy or completeness of this information. Moreover, this Phase I ESA specifically excludes any evaluation of geotechnical conditions, the stability of onsite or adjacent slopes or retaining walls, flooding hazards, seismicity, and the possible impact, if any, of electromagnetic fields associated with onsite or nearby electrical facilities. Also, this report cannot and does not include any evaluation of undocumented activities at the site or on adjacent or nearby properties. The exclusions noted above should not be interpreted to mean that all other potential environmental concerns or conditions are addressed in this Phase I ESA.

Avocet conducted this Phase I ESA on Panattoni's behalf to document environmental conditions at the site for decision making in the context of Carson Industrial, LLC acquiring it for redevelopment. Panattoni Development Company, Inc., Carson Industrial, LLC, and Texas Capital Bank, N.A. may rely upon the information provided in this Phase I ESA report for a period of 180 days from the date of issue. After 180 days, this Phase I ESA should be updated in accordance with ASTM guidance. Avocet will not be liable for any consequential damages arising from the use of this report for other than its intended purpose, for use of this report beyond one year of its issue date, or from unauthorized use by third parties.

1.5 REPORT ORGANIZATION

Including the introduction, this Phase I ESA report is organized into eight sections. Section 2.0 describes the various sources of information utilized in preparing this Phase I ESA report. Section 3.0 presents a summary of relevant background and regional information. Section 4.0 describes the history and current condition of the site, including broad descriptions of past operations involving potentially hazardous substances. Section 5.0 summarizes previous and ongoing environmental assessment and remediation work conducted at the site and the adjoining Coon Trust property. Section 6.0 summarizes information gathered from a review of environmental databases maintained by local, state, and federal government agencies and

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 7
November 22, 2019

describes adjoining and selected nearby properties. Section 7.0 presents a summary and conclusions.

Supporting information is contained in tables, figures, and 11 appendices, all of which follow the text of this report. Appendix A contains a copy of the June 27, 1994 Consent Agreement between Stauffer and DTSC. Appendix B is a summary of environmental conditions at the former Stauffer facility prepared in 2011 by AECOM. Appendix C contains the LUC for the SMC property, and Appendix D contains DTSC's certification of the Soil OU. Appendix E contains figures showing Group Delta's most recent interpretation of the groundwater conditions beneath the site. Appendix F contains historical topographic maps, and Appendix G contains historical aerial photographs. Appendix H is a letter pertaining to the absence of fire insurance map coverage of the site. Appendix I is a City Directory Abstract summarizing entry recorded in city, telephone, and other directories. Appendix J contains photographs taken during the walkover site surveys on November 18, 2013 and September 19, 2019. Appendix K is a report summarizing information available from a review of environmental databases maintained by local, state, and federal government agencies.

2.0 SOURCES OF INFORMATION

Sources of information utilized in preparing this and Avocet's earlier Phase I ESA reports included historical topographic maps; historical aerial photographs; a walkover survey of the site and adjoining properties; in-person and telephone discussions with representatives of the City of Carson, AECOM (SMC's former consultant), and Group Delta (SMC's current consultant); a review of site-specific environmental documents provided by AECOM and Group Delta; a review of records available at selected local and state regulatory agencies; a review of databases maintained by local, state, and federal government agencies; and other records available from commercial and online sources.

2.1 TOPOGRAPHIC MAPS

To evaluate the history of the site and past land uses, Avocet reviewed copies of historical U.S. Geological Survey (USGS) topographic maps published between 1896 and 1981 obtained from Environmental Data Resources, Inc. (EDR), of Shelton, Connecticut. The maps, which Avocet has marked up with the approximate site boundary, are included in chronological order as Figures F-1 through F-9 in Appendix F.

2.2 AERIAL PHOTOGRAPHS

To further evaluate the site's history, Avocet reviewed a "Decade Package" of historical aerial photographs obtained from EDR. EDR's Decade Package generally includes at least one aerial photograph from each decade from the 1920s through the present day. For the subject Phase I ESA, EDR provided aerial photographs taken between 1927 and 2012. Certain of these aerial photographs have been annotated with the site and facility boundaries and are included, in chronological order, as Figures G-1 through G-13 in Appendix G.

2.3 FIRE INSURANCE MAPS

At Avocet's request, EDR conducted a search for fire insurance map coverage but reported that the site is an "unmapped property." A copy of EDR's "Certified Sanborn® Map Report" to that effect is included as Appendix H to this report.

2.4 CITY DIRECTORIES

Telephone and business directories have been published for cities and counties across the United States since the 1700s and often contain potentially useful information on past land uses and the types of business that operated at specific street addresses. EDR extracts information from such directories and consolidates it in its "The EDR-City Directory Abstract," a copy of which is included as Appendix I to this report.

2.5 WALKOVER SURVEY AND COMMUNICATIONS WITH OWNER

Avocet conducted a walkover survey of the site on November 18, 2013, in the course of its original Phase I ESA, accompanied by Mr. Brian Dean of AECOM, SMC's then environmental

consultant. Mr. Dean has been providing consulting services to SMC for over a decade and is very familiar with the history and environmental conditions at the site. Avocet personnel also had follow-up conversations with Mr. Dean and Ms. Amelia Soto of the City of Carson. On September 19, 2019, Avocet conducted another walkover survey of the site, this time accompanied by Ms. Alycia McCord of Group Delta, SMC's current consultant. Avocet notes that Mr. Dean and Ms. McCord both worked for AECOM in 2013 and now both work for Group Delta. Information obtained from Mr. Dean, Ms. McCord, and Ms. Soto is referenced, as appropriate, throughout the remainder of this Phase I ESA report. Selected photographs taken in the course of the walk-over surveys are included in Appendix J

2.6 GOVERNMENT DATABASES

To document potential sources of contamination at or near the site, EDR conducted a search of local, state, and federal government databases on Avocet's behalf. The search included records for the site, the facility, and for other properties within ASTM-standard radii of the site. The records search is summarized in Section 6.0 and Table 1 and a copy of "The EDR Radius MapTM Report with GeoCheck[®]" is included in its entirety as Appendix K. As recommended by ASTM, all but a few of the databases searched were "current," i.e., had been updated within 90 days prior to the search date.

2.7 SITE-SPECIFIC ENVIRONMENTAL REPORTS

A few environment reports pertaining to the former Stauffer facility were provided to Avocet by Panattoni and AECOM for review in 2013, and additional, more recent reports were provided by Group Delta. Selected additional reports were downloaded from the EnviroStor and GeoTracker web sites maintained by the California Environmental Protection Agency (CalEPA) or obtained from regulatory agency files (Section 2.8). Given the facility's 37-year history of environmental investigation and remediation, however, Avocet notes that a very large number of documents containing a vast amount of data are available. Avocet does not claim to have reviewed all of these reports and data. Rather, the volume of information is such that it is not "practically reviewable" and Avocet has instead relied on summaries of environmental conditions and data included in certain of the reports reviewed.

2.8 INFORMATION FROM LOCAL AND STATE AGENCIES

In the course of its original Phase I ESA in 2013, Avocet contacted selected federal, state, and local regulatory agencies to determine whether they possess potentially relevant environmental records pertaining to the site at 2112 East 223rd Street. In particular, Avocet requested records relating to underground storage tanks (USTs), aboveground storage tanks (ASTs), environmental permits, and enforcement orders; reports and correspondence related to site investigation/assessment, soil sampling, monitoring, cleanup/remediation, removal actions, and closures; or any records related to conditions in air, soil, surface water, groundwater, or other environmental media. The agencies contacted and Avocet's interactions with them were as follows:

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 10
November 22, 2019

- A written request was mailed to the U.S. Environmental Protection Agency (EPA), Region 9 on November 19, 2013, but no response was received. EPA has since made the “MyProperty” database available online. Avocet queried the MyProperty database on October 11, 2019 and downloaded a “No Records Certificate” for 2112 East 223rd Street address.
- Written requests were mailed to the DTSC in Chatsworth and Cypress on November 19, 2013. In a letter dated December 2, 2013, DTSC’s Chatsworth office responded that it has no records responsive to Avocet’s request. Pursuant to a letter dated November 25, 2013, Avocet visited DTSC’s Cypress office on January 7, 2014 to review the very large volume of records it maintains. Selected records not available from other sources were reviewed and some were copied. The DTSC Cypress records are referred to, as appropriate, throughout the remainder of this report.
- A written request was faxed to the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB), including its UST and “Spills, Leaks, Investigation, and Cleanup” (SLIC) divisions, on November 19, 2013. In a fax dated November 27, 2013, LARWQCB responded that it has no records responsive to Avocet’s request.
- A written request was mailed to the Sanitation Districts of Los Angeles County (LACoSD) on November 19, 2013. LACoSD indicated it has records pertaining to the former Stauffer facility but Avocet elected not to review them as so much information is available from other sources.
- A written request was mailed to the Los Angeles County Fire Department (LACoFD) on November 19, 2013, but no response was received.
- A written request was mailed to the Los Angeles County Department of Public Works (LACoDPW), but no response was received.
- In a fax dated December 4, 2013, the Los Angeles County Department of Public Health (LACoDPH) responded that it has no records pertaining to the site. It is not clear whether LACoDPH’s fax was in response to the requests submitted to LACoFD or LACoDPW.
- A written request was mailed to the City of Carson, Building and Safety Department, on November 19, 2013, and on January 2, 2014, Avocet reviewed its records. Selected documents not available from other sources were copied and are referred to, as appropriate, throughout the remainder of this report.

The agencies mentioned above were not re-contacted for the subject Phase I ESA on the basis that the only activity at the site since the 2013 requests were made was by or for SMC and the related records are available through EnviroStor or directly from Group Delta.

2.9 OIL AND GAS RECORDS

To assess the possible presence of oil and/or natural gas wells at and in the vicinity of the site, Avocet checked information available online from the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR). The findings of this review are summarized in Section 3.6.

2.10 RADON GAS RECORDS

To assess the possible presence of naturally occurring radon gas in the subsurface, Avocet reviewed data available from EPA and the California Department of Public Health (CDPH), as summarized in “The EDR Radius Map[™] Report with GeoCheck[®]” (Appendix K). The available radon gas data are summarized in Section 3.7.

3.0 BACKGROUND AND REGIONAL INFORMATION

Background and regional information considered relevant to the subject Phase I ESA includes nearby surface water features, the site's physiographic setting, and regional geologic and hydrogeologic conditions.

3.1 SURFACE WATER AND DRAINAGE

The site is located between the Los Angeles River to the east and the Dominguez Channel to the west, although neither of these surface water bodies is directly relevant to this Phase I ESA other than how they may have deposited sediments beneath the site.

The Los Angeles River rises in the Simi Hills and the Santa Susana Mountains and flows through the San Fernando Valley and the Los Angeles Narrows and onto the coastal plain of Los Angeles County, discharging into San Pedro Bay west of downtown Long Beach. Much of the Los Angeles River channel, including the segment nearest the site, has been engineered and is lined with concrete. The Los Angeles River passes within 8,500 feet east of the site at its closest approach. The Dominguez Channel is a similarly engineered drainage channel that originates in the city of Hawthorne to the northwest, and empties into the East Basin of the Port of Los Angeles near San Pedro. The Dominguez Channel passes within 1,200 feet west of the site at its closest approach. The locations of the Los Angeles River and the Dominguez Channel relative to the site are shown in Figure 1.

Although this Phase I ESA excludes an evaluation of the potential for flooding, the EDR Radius Map Report (Appendix K) includes a figure that indicates the site is located within the 500-year floodplain associated with the Los Angeles River and/or the Dominguez Channel.

3.2 PHYSIOGRAPHIC SETTING

In a regional physiographic context, the site is situated on the coastal plain of Los Angeles County, at an elevation of about 25 feet above mean sea level (msl). The coastal plain of Orange and Los Angeles counties is bounded by the Santa Monica Mountains to the north; the Puente Hills, Chino Hills, and the Santa Ana Mountains to the east; and the San Joaquin Hills to the south. The ground surface in the coastal plain typically slopes gently westward, away from these relief features, toward the Pacific Ocean. The boundary of the plain is the Pacific Ocean to the west and the line of contact between the alluvial deposits and the bedrock of the surrounding hills and mountains. On a more localized basis, the site is located south of the "Dominguez Gap," between Dominguez Hill to the northwest and Bixby Knolls and Signal Hill to the east.

3.3 REGIONAL GEOLOGY

The site is located in the Los Angeles Basin physiographic region. The basin is divided into four structural blocks delineated by zones of faulting and flexure. The central block, in which the site is located, extends from the Santa Monica Mountains in the north to the San Joaquin Hills in the south. The central block is dominated by a northwestern synclinal structure known as the South

Gate-Santa Ana syncline, which extends northwest into the greater Los Angeles area from Orange County (Yerkes, et al., 1965). The basement complex is of pre-Cretaceous metasedimentary and metavolcanic rocks with some plutonic intrusions. The basement rocks are overlain by marine and nonmarine clastic sedimentary rocks of late Cretaceous through Pleistocene age. This sedimentary sequence reaches a cumulative thickness of up to 32,000 feet in some areas (Yerkes, et al., 1965). Overlying these sedimentary rocks is a series of unconsolidated alluvial deposits. Only the uppermost portion of this sequence of unconsolidated alluvial deposits contains fresh water, with the underlying portion containing saline water.

3.4 REGIONAL HYDROGEOLOGY

The former Stauffer facility is located in the West Coast (groundwater) Basin and is underlain by the Bellflower aquitard and several deeper aquifers.

The Bellflower aquitard is a heterogeneous mixture of low-permeability silts and clays containing the occasional sand layer, which locally may extend to around 200 feet bgs, although it does not appear to extend to that depth in the site vicinity. More permeable layers within the Bellflower aquitard locally contain perched or semiperched groundwater. In the coastal plain of Los Angeles and Orange counties, the term semiperched is typically applied to shallow water-bearing zones underlain by, but substantially separated from, “produced” aquifers. This separation is often indicated by large vertical differentials in piezometric head and, in some cases, a semiperched water-bearing zone can be supported by fine-grained soils and underlain by unsaturated sediments. As it is generally of poor quality and available in limited quantities only, groundwater in the Bellflower aquitard, including in the Semiperched aquifer, is not suitable for potable use and has no known direct beneficial uses in the site vicinity. The deeper aquifers beneath the site, in vertically descending order, are as follows:

- **Gaspur Aquifer.** Where present, the Gaspur aquifer consists of continental stream deposits within the ancestral channel of the Los Angeles River ranging in size from silt and clay to cobbles and is the basal coarse member of a series of recent alluvial deposits. Seawater intrusion and industrial wastes have significantly impacted groundwater quality in the Gaspur aquifer. Consequently, production from the Gaspur aquifer is very limited and generally occurs from wells that are also screened in deeper aquifers.
- **Gage Aquifer.** The Gage aquifer consists of fine to medium grained sand with variable amounts of gravel, sandy silt, and clay and is the lowest water-bearing zone of the Lakewood Formation. Like the Gaspur aquifer, the Gage aquifer has also been impacted by seawater intrusion in the San Pedro Bay area and by industrial wastes. Consequently, production from the Gage aquifer is limited and generally occurs from wells that are also screened in other, deeper aquifers.
- **Lynwood Aquifer.** The Lynwood aquifer, the upper of two main aquifers within the San Pedro Formation, consists of coarse sand and gravel with some

sandy silt, silt, and clay. Although it has been impacted by seawater intrusion near the coast, the Lynwood aquifer is an important producer of groundwater, and approximately 10 percent of the production wells in the West Coast Basin are screened in this aquifer (California Department of Water Resources [CDWR], 1961).

- **Silverado Aquifer.** The Silverado aquifer, the lower of two main aquifers within the San Pedro Formation, consists of coarse-grained blue-gray sand and gravel. It is reportedly one of the most important groundwater producers in the Los Angeles basin (CDWR, 1961).

3.5 LOCAL HYDROSTRATIGRAPHY

Investigations at the former Stauffer facility have extended to over 400 feet bgs. Data from these investigations have been interpreted as indicating five relatively coarse-grained water-bearing alluvial deposits beneath the facility, denoted as Units A, B, C, D, and E, separated by fine-grained aquitards. The alluvial deposits dip generally to the northeast at gradients ranging from 0.02 to 0.06. The A, B, C, D, and E Units and their correlation to regional hydrogeology are as follows:

- **Surficial Aquitard.** Surficial fine-grained sediments beneath the site extend from grade to approximately 35 feet bgs. These sediments are consistent with fine-grained materials that underlie the adjoining facilities to the north, south, and west, and fit the description, apparent thickness, and basal elevation of the Bellflower aquitard (CDWR, 1961). The materials of the surficial aquitard become saturated at approximately 20 to 25 feet bgs. The aquitard appears to function as a confining layer to the underlying Unit A water-bearing zone. Based on results from testing in 2007, total organic carbon (TOC) concentrations in the soil in this aquitard are high, ranging from 4,200 to 11,000 milligrams per kilogram (mg/kg). High TOC concentrations tend to increase the amount of VOC adsorption within the aquitard, making it difficult to remove VOCs from the surficial aquitard material.
- **Unit A.** The Unit A water-bearing zone ranges from 4 to 50 feet in thickness and continuously underlies the surficial aquitard beneath the former Stauffer facility. Unit A is generally saturated and under confined conditions but may be locally or seasonally unconfined. The base of Unit A generally dips to the northeast at a gradient of 0.06 foot per foot. Unit A thickens to the northeast and thins rapidly to the west and southwest, potentially pinching out southwest of the facility (near Dominguez Channel and Wilmington Avenue). Within the dissolved plume boundaries, Unit A extends offsite in all directions and appears to be in hydraulic communication with several sandy zones underlying the Marathon (former ARCO) refinery to the south. The Unit A water-bearing zone could be upper-member sediments that filled the Dominguez Gap, making it part of the Gaspar

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 15
November 22, 2019

aquifer of Recent geologic age. Alternatively, Unit A could be interpreted as part of the Semiperched aquifer of Recent geologic age (CDWR, 1961).

- **A/B Aquitard.** The A/B aquitard ranges in thickness from 8 to 59 feet and continuously underlies Unit A. The fine-grained sediments contain discontinuous sandy lenses that may provide preferential flow paths within the aquitard. The A/B aquitard extends offsite in all directions and possibly merges with the surficial aquitard to the south. Fine-grained sediments discontinuously underlie the northern portion of the Marathon refinery at a comparable depth with the A/B aquitard. These sediments are consistent with the Bellflower aquitard of Upper Pleistocene geologic age. TOC between the A and B aquitard is significantly lower than that in the surficial aquitard, ranging from 297 mg/kg in Boring EB-4 to 388 mg/kg in Boring SB-32.
- **Unit B.** The Unit B water-bearing zone underlies the A/B aquitard across the facility. The thickness of Unit B ranges from 4 to 29 feet, and the base of the unit generally dips to the northeast at a gradient of 0.03. The thickest portion of the unit (20 to 25 feet) trends in a northwest-southeast direction across the center of the facility. The Unit B water-bearing zone extends offsite in all directions and may merge with the underlying water-bearing zones near the southwestern limit of the Marathon refinery to the south. The unit is saturated and confined beneath the former Stauffer facility but may become unconfined to the west. The sediments comprising Unit B are consistent with the Semiperched or possibly the Gaspar aquifer of Upper Pleistocene geologic age.
- **B/C Aquitard.** The B/C aquitard underlies the Unit B water-bearing zone and ranges in thickness from 7 to 37 feet. The aquitard contains apparent discontinuous sandy lenses that may provide preferred flow paths within the aquitard. The B/C aquitard extends offsite in all directions and may pinch out near the southwestern limit of the Marathon refinery to the south.
- **Unit C Water-bearing Zone.** The Unit C water-bearing zone that underlies the B/C aquitard may have an upper and lower member separated by silty sand and fine-grained beds that may be connected near the northeast corner of the former facility. The thickness of Unit C ranges from 34 to 82 feet, and the basal portion of the unit dips gently northeast at a gradient of 0.02. In general, Unit C is finer grained in the central portion of the facility. Unit C is saturated and under confining conditions, and it extends offsite in all directions beneath adjoining properties. The Unit C sediments are consistent with the thickness and depth of the Gage aquifer in the Upper Pleistocene Lakewood Formation.
- **C/D Aquitard.** Where investigated, the C/D aquitard is found at depths greater than 184 feet below msl beneath the facility. The aquitard ranges in thickness from 34 to greater than 65 feet and appears to be relatively uniform in

thickness (greater than 55 feet) except near the northwest portion of the facility.

- **Unit D Water-Bearing Zone.** The Unit D water-bearing zone is present at depths greater than -230 feet msl, and the thickness of the unit ranges from 20 to 70 feet. The unit is thickest to the northwest where a channel deposit is inferred. Unit D is saturated and under confining conditions. This unit fits the elevation and description of the Lynwood aquifer of the Lower Pleistocene San Pedro Formation.
- **D/E Aquitard.** Where investigated, the aquitard underlying Unit D is found to depths greater than about 300 feet bgs underlying the former Stauffer facility. The boring log for the only onsite boring that penetrated this unit indicates that it is 134 feet thick (or between about 320 to 454 feet bgs). There is a 25-foot-thick sandy bed in the upper portion of this aquitard and a 40-foot-thick clayey layer in the lower portion. Otherwise, the sediments are dark bluish gray or green to black silt, clay, and to a lesser extent silty and/or clayey fine-grained sand. This silt is the aquitard separating the Lynwood and Silverado aquifers within the Lower Pleistocene San Pedro Formation (CDWR, 1961).
- **Unit E Water-bearing Zone.** Unit E is a confined water-bearing zone underlying the Unit D/E aquitard in the one well completed in this unit (Well MW-9E). Unit E consists of sandy sediments from 454 to 490 feet bgs. There is a fine-grained layer (probably discontinuous) from 469 to 474 feet bgs resulting in a composite thickness of the water-bearing materials of 31 feet. The Unit E sediments fit the elevation and description of either a lower member of the Lynwood aquifer or an upper member of the Silverado aquifer, both of the Lower Pleistocene San Pedro Formation.

3.6 OIL AND GAS WELLS

Based on DOGGR records available online, the site is not within the administrative boundary of an oil field, although it is surrounded by them (Figure 1). The Long Beach field is located approximately 1.3 miles east of the site, the Wilmington field is located approximately 1.2 miles to the west-southwest, and the Dominguez field is located almost 2 miles to the north-northeast. DOGGR records available online indicate that the closest “prospect” or “wildcat” oil or natural gas well is or was the Airways Petro Corp. “*Santa Susana 1*” well located approximately 3,900 feet to the west, on the north side of 223rd Street. *Santa Susana 1* was reportedly drilled and abandoned (plugged) in 1950. The term prospect or wildcat is applied to oil or gas wells drilled outside the administrative boundary of a recognized oil field.

Concerns related to plugged oil wells include the possible presence of residual hydrocarbons in soil around the well head (especially if a sump was excavated near the well head during drilling), whether the well was abandoned in accordance with current DOGGR requirements, possible leakage of methane gas from the well head, and possible restrictions on building over or near the

abandoned well. However, Avocet does not believe the plugged *Santa Susana 1* well mentioned above is close enough to have impacted the subsurface environment beneath the subject site.

3.7 RADON GAS

The EPA recommends avoiding long-term exposure to radon levels greater than 4 picocuries per liter (pCi/L). CDPH maintains a radon database for California sorted by zip code (CDPH, May 4, 2010). In brief, indoor radon measurements were performed throughout the state, and the percentage of buildings with reported radon levels greater than 4 pCi/L within each zip code was reported, along with the number of buildings tested. All eight of the buildings tested for radon within the zip code for the site (90745) contained radon at levels less than 4 pCi/L. Moreover, the EPA (1993) and the USGS developed a Map of Radon Zones for the United States, organized by county. According to the map, Los Angeles County is a Radon Zone 2, indicating that radon levels in buildings are expected to be between 2 and 4 pCi/L. EDR's Radius Report (Appendix K) indicates that the average radon activity on the ground floor of residential structures in Los Angeles County was 0.711 pCi/L and average radon activity in basements was 0.933 pCi/L, both of which are well below EPA's recommended maximum exposure level. Based on the above, naturally occurring radon is unlikely to be of concern in the vicinity of the site.

4.0 SITE HISTORY AND CURRENT CONDITION

This section documents the history of the site and the larger former Stauffer facility and describes current site conditions.

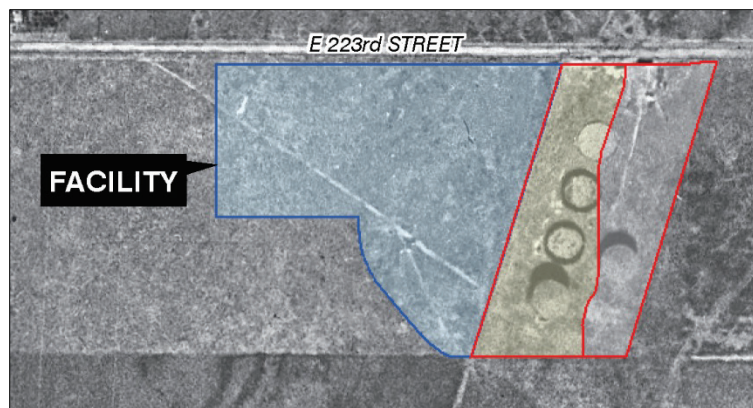
4.1 SITE HISTORY

The history of the site and vicinity has been compiled based on information from the sources outlined in Section 2.0, particularly the historical aerial photographs and historical topographic maps. For discussion purposes, the site's history has been divided into five discrete phases based on land use with, to the extent possible, approximate date ranges.

4.1.1 Predevelopment History, 1896 - <1958

The earliest topographic maps reviewed for Phase I ESA purposes were published in 1896, 1901, and 1902 (Figures F-1, F-2, and F-3). The maps show no development at or immediately around the facility or the site other than an unnamed road that passed east-west through the lower portion. This road is not shown on any of the later maps available to Avocet, so its former name is not known. The 1896 and 1902 maps, which are near identical, show one small structure to the east of the facility and three to the west, although none were close to the boundary of the site. The three early maps also show the Southern Pacific Railroad tracks that parallel Alameda Street to the east of the facility, although Alameda Street itself does not appear to have been present. These early maps also showed that Compton Creek passed within 900 feet to the east of the site, coinciding more or less with the present-day alignment of Dominguez Channel.

An aerial photograph taken in 1927 (Figure G-1 and below) shows that the subject SMC property was vacant and undeveloped, as was much of the surrounding area. The 1927 photograph also shows that East 223rd Street had been constructed and that the former Coon Trust property had been developed with at least two large (~120-foot-diameter) ASTs, one of which was within the boundary of the Carson Industrial LLC property. The two ASTs appeared to have had fixed roofs and, based on the shadows they cast, may have been on the order of 40 to 50 feet high. Three other circular features within the subject site boundary do not cast shadows in the 1927 photograph and may have been foundation pads for additional ASTs or ASTs under construction. The purpose of the ASTs is not discernible from the aerial photograph, although it is noted that oil had been discovered nearby in or around 1921. EDR's City Directory Abstract (Appendix I), which is based on records dating back to 1920, does not include any information for street addresses in the vicinity in the 1920s. Moreover, it is not clear how the tank contents were received



Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 19
November 22, 2019

or distributed, although several linear features visible in the 1927 photograph could indicate subsurface pipelines. Also, a railroad spur from the Southern Pacific Railroad track to the east dead-ended approximately 200 feet from the southeast corner of the former Coon Trust property. Further afield, the 1927 aerial photograph shows that Alameda Street had been constructed to the east, immediately east of the Southern Pacific Railroad tracks, and that Wilmington Avenue had been constructed to the west. The 1927 aerial photograph also shows that the former Compton Creek drainage had been engineered to follow the current course of the Dominguez Channel.

A topographic map published in 1930 (Figure F-4) shows that the SMC property remained undeveloped but there were five (as opposed to two) ASTs on the former Coon Trust property to the east. Starting approximately 0.5 mile to the south of the facility, the 1930 map also shows at least three oil refineries annotated “Pan American,” “Shell,” and “Associated.” As noted elsewhere in this report, the Pan American refinery eventually became the ARCO (now Marathon) refinery, which is still operational, and which was expanded northward to border the former Stauffer facility (Figure 2). A little over 1 mile to the north-northeast, the 1930 map shows the Shell Oil Dominguez Refinery.

An aerial photograph taken in 1947 (Figure G-2) shows that the SMC property remained undeveloped, apparently fallow land, although on the north side of East 223rd Street, the land was being actively farmed. The 1947 photograph also shows that the five ASTs had been removed from the former Coon Trust property and it and the adjoining Marathon property to the east had been developed. The nature of the redevelopment at the former Coon Trust property cannot be discerned from the aerial photograph; however, it appears to have featured two commercial/industrial buildings surrounded by outside storage areas. Very little corroborating information is available regarding how the former Coon Trust property was being used in 1947. City of Carson building permits list Apache Freight as the “owner” of improvements, specifically the “relocation” of a warehouse, in April 1967, but other building permits for sewer and electrical work list Specialty Pipe as the owner in May and June 1967 (Waterstone, March 18, 2002). The earliest City Directory listing is for Apache Freight at 2254 East 223rd Street in a 1970 telephone directory. Specialty Pipe is not mentioned in the City Directory Abstract. The appearance of the former Coon Trust property in the 1947 and later photographs is consistent with it possibly having been split into eastern and western portions. As such, it is possible that Apache Freight and Specialty Pipe may have occupied the former Coon Trust property at the same time and “shared” the same address, although which company occupied which portion is not clear. It is also possible that Specialty Pipe was a contractor working on improvements for Apache Freight. It is noted that neither Apache Freight nor Specialty Pipe are included in any of the regulatory agency databases searched for Phase I ESA purposes (Appendix K).

The nature of the redevelopment on the adjoining Marathon property is similarly not discernible from the 1947 aerial photograph, although it appears to have featured an oval railroad track encircling an exterior storage area. Immediately to the east, two railroad sheds had been constructed immediately adjacent to the Southern Pacific Railroad tracks. A topographic map published in 1947 (Figure F-5) confirms that the five ASTs at the former Coon Trust property had been removed but otherwise does not provide any useable information. A topographic map published in 1951 (Figure F-6) and an aerial photograph taken in 1952 (Figure G-3) shows

conditions at the SMC property more or less as they were in 1947, which is to say the property had not been developed.

4.1.2 PVC Manufacturing, 1958 to 1982

An aerial photograph taken in 1963 (Figure G-4) and a topographic map published in 1964 (Figure F-7) show that the SMC property had been developed consistent with the commencement of PVC manufacturing by American Chemical Company in 1959. The manufacturing infrastructure was located in the southwestern corner of the SMC parcel, in Area 1, and included an “EC Unit,” two cracking furnaces, a large cooling tower, air compressors, a “control house,” and various vertical and horizontal ASTs (Figure 3). Support infrastructure in the form of an office building, changing rooms, a maintenance building, a warehouse, and a laboratory building were located along the northern portion of the SMC property, along the south side of East 223rd Street. The southeastern portion of the SMC property (Area 2) was vacant and undeveloped but appears to have been disturbed by unknown activities. The American Chemical Company manufacturing facilities were served by four railroad sidings that entered at the southeast corner and dead-ended within the SMC parcel.

Further afield, the 1963 aerial photograph shows that the 405 (San Diego) Freeway had been constructed and the properties to the west, southwest, and south had been developed. To the west of the SMC property, Witco Chemical Company (Witco, later Monsanto and now Solutia) had begun manufacturing surfactants and detergents and had constructed a large AST farm. To the southwest, four very large (~150-foot-diameter) ASTs, presumably for crude oil or refined petroleum products, had been constructed on what became ARCO’s northern or northeastern refinery property. To the south, the northern portion of the Geon (now PolyOne) property had been developed with several large industrial buildings. However, the strip of land between East 223rd Street and the 405 Freeway was still vacant in 1963. A topographic map published in 1964 (Figure F-7) shows conditions at the site and the adjoining Carson Industrial LLC property essentially as they were in 1963.

An aerial photograph taken in 1972 (Figure G-5) shows that Stauffer had significantly expanded its manufacturing facilities into the previously vacant area (Area 2) to the east of the original facilities. The expanded facilities included three PVC reactors and several horizontal ASTs immediately south of the laboratory building, a vinyl unit, 1,2-DCA purification and oxychlorination facilities further to the south, additional cracking furnaces and boilers, additional cooling towers, and a waste gas incinerator. Further south was an emergency spill basin flanked by two very large ASTs and a storage area for unspecified materials (Figure 3). To the east, two new buildings, one resembling a “sprung” structure, had been constructed on the adjoining Carson Industrial LLC property, which otherwise appeared more or less as it did in 1947, 1952, and 1963. The suspected sprung structure may have been the subject of the April 1967 building “relocation permit” mentioned earlier. This permit listed Apache Freight as the “owner” and a telephone directory entry from 1970 lists Apache Freight at 2254 East 223rd Street. To the north, the previously vacant strip of land between East 223rd Street and the 405 Freeway had been redeveloped with the Cormier Chevrolet dealership and other businesses. A topographic map

published in 1972 (Figure F-7) shows conditions at the site and the adjoining City of Carson property more or less as described in the 1972 aerial photograph.

By 1981, shortly before manufacturing operations ceased, the former Coon Trust property had become part of the Stauffer manufacturing facility. An aerial photograph taken in 1981 (Figure G-6) shows the SMC property essentially as it had been, but a concrete stormwater impound basin had been constructed in the southwest corner of the Carson Industrial LLC property and additional railroad sidings had been constructed. Avocet understands that the impound basin featured a leachate collection system, and it is noted that prior to its construction, runoff from the former Stauffer facility was discharged directly into the Dominguez Channel. After the basin was constructed, runoff was impounded, treated if necessary, and then discharged under permit to the sanitary sewer system. The industrial waste discharge permit limitation for sanitary sewer discharge was 25 milligrams per liter (mg/L) of 1,2-DCA, suggesting that runoff from the former Stauffer facility may have been contaminated. A topographic map published in 1981 (Figure F-9) reflects the expansion of the former Stauffer facility as outlined above but does not provide any other useable information. The eastern 6 acres of the former Coon Trust property appears to have been largely vacant and unused in 1981. To the west of the site, the 1981 photograph (Figure G-6) shows that the Solutia AST farm had been expanded, and to the south, two more large ASTs had been constructed at the then-ARCO refinery.

4.1.3 Post Stauffer Land Use, 1982 – Present

According to AECOM (May 2011), manufacturing operations at the former Stauffer facility were terminated in 1982, and by 1985, Stauffer had demolished and removed the aboveground manufacturing infrastructure “to grade.” Aerial photographs taken in 1989 and 1994 (Figures G-7 and G-8) show that the manufacturing infrastructure had indeed been removed, although certain buildings and the stormwater impound basin remained. The remaining buildings included those on the northern portion of the SMC parcel and the three warehouses on the adjoining Carson Industrial LLC property. The 1994 photograph shows that the ASTs at the Solutia property had been removed and the then ARCO, now Marathon, property to the east featured two baseball diamonds.

By 2005, the SMC and former Coon Trust properties had been completely cleared of buildings and the stormwater impound basin on what is now the adjoining City of Carson property had been backfilled. The only structure on the SMC property was the centrally located building that housed the VLE equipment and associated treatment systems. The aboveground piping to the VLE wells is also visible, particularly in the 2006 photograph (Figure G-10). Aerial photographs taken in 2005 and 2006 (Figures G-9 and G-10) reflect the above but show the adjoining former Coon Trust property was being used to park cars believed to belong to nearby automobile dealers. In the 2005 photograph (Figure G-9), the Marathon property to the east of the former Coon Trust property was completely vacant, but by 2006 (Figure G-10), the northern portion had been paved and was being used to store what appear to be shipping containers, while the southern portion had been grassed and featured two baseball diamonds.

An aerial photograph taken in 2009 (Figure G-11) shows that the former Coon Trust property had been divided to reflect current boundary conditions, although the site itself remained more or less as it had in 2005 and 2006. To the east, ARCO appears to have combined the eastern 6 acres of the former Coon Trust property with its original property and redeveloped the whole with a large office building surrounded by parking and landscaped areas. The two baseball diamonds had been replaced by a single diamond in the northwest corner of the redeveloped ARCO property. To the west of the site, the VLE structure and associated piping systems were still present at the site. An aerial photograph taken in 2010 (Figure G-12) reflects more or less the same conditions except that cars were no longer being parked on the Carson Industrial LLC property, which was completely vacant and had been cleared of vegetation.

An aerial photograph taken in 2012 (Figure G-13) shows the VLE structure and associated piping systems on the SMC property had been removed and replaced by the existing EISB structure in the southeast corner. The associated piping systems, however, were not visible. As discussed in Section 5.7, AECOM began installing the EISB system in 2010 and it became operational in October 2011. To the east, the Carson Industrial LLC property was still completely vacant and clear of vegetation.

4.2 CURRENT SITE CONDITIONS

Avocet conducted walkover surveys of the site on November 18, 2013 and September 19, 2019, on both occasions accompanied by SMC's environmental consultant. In brief, the site is encircled by a chain link fence, accessible via a normally locked gate in the northwest corner. The eastern fence line separates the site from the adjoining Carson Industrial LLC property, although a gate allows access to the EISB injection wells on that property. Portions of the site are paved with asphalt or feature concrete foundation pads (Photograph J-1), with the remainder covered with crushed concrete (Photograph J-2), assumed to have been generated onsite during demolition of the aboveground infrastructure. Although not visible at the ground surface, Avocet understands that subsurface piping associated with the former manufacturing operations is still present in the subsurface, as might other subsurface infrastructure. AECOM and Group Delta personnel were not able to provide details regarding how subsurface piping runs were purged and/cleaned, if in fact they were, but stated that the piping runs encountered while trenching for the EISB system were "dry." In the northwest corner of the site is a sanitary sewer connection (Photograph J-4). Numerous groundwater monitoring, extraction, and injection wells with aboveground and flush completions are located throughout the site, as follows:

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 23
November 22, 2019

Onsite EISB and Monitoring Wells as of April 2019					
Water-Bearing Zone	Extraction		Injection		Monitoring
	Active	Inactive	Active	Inactive	
Unit A	9	3	13	7	7
Unit B	6	0	12	2	7
Unit C	1	2	2	6	8
Unit D	0	0	0	0	5
Unit E	0	0	0	0	1

Notes: (1) In Unit B, 4 of the 12 injection wells are for emulsified vegetable oil (EVO) only
(2) In Unit C, the active injection and extraction wells are for EVO only

It is noted that the LUC for the SMC property (Appendix C) includes, among other things, a “non-interference” clause to “preserve the physical accessibility to and integrity of the Remedial System” and that the “Remedial System shall not be altered without prior written approval by the Department” (i.e., DTSC). Avocet interprets this clause to mean that monitoring wells, EISB extraction and injection wells, and associated subsurface pipelines that may be impacted by future redevelopment would, with DTSC’s concurrence, have to be properly abandoned and replaced.

4.3 KNOWN RELEASES AND ENVIRONMENTAL FEATURES

In a questionnaire filled out for Resource Conservation and Recovery Act (RCRA) compliance purposes, Zeneca, an affiliate of SMC, lists nine specific instances where liquids were spilled at the former Stauffer facility between April 1970 and July 1981 (Zeneca, December 1, 1998), as follows:

Spills and Liquid Releases Between April 1970 and July 1981		
When	Unit	Incident
April 1970	#3 VCM	VCM bottoms pump failure – spill of EDC – tars & heavy ends – 5 min.
July 1975	#1 PVC	PVC reactor overpressured – relief valve released PVC and water – 1,000 lbs
December 1977	#1 EDC	Maintenance procedure caused EDC spill 200 gal.
August 1979	#3 VCM	Valve failure caused EDC spill
March 1981	#3 PVC	Flange on PVC reactor failed – VCM and water mixture spill – 5,772 pounds of VCM.
April 1981	EDC Storage	Corroded pipe spilled EDC into sewer system.
June 1981	EDC Purification	Line rupture and tank leak spilled EDC.
July 1981	#3 PVC	Valve failure on a reactor caused EDC and PVC spill to sewer and impound basin.
July 1981	EDC Purification	Level controller failure allowed EDC to enter sewer system with wastewater.

Notes: VCM = vinyl chloride monomer
EDC = 1,2-DCA
PVC = polyvinyl chloride

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 24
November 22, 2019

Based on the admittedly limited information provided by Zeneca, it appears that all nine releases occurred in the central process area on the SMC property. Avocet is not aware of any information pertaining to hazardous substance spills at the Stauffer facility prior to April 1970.

In addition to the documented spills summarized above, there were numerous environmental features at the former Stauffer facility, i.e., process and storage features containing hazardous substances, with the potential to have resulted in subsurface environmental impacts. Too numerous to list individually, these features include all of the process units and associated piping systems, ASTs, three USTs, sumps, wastewater collection and treatment systems, and the like.

4.4 OTHER ASTM E1527-13 FEATURES

ASTM E1527-13 includes a list of potential environmental features, such as USTs, sumps, stained surfaces, and the like, that are to be addressed in a Phase I ESA for a commercial or industrial property. The presence or absence of these features, as of September 19, 2019, is summarized below with, where appropriate, a reference to the section of text in which they are described.

Potential Environmental Feature or Condition	Absent	Present	Discussion Section
Hazardous Substances and Petroleum Products in Connection with Identified Uses	✓		
Storage Tanks		✓	Section 5.7
Odors	✓		
Pools of Liquid	✓		
Drums		✓	Section 5.7
Hazardous Substance and Petroleum Products Containers (Not Necessarily in Connection with Identified Uses)		✓	Section 5.7
Unidentified Substance Containers	✓		
Polychlorinated Biphenyls	✓		
Heating/Cooling	✓		
Stains or Corrosion	✓		
Drains and Sumps	✓		
Pits, Ponds, or Lagoons	✓		
Stained Soil or Pavement	✓		
Stressed Vegetation	✓		
Solid Waste	✓		
Wastewater	✓		
Wells (Groundwater Monitoring only)		✓	Section 5.0
Septic Systems	✓		

5.0 PREVIOUS INVESTIGATIONS AND REMEDIATION

Subsurface environmental conditions at the former Stauffer facility have been comprehensively characterized over the past 37 years, a significant effort has been made to mitigate VOC impacts in vadose zone soil, and groundwater remediation is ongoing. Summaries of the investigation and remediation programs are provided below.

5.1 INITIAL SOIL INVESTIGATION, CONVERSE, 1982

Shortly after manufacturing operations were terminated, Stauffer retained Converse Consultants (Converse) to conduct a shallow vadose zone soil investigation. Although Avocet has not reviewed the resulting Converse report, it appears that soil matrix samples were collected at nominal depths of 1, 5, and, in a few cases, 9 feet bgs from 22 shallow borings (Borings P-1 through P-22). Seventy soil samples were analyzed for ethylene chloride, VC, 1,2-DCA, and vinyl acetate using EPA Method 625 and an additional 20 soil samples were preserved in the field with tetraglyme and analyzed for VOCs using EPA Method 624. Converse reported that 1,2-DCA was detected in the upper 5 to 10 feet of the soil profile throughout the facility; however, few, if any, of the other analytes were detected (ENSR Consulting and Engineering [ENSR], October 1995).

It appears that 13 of the 22 Converse borings were located on the subject SMC property, with the other 9 located on the former Coons Trust property to the east (ENSR, October 1995). As shown in Figure 8, Converse's boring locations were distributed throughout the former Stauffer facility but with bias toward former manufacturing facilities. Soil samples were collected at nominal depths of 1 and 5 or 6 feet bgs and in some borings at 9 feet bgs. The highest reported 1,2-DCA concentration was 145.203 mg/kg in the 5-foot sample from Boring P-17, located south of former Tanks T-207 and T-208, both of which contained VCM, south of the so-called central process area (ENSR, October 1995). It is noted for context that the DTSC-approved RBC for 1,2-DCA in the upper 15 feet of the soil profile at the former Stauffer facility is 29.7 mg/kg (AECOM, January 2011). For additional perspective, EPA's Regional Screening Levels (RSLs) for 1,2-DCA in residential and industrial soil are 0.46 and 2.0 mg/kg, respectively (EPA, April 2019).

5.2 PRE-DEMOLITION INVESTIGATION, BROWN & CALDWELL, 1986

As a condition of issuing a demolition permit, the City of Carson requested additional characterization of the former Stauffer facility. The additional investigation was conducted in 1986 by Brown and Caldwell with DTSC oversight and involved 42 borings, Borings BC-1 through BC-42, located throughout the facility. Six of the 42 borings, specifically Borings BC-1, BC-23, BC-39, BC-40, BC-41, and BC-42, were completed as groundwater monitoring wells in the uppermost water-bearing zone. The original well designations, with the "BC" prefix, were subsequently changed to Wells MW-1A through MW-6A, respectively, with the "A" suffix indicating they are screened in Unit A. It is noted that the six groundwater monitoring wells were located on or near the perimeter of the by then inactive facility, as opposed to in areas where soil contamination had previously been reported.

Soil samples from the borings were analyzed for VOCs using EPA Method 8240, and selected soil samples were also analyzed for metals, semivolatile organic compounds (SVOCs) using EPA Method 8270, and fuel hydrocarbons using EPA Method 8015. As in the earlier Converse investigation, 1,2-DCA and certain other VOCs were “widespread” throughout the former facility. However, SVOCs, if detected, were present at generally low concentrations only. Of the 42 Brown and Caldwell borings, 39 were located on the SMC property with the other 3 located on the former Coon Trust property to the east (Figure 8). The highest 1,2-DCA concentrations were reported in Boring BC-19, with concentrations increasing with depth to 64,000 mg/kg at 40 feet bgs, the deepest soil sample collected. Although Avocet has not reviewed the original Brown and Caldwell report, ENSR has indicated that 1,2-DCA concentrations in soil generally increased with depth in source areas (ENSR, October 1995).

Groundwater samples contained 1,2-DCA and other VOCs, with the highest 1,2-DCA concentration of 620 mg/L reported in the sample from Well MW-2A, located in the “central process area” of the facility (ENSR, October 1995). Benzene was reported at 14 mg/L in the sample from Well MW-3A, located near the hydraulically upgradient facility boundary (in the northeast corner of the former Coon Trust property); however, its presence was attributed to migration from an unidentified offsite source (ENSR, October 1995). Benzene concentrations in Well MW-3A subsequently ranged up to 18 mg/L in November 1994 but then declined, somewhat erratically, to 0.1 mg/L by April 2008 (AECOM, May 2011).

5.3 UST REMOVALS, OHM, OCTOBER 1993

Three USTs were operated at the former Stauffer facility, two for leaded gasoline and one for waste oil storage. The 500- and 2,000-gallon gasoline USTs were located in the northwest corner of the SMC property, immediately south of the office building (Zeneca, December 1, 1998). The waste oil tank was also located in the northwest corner of the SMC property, immediately south of the former Maintenance Building. The approximate locations of these three USTs are shown in Figure 8. It is not clear when the three USTs were installed but the waste oil UST was reportedly taken out of service in 1978 by removing residual oil, flushing the tank interior, and filling it with sand. The two fuel tanks were reportedly taken out of service in 1982, “cleaned,” and filled with water (OHM Remediation Services Corporation [OHM], April 1994).

In 1993, all three single-wall USTs were permanently closed by removal by OHM with oversight from LACoDPW (OHM, April 1994). Although not described in detail in OHM’s report, it appears that impacted soil was encountered during the removal of the USTs and “over-excavated.” A total of 12 soil matrix samples were collected from beneath the three USTs and the associated piping systems and dispensers and analyzed for total petroleum hydrocarbons (TPH) as gasoline (TPH-g) using EPA Method 8015M, halogenated VOCs using EPA Method 8010, aromatic VOCs using EPA Method 8020, and organic lead using EPA Method 7420. None of the soil samples contained TPH-g, aromatic VOCs, or organic lead; however, trace concentrations of chlorinated VOCs were detected in samples collected from beneath the waste oil UST and the dispenser island associated with the 2,000-gallon gasoline UST (OHM, April 1994). The chlorinated VOCs included methylene chloride, 1,2-DCA, and

tetrachloroethylene (PCE). LACoDPW issued an “no further action” (NFA) letter for the three USTs on June 29, 1994.

5.4 PHASE I REMEDIAL INVESTIGATION, ENSR, 1995

Pursuant to the Consent Agreement with DTSC and a DTSC-approved work plan, Stauffer retained ENSR to conduct a “Phase I” remedial investigation in 1995. ENSR’s investigation included a topographic and boundary survey, a soil gas survey, a cone penetrometer test (CPT) investigation, borings, and the installation of additional monitoring wells to depths up to 200 feet bgs. The Phase I remedial investigation also included a “baseline” risk assessment. Although the Phase I remedial investigation included groundwater monitoring wells, its emphasis was broadly on the vadose zone. Groundwater conditions were further investigated in a Phase II remedial investigation.

Conducted in March 1995 for screening purposes, the soil gas survey involved the collection of samples on a roughly 200-foot grid pattern with additional sample points in areas not previously investigated. A total of 59 soil gas samples were collected at a nominal depth of 5 feet bgs and analyzed for chlorinated and aromatic VOCs using EPA Methods 8010 and 8020, respectively. A total of 17 VOCs was detected in the samples, with 1,2-DCA being the most widely distributed and with the highest concentrations, up to 15 mg/L in Boring SG-37 located in the southern portion of Area 2. Of the 59 soil gas sampling locations, 26 were located on the SMC property with the other 23 located on the former Coon Trust property. The highest 1,2-DCA concentration reported was 15 mg/L in the sample from Boring SG-37, located in the southern portion of Area 2, near former Tank T-1553A, which contained 1,2-DCA. Elevated concentrations of other VOCs were also reported in other soil gas samples, including up to 0.021 mg/L of PCE, up to 0.25 mg/L of 1,1,2-trichloroethane, up to 0.16 mg/L of TCE, up to 0.039 mg/L of 1,1-dichloroethane, and up to 0.44 mg/L of 1,1-dichloroethylene (1,1-DCE).

The CPT survey to assess lithology involved 23 boring, Borings CPT-1 through CPT-23, to depths ranging from 66 to 91 feet bgs. No soil or groundwater samples were collected from the CPT borings; however, the lithologic data were interpreted to indicate the presence of relatively discrete layers of water-bearing, predominantly granular sediments beneath the facility. Of the 23 CPT borings, 16 were located on the SMC property and the other 7 were located within the boundary of the former Coon Trust property (Figure 8).

ENSR collected soil matrix samples from 23 additional borings, Borings B-1 through B-10 and the borings for 13 additional monitoring wells (Wells MW-01B, MW-02B, MW-05C, MW-06C, MW-07A, MW-07B, MW-08A, MW-09A, MW-10A, MW-11B, MW-12B, and MW-13B). As indicated by the A, B, and C suffixes, four of these wells were screened in Unit A, six in Unit B, and two in Unit C. A total of 94 soil matrix samples from these borings were analyzed for VOCs and most were also analyzed for SVOCs and metals. A few selected samples were also analyzed for TOC, pH, chloride, and hexavalent chromium. The soil sample analytical results indicated significant impacts by VOCs, with 1,2-DCA concentrations ranging up to 18,000 mg/kg in the 35-foot sample from Boring B-3, located in the northern portion of Area 2. Isoconcentration maps for 1,2-DCA prepared using the ENSR and earlier data indicated three source areas: one in

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 28
November 22, 2019

Area 1, coinciding with the location of the original American Chemical Company manufacturing infrastructure; and one each in the northern and southern portions of Area 2 (ENSR, October 1995). Twenty of the ENSR borings were located within the boundary of the subject SMC property and three were located on the former Coon Trust property. With only a few minor exceptions, metals were either not detected in the soil samples or were reported at concentrations consistent with accepted background ranges (ENSR, October 1995). SVOCs were detected in a few samples collected within the SMC property but the reported concentrations were below residential and industrial RSLs.

The new and existing wells at the facility were sampled in July 1995, along with existing wells on adjoining properties, and analyzed for VOCs, SVOCs, and metals. In brief, the data showed that groundwater in Unit A beneath the vadose zone source areas mentioned above was contaminated by VOCs, notably 1,2-DCA, chloroform, TCE, and VC. The highest reported concentrations of these compounds, all in Unit A, were 680, 15, 20, and 28 mg/L, respectively. The 1,2-DCA, TCE, and VC concentrations were considered high enough to be indicative of the possible presence of dense nonaqueous-phase liquid (DNAPL), although no DNAPL had been encountered at that time or in subsequent subsurface work. The groundwater data also showed that these and other VOCs had migrated vertically down to Units B and C and laterally beyond the former facility boundary. On the other hand, the presence of very high aromatic VOC concentrations, notably including benzene, suggested that groundwater beneath the facility had been impacted by contaminant migration from offsite sources. More specifically, migration from the adjoining Monsanto (now Solutia) facility to the west (Figure 2), where benzene was present as light nonaqueous-phase liquid (LNAPL), had impacted the southwest portion on the facility, and migration from an unidentified source offsite to the north had impacted the northeastern corner of the former Coon Trust property. It is noted that a sample from Well MW-3A, in what is now the Marathon portion of the former Coon Trust property, contained benzene at 15 mg/L. As previously noted, benzene concentrations in Well MW-3A subsequently ranged up to 18 mg/L in November 1994 but then declined, somewhat erratically, to 0.1 mg/L by April 2008 and 0.14 microgram per liter ($\mu\text{g/L}$) by 2010 (AECOM, May 2011). AECOM suspects the decrease in benzene concentrations is attributable to the source having been eliminated, dispersion, and other natural attenuation mechanisms. SVOC concentrations in groundwater were generally not problematic, with the possible exception of 0.013 mg/L of naphthalene in a sample from Well MW-03A, and metals concentrations were generally within background ranges (ENSR, October 1995). The naphthalene in Well MW-03A was attributed to an offsite source to the north, presumably the same source to which the benzene in this area had been attributed.

5.5 SOIL OU REMEDIATION, 1997 - 2011

Based on the investigations summarized above, a remedial action plan (RAP) for saturated and unsaturated soil from the ground surface to 35 feet bgs (i.e., the Soil OU) was prepared and approved for implementation by DTSC. The selected remedy was high vacuum VLE, essentially akin to dual-phase extraction. Stage I of the soil remediation effort began in September 1998 and involved VLE from 16 “multi-phase” extraction wells. Vapor from the extraction wells was treated in a high-temperature thermal oxidizer before being discharged to the atmosphere

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 29
November 22, 2019

pursuant to a “Permit to Operate” issued by the South Coast Air Quality Management District. Liquid consisting of shallow groundwater and condensate from the extracted vapor was treated by air stripping and discharged to the sanitary sewer system pursuant to a permit issued by the LACoSD. The treatment systems were housed in a purpose-built structure located in the center of the SMC property. In Stage II of the soil remediation effort, which began in 2000, the VLE was expanded to include an additional 90 multi-phase extraction wells (Figure 4). In November 2002, the VLE system was extended again to include four VLE wells on the former Coon Trust property to address soils between 25 and 35 feet bgs containing up to 200 mg/kg of 1,2-DCA. However, monitoring of the extracted vapor from these wells showed that it contained only very low VOC concentrations, indicating that VLE was not being effective, in contrast to elsewhere at the former Stauffer facility. Concluding that 18 months of VLE had not significantly mitigated the impacted saturated soil, Earth Tech recommended that the four wells on the former Coon Trust property be destroyed (Earth Tech, May 13, 2004). DTSC concurred with this request in an internal memorandum dated June 30, 2004 and formally approved Earth Tech’s request in a letter dated February 23, 2005.

Between June 2004 and November 2005, an *in-situ* thermal destruction (ISTD) pilot test was conducted in an approximately 7,200-square-foot area within the Stage I VLE area. Soil between the “heater wells” was heated to temperatures approaching the pilot test goal of 212°F (100°C). The ISTD pilot test is estimated to have destroyed 24,800 pounds of VOCs (AECOM, May 2011). In August 2008, the effectiveness of the VLE system was improved via a pneumatic fracturing program involving 48 borings. In brief, the effective permeability of saturated, fine-grained soils between 25 and 35 feet bgs was increased using compressed nitrogen to pneumatically fracture the soil structure and sand as a proppant to keep the fractures open. Thirteen of the 48 fracking borings were converted to VLE wells. Five additional VLE wells were installed in August 2009 and September 2010 to address “isolated hotspots” (DTSC, October 15, 2013) and certain of the peripheral VLE wells were also destroyed. In all, 125 shallow wells, screened from 8 to 35 feet bgs, were used for VLE purposes. The location of the treatment system structure, the VLE wells, and the associated piping systems are shown in Figure 4.

The effectiveness of the VLE system was checked periodically by collecting and analyzing soil matrix samples in the VOC-impacted areas. In 2004, soil samples were collected from 26 “verification” borings at 5-foot intervals from 10 to 35 feet bgs (Figures 5 and 6). The results of the soil sample analyses were compared to RBCs calculated in an HHRA and are summarized below.

Risk-Based Concentrations (RBCs) for VOCs in Soil (mg/kg)		
Compound	Shallow Soil (0-15 feet. bgs)	Deep Soil (>15 feet. bgs)
1,2-Dichloroethane (1,2-DCA)	29.7	81.9
Vinyl chloride (VC)	0.37	0.37
1,1-Dichloroethylene (1,1-DCE)	1.91	1.91
1,1,2-Trichloroethane	42.8	42.8

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 30
November 22, 2019

It is noted that the RBCs were based on “estimated lifetime cancer risk” (ELCR) with a risk threshold of 1×10^{-5} . It is further noted that the RBCs for “shallow” soil were based on dermal contact, ingestion, and inhalation exposure pathways, whereas the RBCs for “deep” soil were based on exposure via inhalation only. Smaller numbers of verification borings were drilled and sampled in 2005, 2007, and 2009 at locations where residual VOC concentrations exceeded the RBCs. Verification boring locations are shown in Figures 5 and 6.

VLE was terminated, with DTSC’s concurrence, on November 4, 2011 (DTSC, October 15, 2013). The criterion for termination was a VOC mass removal rate of 0.9 pound per hour. In all, the VLE system operated for approximately 13 years and removed an estimated 300,810 pounds of VOC mass from the upper 35 feet of the unsaturated and saturated soil profile. It is noted that an estimated 300,810 pounds of VOC mass removed includes the estimated 24,800 pounds destroyed during the ISTD pilot test. On termination of VLE, AECOM reported that no VOCs were present in shallow soil, i.e., within 15 feet of the ground surface, at concentrations above the RBCs summarized above (AECOM, January 2011). The highest reported residual VOC concentrations in the upper 15 feet of the soil profile at the facility were as follows:

Maximum Residual VOCs in Shallow Soil (0-15 feet bgs)					
Compound	SMC Property	Carson Industrial LLC Property	RBC (mg/kg)	Residential RSL (mg/kg)	Industrial RSL (mg/kg)
1,2-Dichloroethane (1,2-DCA)	0.11	0.011	29.7	0.46	2.0
Vinyl chloride (VC)	0.0029	0.0012	0.37	0.059	1.7

As shown above, the maximum residual VOC concentrations in the upper 15 feet of the unsaturated soil profile are orders of magnitude lower than the RBCs and residential RSLs. Residual 1,2-DCA and VC isoconcentrations in soil at different depth intervals, as interpreted by AECOM (Appendix B), are presented in Figures 5 and 6, respectively. As indicated in Figures 5 and 6, residual VOC concentrations above RBCs are present in the generally saturated and fine-grained soils between 25 and 35 feet bgs. Isoconcentrations developed by AECOM from the post-remediation verification data indicate that residual 1,2-DCA and VC concentrations above the RBCs in soil at 20 feet bgs are limited to two small areas beneath the SMC property (Figures 5 and 6).

Recognizing that the point of diminishing returns had been reached, DTSC certified that remediation in the Soil OU was complete in a document dated October 15, 2013. Residual VOC contamination in soil is addressed via a LUC for the SMC property (Appendix C). The LUC is based on potential receptors not being exposed to residual VOCs in soil at concentrations above the RBCs at 20 feet bgs and deeper, other than possibly via inhalation. As such, the LUC requires vapor barriers beneath future buildings, unless DTSC accepts “analysis” that indicates they are unnecessary, and prohibits sensitive land uses such as residential, hospitals, schools for persons under 21, and day care for children. As noted previously, the former Coon Trust property is covered by a separate LUC recorded on December 21, 2005. After the LUC was

recorded, DTSC issued an NFA letter for the former Coon Trust property which acknowledged impacts attributed to the adjoining SMC property (DTSC, March 30, 2006).

5.6 ADDITIONAL GROUNDWATER ASSESSMENT, 1995 - 2006

As the lateral and vertical distribution of VOCs in groundwater was not adequately defined by ENSR's Phase I remedial investigation (Section 5.4), additional monitoring wells were periodically installed through 2006. In all, 38 monitoring wells were installed within the boundary of the former Stauffer facility and 19 were installed offsite, for a total of 57. These 57 wells have generally been monitored on a semiannual basis. Stauffer and SMC have also conducted annual monitoring in more than 40 offsite wells installed on surrounding properties in conjunction with unrelated groundwater quality investigations. In broad terms, the principal groundwater contaminants are 1,2-DCA, VC, and TCE. Other VOCs are generally present in a limited number of wells, have been detected sporadically, and/or have been reported at lower concentrations with distributions similar to the "primary" VOCs. Collectively, data from the Stauffer/SMC and third-party wells have shown that VOCs attributed to the former Stauffer facility have migrated laterally offsite to the southwest and west and vertically down to Unit D, at around 300 feet bgs. VOCs have not been detected in Unit E groundwater at around 465 feet bgs. Historically, 1,2-DCA has been detected at the highest concentrations and over the largest area. As Avocet understands SMC will retain responsibility for groundwater contamination, a detailed discussion is not warranted herein other than in terms of how it could impact redevelopment of the subject site. In this regard, Unit A, the uppermost water-bearing zone, is most relevant and is discussed in more detail below. Information on the deeper water-bearing zones is provided in Appendix B.

The Unit A water-bearing zone ranges from 4 to 50 feet in thickness and is confined beneath the surficial aquitard, which is present from the ground surface to approximately 35 feet bgs. The base of Unit A generally dips to the northeast at a gradient of 0.06 foot per foot. The unit thickens to the northeast and thins rapidly to the west and southwest, potentially pinching out southwest of the facility, near Dominguez Channel and Wilmington Avenue (Figure 2). Unit A may be part of the Semiperched aquifer of Recent geologic age or part of the Gaspar aquifer. As of April 2010, 1,2-DCA concentrations in Unit A ranged up to over 10,000 µg/L in as many as four discrete areas of the former Stauffer facility. The highest 1,2-DCA concentration in Unit A as of April 2010 was in Well 14A (67,000 µg/L), located on the former Coon Trust property to the east, although an even higher concentration (72,000 µg/L) was reported in an offsite well on the Marathon property to the south. Isoconcentrations of 1,2-DCA and other groundwater contaminants in Unit A and the deeper water-bearing zones are included in Appendix B.

5.7 GROUNDWATER REMEDIATION, 2011 – PRESENT

Pursuant to ENSR's 1999 Phase II remedial investigation, which focused on groundwater and included an HHRA, AECOM conducted a groundwater feasibility study and prepared a RAP for groundwater (AECOM, May 2011). AECOM's feasibility study and RAP were informed by the results of nine groundwater pilot tests, including three variations of air sparging, two recirculating well stripping tests, enhanced aerobic biodegradation by biosparging and nutrient addition, and three different EISB tests using different electron donors. In the RAP, AECOM

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 32
November 22, 2019

proposed the ongoing EISB system described below for full-scale implementation. It is noted that for remediation purposes, the Groundwater OU was redefined to include saturated sediments between 25 and 35 feet bgs that had previously been included in the Soil OU. Based on a 2003 amendment to ENSR's HHRA for groundwater, RBCs for groundwater remediation were as follows:

Risk-Based Concentrations (RBCs) for VOCs in Groundwater (µg/L)		
Compound	Shallow Groundwater (Unit A)	Deep Groundwater (Units C & D)
1,2-Dichloroethane (1,2-DCA)	530,000	57
Vinyl chloride (VC)	8,900	0.55
1,1-Dichloroethylene (1,1-DCE)	13,000	0.85
Benzene	95,000	7.7
Chloroform	--	3.57
Trichloroethylene (TCE)	--	46
Tetrachloroethylene (PCE)	--	13

As with the RBCs for soil (Section 5.5), the RBCs were based on an ELCR of 1×10^{-5} . The RBCs for "shallow" groundwater were based on exposure via inhalation only, whereas the RBCs for "deep" groundwater were based on dermal contact, ingestion, and inhalation exposure pathways. The baseline condition for groundwater remediation is depicted in the 1,2-DCA and other VOC isoconcentrations included in Appendix B.

The EISB system is designed to biodegrade dissolved VOCs in groundwater in the Unit A, B, and C water-bearing zones, although Avocet understands that remediation in Unit C was terminated in late 2018. Dissolved VOCs have also been detected in Units D and E, albeit sporadically and at generally low concentrations only. The original EISB system consisted of 16 extraction wells along the hydraulically downgradient (western) facility boundary to "capture" contaminated groundwater. Of these 16 extraction wells, 7 were screened in Unit A, 5 in Unit B, and 4 in Unit C. The extracted groundwater is amended aboveground with soluble electron donors by adding ethanol and sodium lactate. The amended groundwater, which is not treated to remove VOCs, is then injected back into the aquifers, originally via 25 injection wells located along the hydraulically upgradient boundaries of the facility. More specifically, 18 injection wells were located along the northern and eastern boundaries of the SMC property and 7 were located along the eastern boundary of the adjoining Carson Industrial LLC property. Each well is protected by a flush-mounted and traffic-rated concrete vault. Of the original 25 injection wells, 11 were screened in Unit A, 8 in Unit B, and 6 in Unit C. The 80-foot-wide by 85-foot-long treatment compound is in the southeastern corner of the SMC property. A 26-foot-wide road is located along the eastern boundary of the SMC property to provide vehicular access. Construction of the EISB system began in December 2010 and was completed in August 2011. Startup and testing of the system were conducted between August and October 2011. After a "shake down" period, the EISB system became fully operational on October 20, 2011. As of October 2013, the total recirculation rates in Units A, B, and C were 57, 92, and 98 gpm, respectively. EISB system maintenance includes periodic well redevelopment to

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 33
November 22, 2019

maintain injection rates, adjustments to recirculation rates, and adjustments to donor dosage rates.

To optimize performance and address recalcitrant hotspots, the EISB system has been modified several times since remediation began in 2011. For example, AECOM and/or Group Delta have installed new injection wells and converted existing monitoring wells to injection wells. Also, EISB in Unit C was suspended in February 2015 for rebound monitoring purposes. Limited EISB was resumed in Unit C between August and December 2018 but has since been suspended again. A summary of the active and inactive extraction and injection wells is provided in Section 4.2 and the layout of the current EISB system is shown in Figure 7. On September 27, 2019, Group Delta proposed additional modifications to address residual source area contamination in Unit A around Wells MW-7A and MW-10A (Group Delta, September 27, 2019). The modifications involve hydraulic fracturing of the aquitard and the injection of EVO via a series of closely spaced direct-push injection borings around Wells MW-7A and MW-10A. Group Delta also proposed to convert two Unit B extraction wells (Wells EX-1B and EX-4B) to injection wells. DTSC approved Group Delta's proposed modifications for implementation via email on October 9, 2019 and Avocet understands the modifications will be made before the end of 2019. Figures showing Group Delta's interpretation of groundwater conditions at the site, as reported in its first semi-annual groundwater monitoring report for 2019 (Group Delta, September 30, 2019), are included in Appendix E.

AECOM does not expect the EISB system to mitigate dissolved VOCs that have already migrated beyond the system's zone of influence. Rather, monitored natural attenuation (MNA) is being implemented for "offsite" groundwater contamination based on the assumption that the EISB system is providing "onsite source control." Natural attenuation relies on natural processes that include various intrinsic physical, chemical, and biological processes that are occurring to reduce VOC concentrations in groundwater. Treatment of the source area by EISB will significantly reduce or eliminate further mass flux of VOCs to the offsite areas. Once the source area is treated and offsite VOC migration has stopped, the effectiveness of MNA in reducing dissolved VOC concentrations in offsite areas is expected to increase. The MNA program consists of semiannual monitoring and sampling of offsite groundwater monitoring wells to ensure that natural attenuation processes are occurring.

6.0 ADJOINING AND NEARBY PROPERTIES

This section summarizes a search by EDR of environmental databases and describes properties adjoining the subject site and selected nearby properties. The descriptions of adjoining and selected nearby properties are based on Avocet's observations from public rights-of-way, the adjoining areas of the facility, information included in the EDR report (Appendix K), and information available from the GeoTracker and EnviroStor websites maintained by CalEPA. As previously noted, the former Stauffer facility is located at the north end of an area dominated by petrochemical and related industries. Hazardous substance releases at several adjoining and nearby properties have impacted soil and/or groundwater, and, in some cases, these impacts have migrated beneath the subject SMC property. The history and current condition of adjoining and selected nearby properties are summarized below with emphasis on their impact, if any, on the subject SMC property.

6.1 DATABASE LISTINGS

EDR's database search encompassed over 90 databases maintained by local, state, and federal government agencies, including all of the databases specified in Section 8.2.1 of ASTM E1527-13. The "target property" address used by EDR for records search purposes was 2112 East 223rd Street, Carson. EDR's September 19, 2018 Radius Map Report with GeoCheck[®], which is included in Appendix K, identifies numerous listings at the target property address and within ASTM-recommended search radii. These listings are summarized in Table 1, but in the interest of brevity and making relevant information more accessible, the following summaries focus on those database listings considered potentially relevant to the objectives of the subject Phase I ESA, specifically those pertaining to the subject site and to nearby properties with documented hazardous substance releases with the potential to have impacted the site. Other properties and/or database listings not considered indicative of a hazardous substance release, database listings for hydraulically downgradient or crossgradient properties, and database listings with "Closed – Case Completed" status have generally been screened out. It is noted in this regard that inclusion in certain of the databases searched is not, in and of itself, an indication that hazardous substances have been released or that the subsurface beneath the properties is contaminated. For example, inclusion in the HAZNET or the other databases that pertain to hazardous waste generation indicates that the generator is following the proper procedures. Similarly, the fact that USTs or ASTs are or were operated at a property and were registered with the state is not, in and of itself, of concern unless the tanks(s) had leaked, in which case the property should be included in other databases.

6.2 TARGET PROPERTY LISTINGS

The target property is numerous federal, state, and local databases under different variations of address and/or with different owner/operators. It is noted in this regard that even a minute variation in spelling or punctuation in an address or company name results in separate listings. To the extent possible based on the available information, the target property listings are summarized below in terms of whether they pertain to the subject SMC property, the former Coon Trust property, and/or the former Stauffer facility as a whole.

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 35
November 22, 2019

Address	Company	Database	Comment
Subject Site Listings			
2112 223 rd St E	Stauffer Management Co.	CA RGA LUST	Assumed to pertain to former USTs at the site
2112 E 223 rd St	Stauffer Management Company LLC	CA DRYCLEANERS	Apparently erroneous listing derived from SCAQMD records
		CA HAZNET	Pertains to hazardous waste (sludge from EISB) generation between 2008 and 2012
		CA CERS	Pertains to ongoing EISB remediation
2112 East. 223 rd St.	Stauffer Management Company LLC	FINDS	Pointer to EnviroStor, RCRA-related, and other database listings
		ECHO	Pertains to EPA hazardous waste generator ID
2112 East. 223 rd Street	Stauffer Management Co.	CA WDR	Pertains to ongoing EISB remediation
		CA CIWQS	Pertains to WDR for ongoing EISB remediation
2112 East. 223 rd Street	Stauffer Management Company LLC	SEMS-ARCHIVE	Site evaluated in 1986 but does not qualify for NPL
		CORRACTS	Pertains to past use for plastics manufacturing
		RCRA-TSDF	Pertains to ongoing EISB treatment
		RCRA-LQG	Pertains to past hazardous waste generation
		CA ENVIROSTOR	Pertains to DTSC involvement with facility-wide assessment and remediation
		CA CPS-SLIC	
		CA HIST Cal-Sites	
		CA HIST UST	Pertains to former USTs & ASTs
		2020 COR ACTION	Pertains to ongoing EISB remediation
		CA HWP	Pertains to ongoing site remediation
		CA CERS	Pertains to ongoing site remediation
2112 East. 223 rd Street	Stauffer Management Co.	CA Los Angeles Co. HMS	Pertains to unspecified permits
2112 E. 223 rd St.	City of Carson-Atkemix Thirty Seven Inc.	FINDS	Pointer to other database listings
2112 E 223 rd St.	Stauffer Chemical Co.	CA Los Angeles Co. HMS	Pertains to unspecified “removed” permits
		CA WDS	Pertains to ongoing EISB remediation
2112 0223 rd St E	Stauffer Management Co.	CA RGA LUST	Assumed to pertain to former USTs at the site with references to 1997 and 1998
2112 223 rd	Stauffer Management Co., LLC	CA CERS	Pertains to WDR violation on 8/17/2017 and other permit violations, including late submission of reports.

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 36
November 22, 2019

Address	Company	Database	Comment
2201_E_223 rd St Off Site.	Stauffer Management Co	RCRA SQG	Pertains to hazardous waste generation in 1997
		CA RESPONSE	Pertains to DTSC involvement & oversight facility-wide
		CA ENVIROSTOR	Pertains to DTSC involvement with facility-wide assessment and remediation
		CA LUST	Appears to pertain to UST removals in 1993
		CA CPS SLIC	Appears to pertain to UST removals in 1993
		CA DEED	Pertains to 9/4/2013 LUC
		CA CORTESE	Pertains to land use restrictions
		CA HAZNET	Pertains to hazardous waste generation in 1997
		CA HIST CORTESE	Rationale for listing unclear
CA CERS	Pertains to ongoing remediation		
Other Potentially Relevant Listings			
2254 223 rd	City of Carson - Swan Property	CA CPS SLIC	Rationale for listing unclear
2254 E. 223 rd Street	Coons Trust Property	CA ENVIROSTOR	Pertains to DTSC oversight and land use restrictions
		CA SLIC	Pertains to past LARWQCB involvement
		CA VCP	Pertains to DTSC oversight & reimbursement under VCP
		CA DEED	Pertains to 12/21/2005 LUC
		CA CERS	Pertains to past LARWQCB involvement

In broad terms, none of these target property listings summarized above suggest site conditions beyond those documented elsewhere in this report.

6.3 ADJOINING PROPERTIES TO THE NORTH

To the north of the site is a strip of land between East 223rd Street and the 405 Freeway. From east to west, this strip of land features or has featured a Cruise America recreational vehicle sales and service facility, the Cormier Chevrolet/Hyundai car dealership, a Honda facility, and a LACoFD fire station.

6.3.1 Cruise America Facility, 2233 East 223rd Street

The Cruise America facility is a recreational vehicle sales and service facility on the north side of East 22rd Street (Figure 2). The Cruise America property features in several databases related to the generation of hazardous waste; however, the generation of hazardous waste is not, in and of itself, an indication that releases have occurred. Avocet notes that database entries include numerous violations; however, they appear to be of the administrative type, as opposed to violations indicting a hazardous substance release. The street address also features in numerous databases related to one or more leaking USTs under previous owners or occupying entities. More specifically, the address is listed under Cormier Hyundai as a small-quantity hazardous waste generator and under Carson Redevelopment Agency as a leaking UST site. The property

does not appear to feature in the GeoTracker database, but information provided by EDR indicates that a leaking UST case was opened in September 1997, apparently pursuant to the closure or removal of two USTs. No other information is available other than the leaking UST case apparently involved soil only was closed in March 1998.

Based on the above, there is no indication that releases at the Cruise America property have impacted the subject site.

6.3.2 WIN Chevrolet/Hyundai, 2201 East 223rd Street

Now occupied by WIN Chevrolet and Hyundai, the original Cormier Chevrolet dealership at this location dates back to between 1964 and 1972 and has featured as many as eight USTs over the years, including at least one UST that featured two compartments and was counted as two separate USTs. ENSR has reported that the eight USTs contained gasoline, waste oil, fresh motor oil, fresh transmission fluid, and unspecified degreasing solvents (ENSR, October 1995). It appears that there have been two separate releases at the former Cormier property, a release of gasoline discovered in 1986 and a more recent release of waste oil in 2008.

No documentation pertaining to the earlier release is available through GeoTracker; however, AECOM has reported that six of the USTs in the southwest corner of the Cormier property were removed in 1986 (Earth Tech AECOM, January 29, 2009). Numerous soil borings revealed three distinct areas of soil contamination attributed to the USTs. The contaminated soils were excavated and removed in 1989 and two new double-walled USTs were installed and utilized for oil storage. In September 1994, two other gasoline USTs were removed from the north-central portion of the Cormier property. As of 1995, Cormier had installed at least eight groundwater monitoring wells, some of which contained 1,2-DCA attributed to releases at the Stauffer facility.

According to documents available through GeoTracker, four USTs (including a dual-compartment tank that was counted as two) were removed in November 2005: two 500-gallon motor oil tanks, a 500-gallon transmission fluid tank, and a 1,000-gallon waste oil tank (LARWQCB, July 16, 2008). These four USTs were located adjacent to a repair shop and were replaced by ASTs. Soil matrix samples collected in conjunction with the UST removals contained total recoverable petroleum hydrocarbons (TRPH) at concentrations up to 135,000 mg/kg; however, benzene and methyl *tert*-butyl ether (MTBE) were not detected. In April 2007, three borings were drilled to 30 feet bgs to assess the lateral and vertical extent of the TRPH impact, which appeared to be centered beneath a dispenser island. Of the 18 soil samples analyzed, only one 5-foot sample contained TRPH, at 554 mg/kg, and none contained benzene or MTBE. LARWQCB concluded that this residual contamination did not pose a significant threat and, on July 16, 2008, issued an NFA letter for the four removed USTs.

Based on the above, it appears unlikely that the 2005 waste oil release has impacted the subject site; however, the earlier release discovered in 1986 may have, although any such impacts would have been minor compared to the impacts attributed to Stauffer's operations. It is noted, however, that groundwater extraction from EISB wells along the western boundary of the former

Stauffer facility could conceivably accelerate the migration of residual contaminants, if any, toward the former Stauffer facility.

6.3.3 Honda, 2055 East 223rd Street

Now occupied by Honda for the sale and service of generators, the property at 2055 East 223rd Street, to the northwest of the site (Figure 2), was previously occupied by U.S. Golf. The property is listed in several leaking UST databases and is referred to as the former Markstein Property. In brief, it appears that groundwater beneath the property has been impacted by gasoline attributed to a release from a former UST, with U.S. Golf listed as the “responsible party.” Three groundwater monitoring wells have been installed at the property and are being monitored on a semiannual basis (Economy Environmental, Inc., January 15, 2011). The most recent monitoring report available through GeoTracker indicates that the historical maximum concentrations of TPH-g, benzene, and MTBE in groundwater have been 98,000 µg/L, 15,000 µg/L, and 380 µg/L, respectively (Economy Environmental, Inc., January 15, 2011). The most recent data, for the fourth quarter of 2010, however, indicate current maximum TPH-g, benzene, and MTBE concentrations of 1,000 µg/L, 17 µg/L, and 6.6 µg/L, respectively (Economy Environmental, Inc., January 15, 2011). At least one additional groundwater monitoring event occurred in February 2014, and although the report is not available on GeoTracker, the maximum reported concentrations of TPH-g, ethylbenzene, xylenes, and naphthalene were 4,4600 µg/L, 218 µg/L, 118.4 µg/L, and 168 µg/L, respectively (LARWQCB, June 16, 2014). LARWQCB stated that it could not close the case pursuant to its “low threat closure policy” (LTCP) and asked the responsible party to collect and analyze soil matrix samples from two borings to 20 feet bgs in the former UST area (LARWQCB, June 16, 2014). The responsible party complied, and although the report is not available on GeoTracker, the soil matrix samples contained only benzene and toluene at maximum concentrations of 0.0057 and 0.0051 mg/kg, respectively (LARWQCB, December 29, 2014). Pursuant to these results, LARWQCB issued an NFA letter for the leaking UST case pursuant to its LTCP (LARWQCB, December 29, 2014).

Contrary to the regional hydraulic gradient in Unit A, as interpreted at the former Stauffer facility, groundwater beneath the former U.S. Golf property reportedly flows to the north-northwest, possibly indicating that one or more of the three monitoring wells are actually screened in a perched zone overlying Unit A proper. Regardless of whether the hydraulic gradient is to the north-northwest or to the southwest, however, the former U.S. Golf property would not be considered hydraulically upgradient of the former Stauffer facility. As such, it is unlikely that the gasoline release at the former U.S. Golf property has adversely impacted the subsurface environment beneath the subject site.

6.3.4 LACoFD Fire Station #127, 2049 East 223rd Street

Located to the northwest of the site (Figure 2), this LACoFD station formerly featured two 1,000-gallon USTs, one for gasoline and one for diesel. Based on records available through GeoTracker, the two USTs were removed in November 1995, at which time contaminated soil was identified in the floor of the tank excavation, with TPH-g concentrations up to 400 mg/kg and benzene concentrations up to 1.02 mg/kg (LARWQCB, February 17, 2011). The lateral

extent of the contamination was delineated via the collection of soil samples from four monitoring well borings, all screened in Unit A, and five direct-push borings. Soil samples from these borings contained TPH-g at concentrations up to 7,040 mg/kg, benzene up to 5.39 mg/kg, and MTBE up to 4.48 mg/kg. Unit A groundwater samples contained TPH-g at concentrations up to 3.6 mg/L, benzene up to 0.27 mg/L, and MTBE up to 1.19 mg/L.

Between February 4 and March 26, 2010, approximately 20 gallons of Fenton's reagent were injected into each of three injection wells in the former UST area. Post-remediation groundwater monitoring showed that only 0.0184 mg/L of MTBE remained in groundwater in a single well; no other hydrocarbons were detected (LARWQCB, February 17, 2011). LARWQCB concluded that this residual contamination did not pose a significant threat and, on March 28, 2011, issued an NFA letter for Fire Station #127.

Contrary to the regional hydraulic gradient in Unit A, as interpreted at the former Stauffer facility, groundwater beneath Fire Station #127 reportedly flowed to the east-southeast, possibly indicating that one or more of the four monitoring wells were actually screened in a perched zone overlying Unit A proper. Taking the east-southeasterly gradient at face value, however, Fire Station #127 would be considered hydraulically upgradient of the former Stauffer facility. Given the intervening distance and the minor nature of the residual contamination, however, it is considered unlikely that the fuel hydrocarbon releases at Fire Station #127 have adversely impacted the subsurface environment beneath the subject site. It is noted that the east-southeasterly gradient reported at Fire Station #127 is opposite the north-northeasterly gradient at the adjoining former U.S. Golf property discussed above in Section 6.3.3.

6.4 ADJOINING PROPERTIES TO THE SOUTH

Directly to the south of the site is the Marathon (former ARCO) refinery and to the southwest is a PolyOne (formerly Geon) petrochemical facility. Further south is a former Johns Manville asbestos facility.

6.4.1 Marathon Refinery

Now owned and operated by Marathon, the former ARCO refinery borders the site to the south (Figure 2). Originally a Pan American Petroleum Company refinery, which commenced operations in 1923, it was purchased and expanded by ARCO in 1937 (Earth Tech AECOM, January 29, 2009). Over 400 borings have been drilled and numerous monitoring wells have been installed over the past 30 years to evaluate petroleum contamination underlying the refinery. Most of the wells are screened within the water table aquifer. ARCO and its affiliates have also installed at least seven and possibly as many as ten or more monitoring wells into deeper aquifers as part of its vertical delineation of fuel oxygenates. These monitoring wells are in addition to nine industrial production wells. Investigations at the facility have identified as many as ten areas underlain by LNAPL attributed to releases from refinery operations. Other contaminants identified in soil and groundwater beneath the refinery include aromatic hydrocarbons, notably benzene, toluene, ethylbenzene, and total xylenes (BTEX); MTBE; and other fuel oxygenates. Chlorinated VOCs, including 1,2-DCA and VC, have also been detected.

In particular, sample results from three ARCO monitoring wells located near the southeast corner of the SMC property contain 1,2-DCA attributed to the former Stauffer facility.

ARCO's subsurface investigations have shown that petroleum hydrocarbons beneath the "North Property," south and southwest of the former Stauffer property, do not extend beyond 225 feet bgs and plumes beneath the Main Refinery (located further south) do not extend beyond 340 feet bgs. High-volume groundwater recovery systems are in operation using shallow recovery wells located in the central and western portions of the ARCO refinery. The ARCO refinery is considered hydraulically downgradient of the site, although the onsite EISB extraction wells may locally reverse the regional groundwater flow directions in Unit A and the deeper water-bearing zones.

6.4.2 PolyOne Facility, 2104 East 223rd Street

Formerly operated by B.F Goodrich and Geon (ENSR, October 1995), the PolyOne facility is located southwest of the subject site (Figure 2) and dates back to between 1952 and 1963. PolyOne's product line includes vinyl plastisols and additives (Earth Tech AECOM, January 29, 2009). Prior operations included the polymerization of PVC and VC that was stored onsite. No information is available on GeoTracker or EnviroStor for the PolyOne property; however, ENSR has reported that subsurface environmental investigations date back to at least 1991 and have included at least eight groundwater monitoring wells screened in Unit A and, in one case, in a perched zone overlying Unit A. No information is available regarding the possible impact, if any, of PolyOne's operations on the subsurface environment. However, data from the PolyOne wells indicate the presence of 1,2-DCA at concentrations up to 80 mg/L (ENSR, October 1995) that has been attributed to releases at the former Stauffer facility.

6.4.3 Former Johns Manville Property, 2420 East 223rd Street

Between 1937 and 1982, Johns Manville manufactured asbestos insulation products, asbestos cement pipe, mineral wool insulation, and PVC pipe on an approximately 65-acre property located south of the Marathon refinery (DTSC, June 29, 1990). The Johns Manville property was accessed via a driveway from East 223rd Street. As a result of Johns Manville's manufacturing operations, near-surface soil in some areas of the property was impacted by asbestos fibers. A remedial investigation showed that airborne asbestos fibers were the only "contaminant of concern." A subsequent feasibility study showed that excavating asbestos-containing soil and placing it in onsite containment cells was the best remedial alternative. During remedial excavation between October 1989 and June 1991, three USTs were encountered and removed and associated contaminated soil was excavated and transported offsite for disposal (DTSC, June 29, 1990). The volume of asbestos-containing soil at the Johns Manville property was estimated at 550,000 cubic yards. Of this total, approximately 88,000 cubic yards were excavated and placed in one or more of three onsite cells. On completion of the remedial excavation, the disposal cells were paved with asphalt and the property deed restricted.

6.5 ADJOINING PROPERTIES TO THE EAST

Immediately east of the site is the Carson Industrial LLC property, representing the western 6 acres of the former Coon Trust property, and beyond it, a Marathon administrative building.

6.5.1 Carson Industrial LLC Property, 2254 East 223rd Street

The approximately 11-acre former Coon Trust property, of which the Carson Industrial LLC property was a part, was first developed prior to 1927 with as many as five very large ASTs. The purpose of the ASTs is not known, but given the then recent and nearby discovery of oil and the numerous refineries to the south, they may have stored crude oil or refined petroleum products. Sometime prior to 1947, the five ASTs were removed and the former Coon Trust property was redeveloped as what appears to have been a storage facility. Historical records indicate that Apache Freight and Specialty Pipe occupied the property at some point in time, possibly simultaneously, as the former Coon Trust property may have been divided into eastern and western portions. Very little is known about Apache Freight, Specialty Pipe, and possibly other tenants or occupants over the years. There are no records of USTs having been located at the former Coon Trust property, although Avocet notes that it would be somewhat unusual if Apache Freight had not had USTs to fuel its trucks.

Between 1978 and 1982, the former Coon Trust property was part of the former Stauffer facility. Stauffer's expansion into the former Coon Trust property involved mostly warehouse capacity, although some manufacturing infrastructure was included, as was a large concrete-lined stormwater impound basin. After Stauffer ceased manufacturing in 1982, the infrastructure on the former Coon Trust property was demolished "to grade"; foundations and other subsurface features, possibly including pipelines, were left in place. Stauffer has since investigated subsurface environmental conditions beneath the former Coon Trust property to assess the impact of Stauffer's manufacturing operations; however, none of the investigations addressed prior land uses, notably the large ASTs present in the 1920s.

In February 2014, Avocet conducted a Phase II investigation and a vapor intrusion assessment in the western portion of the former Coon Trust property as a precursor to Carson Industrial LLC purchasing it from the City of Carson. Avocet's additional Phase II investigation included the collection and analysis of six soil matrix samples from borings advanced within the footprints of the former ASTs. The soil matrix samples were analyzed for TPH and VOCs. In addition to the soil matrix sampling associated with the former ASTs, Avocet also collected soil vapor samples at 5 and 15 feet bgs at 12 locations throughout the site (Avocet, April 9, 2014). The results of the soil matrix sampling indicated that low, ultimately insignificant concentrations of TPH in the oil range were detected in three of the six samples collected. In addition, five of the six samples contained detectable concentrations of one or more of four VOCs; however, all of the reported concentrations were well below potentially applicable regulatory screening levels. Of the 29 (24 plus 5 duplicates) soil vapor samples, 8 contained relatively low but detectable concentrations of one or more of seven VOCs, including 1,2-DCA, the predominant contaminant associated with the former Stauffer facility. The relatively low VOC concentrations in soil vapor were considered consistent with the completed and DTSC-certified vadose zone remediation program (Avocet, April 9, 2014). Avocet understands that Carson Industrial LLC does not plan

to construct any occupied structures; rather, its property will be paved and leased to Marathon for employee parking.

Regardless of the future use of the Carson Industrial LLC property, Avocet believes there is little likelihood that operations on the former Coon Trust property prior to 1978 are likely to have impacted subsurface conditions beneath the subject SMC property.

6.5.2 ARCO Polypropylene, LLC, 2420 East 223rd Street

Little is known about the early history of the property immediately east of the former Coon Trust property other than that it was first developed for industrial purposes before 1947, prior to which it had been agricultural. In the late 1940s and 1950s, it appears to have been some type of outside storage facility served by an oval-shaped railroad track; however, the type(s) of materials stored are not known. By the early 1960s, it appears to have been contiguous with the property to the south but was still being used for outside storage. At some stage it was acquired by ARCO, which constructed two baseball diamonds on the southern portion and paved the northern portion for storage. After it acquired the eastern 6 acres of the former Coon Trust property from the City of Carson sometime after 2005, ARCO redeveloped the two adjoining properties with an administrative building for ARCO Polypropylene, LLC, with a street address of 2420 East 223rd Street.

Absent additional readily accessible information, it is difficult to assess the potential impact, if any, of operations on the ARCO property on the subject site. It is noted in this regard that the presence of very high benzene concentrations in groundwater in Well MW-3A, in the northeast corner of the former Coon Trust property, remain unexplained. It is just as likely, however, that the benzene migrated from another property to the north or northeast.

6.6 SOLUTIA PROPERTY TO THE WEST

Immediately west of the site is the approximately 10.7-acre Solutia (formerly Witco and Monsanto) facility at 2100 East 223rd Street. After being agricultural land, the Solutia property was developed in the early 1960s (Northgate Environmental Management, Inc. [Northgate], June 29, 2012) with as many as 22 ASTs in the southern portion of the property. These ASTs were grouped into a “Western Tank Farm” and a “Southeastern Tank Farm.” To the north of these AST farms were an office building, a warehouse, and other process infrastructure. Wastewater treatment facilities were located in the southwest corner of the property. According to ENSR, the property was a surfactant and detergent manufacturing facility operated by Witco in 1995 (ENSR, October 1995); however, it is not clear from readily available information whether Witco was the original operator. Regardless, Monsanto Chemical Company (Monsanto) acquired the property from Witco in 1985 (Earth Tech AECOM, January 29, 2009) and continued surfactant manufacturing until 1991. Raw materials used in manufacturing included benzene, paraffin, olefin, chlorine, anhydrous ammonia, and aluminum chloride.

Shortly after it acquired the property, Monsanto began investigating subsurface environmental conditions. Groundwater monitoring wells screened in Units A and B indicated the presence of TPH, chlorobenzene, and benzene in groundwater, the latter of which was also present as

LNAPL. The TPH and aromatic hydrocarbons, notably including the benzene, were attributed to releases from the Monsanto property, but Units A and B also contained 1,2-DCA at concentrations up to 70 and 100 mg/L, respectively (ENSR, October 1995), suggesting migration from the Stauffer facility. Monsanto installed three “skimming wells” to recover benzene LNAPL from the shallow water-bearing unit and also operated a “pulsed” soil vapor extraction system from August 1995 through October 2001 as part of a soil and groundwater RAP prepared under a Consent Agreement with DTSC entered in December 1990. In 1993, Monsanto sold the property to Remediation Capital Corporation; however, Remediation Capital Corporation declared bankruptcy and responsibility for remediating the site reverted to Solutia, which was spun off from Monsanto in September 1997.

In or around 2011, Solutia excavated approximately 940 cubic yards of benzene-impacted soil and transported it offsite for disposal. Pursuant to post-excavation soil and soil vapor sampling, DTSC issued Solutia an NFA letter for soil on the basis that residual benzene concentrations in vadose zone soil “will likely biodegrade over time” (DTSC, June 29, 2012). In the same letter, however, DTSC noted that continuous groundwater remediation is needed to prevent benzene off-gassing from groundwater from re-contaminating vadose zone soil.

Based on documents available through EnviroStor, Avocet understands that Solutia pilot tested an oxygen biosparge system in part of the area formerly underlain by benzene LNAPL (Solutia, October 10, 2013). However, DTSC has noted that SMC’s EISB extraction wells along the boundary with the Solutia property have reversed the natural southwesterly groundwater flow direction in Unit A and may be causing benzene beneath the Solutia property to migrate toward the SMC property. Moreover, DTSC has pointed out that Solutia’s attempt to create conditions conducive to aerobic degradation are “mutually exclusive” from SMC’s program to establish conditions conducive to anaerobic degradation (DTSC, March 14, 2013). Notwithstanding the above, Solutia continued with the biosparge pilot test but noted that the biotranspiration rate began to decline and applied for a general Waste Discharge Requirements (WDR) permit to allow it to add supplements to groundwater to enhance bioremediation activity (Northgate, January 30, 2019). The WDR permit was issued in February 2014 and Solutia began injecting a nitrate, phosphate, lactate, and ferrous sulfate solution into the subsurface via 23 biosparge wells. Solutia has since made a few modifications, but bioremediation appears to be ongoing (Northgate, January 30, 2019).

Avocet notes that the area Solutia is bioremediating is to the west and southwest of the subject site and that SMC is operating several EISB extraction wells along the shared site boundary. It seems likely that SMC’s extraction wells could be drawing in benzene and possibly other contaminants from the adjoining Solutia site and, as previously noted, 1,2-DCA attributed to the SMC site has been detected at the Solutia site in the past.

6.7 OFFSITE DATABASE LISTINGS

After reviewing the information provided in EDR’s report (Appendix K) and additional information available from the GeoTracker and EnviroStor websites maintained by CalEPA, the following two sites are considered potentially relevant for Phase I ESA purposes.

6.7.1 Niklor Chemical Co., 2060 East 220th Street

The former Niklor facility is located approximately 0.26 mile north of the former Stauffer facility. Documents available through GeoTracker indicate that Niklor manufactured chloropicrin, a soil fumigant, at the facility for 34 years until 2003, at which time the site was cleared, apart from an office building (Environmental Audit, Inc. [EAI], January 15, 2007). At some stage, it was discovered that soil around a wastewater clarifier (referred to as Sump T-001) had been impacted by chloropicrin. As part of the subsequent investigation, as many as seven groundwater monitoring wells were installed and a soil vapor survey was conducted. Based on their depths, the wells appear to have been screened in or above Unit A and they generally indicate flow to the south. Data from the wells indicated the presence of several chlorinated and aromatic VOCs, which Niklor maintained were not attributable to its former operations.

In May and June 2006, approximately 2,500 cubic yards of chloropicrin-impacted soil was excavated from around the wastewater clarifier. The excavation extended to a depth of 25 feet bgs, approximately 5 feet beneath the water table, and necessitated the destruction of one of the seven monitoring wells. A total of 22 confirmation soil samples from the walls and floor of the excavation contained residual concentrations of chloropicrin at up to 34.8 micrograms per kilogram ($\mu\text{g/kg}$) and also elevated concentrations of sodium and chloride (EAI, January 15, 2007). EAI noted that there are no screening levels for chloropicrin but it considered the residual concentrations low and requested closure for soil. It is not clear whether LACoFD granted closure for soil, but it appears that periodic groundwater monitoring was conducted at least through 2011. The groundwater data indicate that elevated sodium and chloride concentrations are generally limited to within the former site boundary and that relatively low concentrations of certain VOCs are also present (EAI, April 15, 2011). GeoTracker indicates that the case was closed on November 21, 2007.

Taking the reported southerly groundwater flow direction at face value, the former Niklor facility would be directly upgradient of the former Stauffer facility. However, based on the intervening distance and the generally low VOC concentrations reported in groundwater beneath the Niklor property, it appears unlikely that the subject site has been adversely impacted.

6.7.2 Rainbow, 21119 Wilmington Avenue, Carson

The approximately 10-acre Rainbow facility is located almost a mile north of the former Stauffer facility and has been used since the 1960s for tanker truck cleaning, truck and trailer parking, waste containerization, vehicle staging, and vehicle maintenance. In the 1980s, Rainbow applied for and was granted Interim Status authority to act as a hazardous waste facility. Rainbow initially intended to apply for a Standardized Permit to treat wastewater generated during cleaning of hazardous waste transportation vehicles. However, after considering its options, Rainbow elected to limit operations to cleaning hazardous material transportation vehicles and applied for authorization under the Permit by Rule tier to operate a wastewater treatment plant at the site.

Without going into detail, it appears that tanker truck cleaning and related operations have resulted in significant vadose zone and groundwater impacts involving PCE at the Rainbow site.

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 45
November 22, 2019

As of 2004, as many as 11 “solid waste management units” (SWMUs) and two “areas of concern” (AOCs) had been identified. On December 28, 2004, DTSC and Rainbow entered into a Corrective Action Consent Agreement (Docket HWCA: P1-04/05-005) for the investigation of the SWMUs and AOCs at the site. Based on a review of existing site characterization data, DTSC concluded that additional investigation was warranted at SWMUs 2, 3, 8, 10, and 11, and AOC 2. Rainbow has since characterized subsurface conditions and begun remediating soil and groundwater impacts (Environ, July 26, 2013).

While the subsurface impacts beneath the Rainbow site are significant, it is not directly upgradient of the former Stauffer facility based on interpreted flow directions in the impacted intervals. Moreover, the Rainbow site is almost 1 mile away from the former Stauffer facility, and Rainbow’s site assessment data do not indicate that its contamination has migrated very far offsite. Based on the above, it appears unlikely that the former Stauffer facility has been adversely impacted by releases at the Rainbow site.

7.0 SUMMARY AND CONCLUSIONS

This section presents the conclusions of the Phase I ESA for the subject site in terms of identified and sequentially numbered RECs, CRECs, HRECs, and OEFs.

7.1 RECOGNIZED ENVIRONMENTAL CONDITIONS

ASTM (2013) defines RECs as:

“ . . . the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.”

ASTM (2013) goes on to define *de minimis* as:

“ . . . a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.”

Based on the subject Phase I ESA, Avocet has identified a single REC at the site, as follows:

- **REC 1 – Groundwater Contamination.** Groundwater in Units A, B, and C beneath the site has been impacted by 1,2-DCA, VC, and other VOCs. Groundwater remediation was initiated in October 2011 but is expected to require at least five years before cleanup goals in Unit A are achieved. As groundwater in Unit A has no direct beneficial uses, the cleanup goals are based on exposure via inhalation of VOC vapors at the ground surface. It is noted in this regard that soil vapor conditions beneath the SMC property have not been assessed since 1995, although the LUC (Appendix C) requires vapor barriers beneath new buildings unless DTSC accepts “analysis” that indicates they are unnecessary. As groundwater contamination beneath the site has not yet been addressed to DTSC’s satisfaction, and as the LUC for the site was triggered by residual soil contamination (as opposed to groundwater contamination), Avocet does not believe groundwater contamination is an HREC or a CREC.

7.2 CONTROLLED RECOGNIZED ENVIRONMENTAL CONDITIONS

ASTM (2013) defines CRECs as a REC:

“ . . . resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 47
November 22, 2019

implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls)."

Based on the subject Phase I ESA, Avocet has identified a single CREC at the site as follows. To minimize possible confusion, the REC and CREC identification numbers are sequential.

- **CREC 2 – Soil Contamination at 25 to 35 Feet bgs.** Contaminants attributed to releases at the site are present in saturated, low-permeability soil between 25 and 35 feet bgs. VLE was not effective in removing VOCs from soil in this vertical interval, which has been transferred to the Groundwater OU. Residual contamination between 25 and 35 feet bgs (Figures 5 and 6) resulted in a LUC being recorded for the SMC property. As residual soil contamination between 25 and 35 feet bgs is addressed by the LUC, it is considered a CREC as opposed to a REC or HREC.

7.3 HISTORICAL RECs (HRECs):

ASTM defines HRECs as

"... a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls)."

Based on the subject Phase I ESA, Avocet has identified two HRECs at the site, as follows. To minimize possible confusion, the REC, CREC, and HREC identification numbers are sequential.

- **HREC 3 – Soil Contamination at 0 to 15 Feet bgs.** As noted above, contaminants attributed to releases at the site have impacted the surficial aquitard above Unit A as well as groundwater in Unit A and deeper water-bearing zones. To the extent they impacted the upper 15 feet of the unsaturated vadose zone, contaminants in this vertical interval have been addressed by VLE, and DTSC has certified that remediation in that interval is complete. As such, VOC impacts in the upper 15 feet of the unsaturated vadose zone beneath the site are considered an HREC.
- **HREC 4 – Former USTs.** Stauffer operated three single-walled steel USTs in the northwest corner of the subject site: 500- and 2,000-gallon USTs for leaded gasoline and a 500-gallon UST for waste oil. It is not clear when the three USTs were installed but the waste oil UST was taken out of service in 1978 and the gasoline USTs were taken out of service in 1982. In 1993, all three single-wall USTs were permanently closed by removal. Impacted soil was encountered during the removal of the USTs and over-excavated. A total of 12 soil matrix samples were collected from beneath the three USTs and the associated piping systems and dispensers and analyzed for a variety of fuel hydrocarbon constituents. None of the

soil samples contained fuel hydrocarbons, and on June 29, 1994, LACoDPW issued an NFA letter for the three USTs.

7.4 OTHER ENVIRONMENTAL FEATURES (OEFs)

OEFs are potential environmental features or conditions that do not meet the definition of a REC, CREC, or HREC but which may warrant mention in the context of acquiring and redeveloping the site. Based on the subject Phase I ESA, Avocet has identified three OEFs at the site, as follows. To minimize possible confusion, the REC, CREC, HREC, and OEF identification numbers are sequential.

- **OEF 5 – Subsurface Piping and Other Infrastructure.** In the years that followed the cessation of manufacturing operations in 1982, SMC demolished and removed buildings and aboveground infrastructure “to grade,” meaning that subsurface infrastructure, including pipelines and possibly sumps and vaults, was left in place. AECOM personnel are unaware whether the pipelines were systematically drained and flushed prior to being abandoned but have reported that pipelines encountered when trenching for remediation system piping did not contain liquids. It would be prudent to assume that subsurface piping and possibly other infrastructure will be encountered during site redevelopment and will have to be addressed appropriately.
- **OEF 6 – Consent Agreement.** The site is subject to continued DTSC oversight pursuant to the Consent Agreement entered in 1994 (Appendix A).
- **OEF 7 – Land Use Covenant.** The LUC (Appendix C) restricts how the SMC property can be used. Assuming Panattoni is not contemplating anything other than commercial/industrial redevelopment, the Prohibited Uses (Article 4.01) and Prohibited Activities (Article 4.03) should not apply. However, the articles pertaining to soil management, new construction, and non-interference with the EISB system and associated monitoring wells may apply. With respect to soil management (Article 4.02), DTSC requires a Soil Management Plan if soil at or below 15 feet bgs is to be disturbed. Article 4.04 of the LUC requires that new buildings feature vapor barrier “unless analysis is provided to indicate vapor barriers are unnecessary as approved by the Department” (i.e., DTSC). As previously noted, Avocet interprets the non-interference clause (Article 4.05) as requiring future landowners to seek DTSC’s approval to replace any remediation or monitoring infrastructure damaged or destroyed during redevelopment.

Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 49
November 22, 2019

Respectfully submitted,

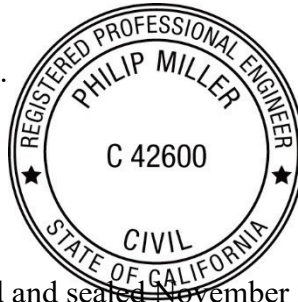
AVOCET ENVIRONMENTAL, INC.



Philip Miller, P.E.

Principal

(RCE No. C042600)



Signed and sealed November 22, 2019

REFERENCES

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Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 51
November 22, 2019

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Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 52
November 22, 2019

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Phase I Environmental Site Assessment

Former Stauffer Chemical Company Facility
2112 East 223rd Street, Carson, California 90745

Page 53
November 22, 2019

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Tables

Table 1
EDR Database Listings
Former Stauffer Chemical Company Facility
2112 East 223rd Street
Carson, California, 90745

Site Name	Address	Database Acronyms	Distance (miles)	Direction	Discussed in Text
Stauffer Management Co	2112 East 223rd Street	RGALUST, CERS, DRYCLEANERS, HAZNET, CERS, FINDS, ECHO, CIWQS, WDR, RCRA-LQG, CERS, CORRACTS, SEMS-ARCHIVE, RCRA TSDF, 2020 COR ACTION, CPS-SLIC, HIST Cal-Sites, HIST UST, ENVIROSTOR, HWP, LOS ANGELES CO. HMS, WDS, RGA LUST	Target Property	N/A	Yes
City Of Carson - Atkemix Thirty Seven Inc.		FINDS			Yes
Stauffer Management Co	2201 East 223rd Street (Offsite)	CPS-SLIC, ENVIROSTOR, RCRA-SQG, DEED, LUST, Cortese, RESPONSE, HIST CORTESE	0.003	WNW	Yes
City Of Carson - Swan Property	2254 East 223rd Street	CPS-SLIC	0.006	NE	Yes
Coons Trust Property		CPS-SLIC, ENVIROSTOR, DEED, VCP			Yes
Cormier Chevrolet Co	2201 East 223 Street	RCRA-SQG, SWEEPS UST, CA FID UST	0.010	NNW	Yes
Bfgoodrich Chemical Group	2104 East 223rd Street	HIST UST	0.010	NW	Yes
Carson Redevelopment Agency	2233 East 223rd Street	LUST	0.018	NNE	Yes
Monsanto Chemical Company	2100 East 223rd Street	CPS-SLIC, HIST Cal-Sites, ENVIROSTOR, SWEEPS UST, CA FID UST	0.021	WNW	Yes
Solutia Inc. Carson Site		RCRA-LQG, CORRACTS, RCRA-TSDF, HWP			Yes
Polyone Corp	2104 East 223rd Street	CERS HAZ WASTE	0.041	SW	Yes
Fire Station 127	2049 East 223rd Street	CPS-SLIC, HIST UST	0.043	WNW	Yes
City Of Carson - Lucas Property	2059 East 223rd Street	CPS-SLIC	0.043	WNW	No
Cormier Hyundai	2233 East 223rd Street	RCRA-SQG, SWEEPS UST	0.043	ENE	Yes
Praxair Distribution Inc	2006 East 223rd Street	UST	0.046	WNW	No
Monsanto Chemical Company	2100 East 223rd Street	ENVIROSTOR, Cortese, RESPONSE, HIST CORTESE	0.051	W	Yes
Cormier Chevrolet	2201 East 223rd Street	CPS-SLIC, HIST UST, SWEEPS UST, CERS HAZ WASTE, CERS TANKS, RCRA-SQG, LUST, HIST CORTESE, UST	0.053	N	Yes
Win Chevrolet Hyundai		AST			Yes
Caliber Collision Center		AST			Yes
Solutia Inc.	2100 East 223rd Street	CERS HAZ WASTE	0.055	W	Yes
Monsato Carson Plant		CPS-SLIC			Yes
Carson Redevelopment Agent	2233 East 223rd Street	HIST CORTESE	0.063	NE	Yes
Cruise America		CERS HAZ WASTE			Yes
Former Markstein Property	2055 East 223rd Street	LUST	0.069	WNW	Yes
Herron Optical Products Division	2035 East 223 Street	RCRA-SQG	0.069	WNW	No
Former Markstein Distributors	2055 East 223rd Street	CERS HAZ WASTE, HIST CORTESE	0.072	WNW	No
LA County Fire Station #127	2049 East 223rd Street	SWEEPS UST, CERS HAZ WASTE, LUST, HIST CORTESE	0.100	WNW	Yes
City Of Carson - La County Property		CPS-SLIC			Yes
Arco Polypropylene LLC	2384 East 223rd Street	CPS-SLIC	0.108	ENE	No
City Of Carson - Arco		CPS-SLIC			No
Ineos Polypropylene LLC		CERS HAZ WASTE			No
City Of Carson - L & M Franklin Inv.	2035 East 223rd	CPS-SLIC	0.118	WNW	No
Praxair, Inc.	2006 East 223rd Street	SWEEPS UST, CERS HAZ WASTE, CERS TANKS, AST	0.119	W	No

Table 1
EDR Database Listings
Former Stauffer Chemical Company Facility
2112 East 223rd Street
Carson, California, 90745

Site Name	Address	Database Acronyms	Distance (miles)	Direction	Discussed in Text
City Of Carson - Arco	2006 East 223rd	CPS-SLIC	0.120	WNW	No
Liquid Carbonic		HIST UST, CERS HAZ WASTE, HIST UST, SWEEPS UST, CA FID UST			No
Certified Coating At Arco	2000 East 223rd Street	RCRA-SQG	0.138	WNW	No
Manville Plant Site	2400 East 223rd Street	WMUDS/SWAT	0.157	ENE	
Edoco	22039 South Westward Avenue	HIST CORTESE, HIST UST, SWEEPS UST, HIST UST, CA FID UST, RCRA-SQG, LUST, SWEEPS UST	0.165	NNE	No
Ventura Transfer Company	2418 East 223rd Street	UST, LUST	0.183	ESE	No
Freeway Engine Sales	1935 East 223rd Street	RCRA-SQG	0.183	WNW	No
Red-d-arc Inc	1945 East 223rd Street	CERS HAZ WASTE	0.184	WNW	No
Timco	2032 220th Street E	LUST	0.185	NW	No
Spinello Construction	2414 East 223rd Street	SWEEPS UST	0.194	ENE	No
Ameron Pipe Lining Division		HIST UST, SWEEPS UST, CA FID UST			No
Ventura Transfer Company	2418 E 223rd Street	CERS HAZ WASTE, CERS TANKS, HWT, HIST UST, SWEEPS UST	0.203	ENE	No
Carson Bodyshop	1933 East 223rd Street	RCRA-SQG, LUST	0.203	W	No
Manville Corporation	2420 East 223rd Street	HIST Cal-Sites, CA BOND EXP. PLAN, ENVIROSTOR, DEED, LUST, RESPONSE, HIST CORTESE	0.210	ENE	Yes
Dayton Superior Specialty Chemical	22039 South Westward Avenue	LUST	0.213	NNE	No
L B Foster Co	2424 East 223rd Street	HIST UST, SWEEPS UST, SWEEPS UST, CA FID UST	0.220	ENE	No
Environmental Dynamics	22222 Wilmington Avenue	Ind. Haz Waste	0.220	WNW	No
Tri West Distributors, LLC		UST			No
Carson Chevron		RCRA NonGen / NLR			No
Montrose Chemical Corp.	20201 S Normandie Avenue	SEMS, CONSENT, NPL, RCRA-LQG, ROD, US ENG CONTROLS, US INST CONTROL	0.224	WSW	No
Johns Manville Plt	2430 East 223rd	SEMS-ARCHIVE, RCRA-SQG	0.236	ENE	Yes
Carson Ventures, LLC	1933 East 223rd Street	LUST	0.238	W	No
Niklor Chemical Co. Inc.	2060 East 220th Street.	LUST	0.240	NNW	Yes
Texaco	22232 Wilmington	LUST, HIST CORTESE, Cortese, HIST UST	0.245	WNW	No
Tesoro/Shell		RCRA NonGen / NLR			No
Texaco/Equilon		UST			No
Watson Land Co	2116 East 220th Street	HIST CORTESE, LUST	0.247	N	No
Lido Van & Storage		HIST UST, SWEEPS UST, CA FID UST			No
Niklor Chemical Company Inc.	2060 East 220th Street.	HIST UST, ENVIROSTOR, CORRACTS, SEMS-ARCHIVE, RCRA TSDF, HWP, RCRA NonGen / NLR, UST, SWEEPS UST, ENVIROSTOR	0.248	NNW	Yes
CCL Tube Inc.	2250 East 220th Street	RCRA NonGen / NLR, CERS HAZ WASTE	0.248	NNE	No
Timco	2032 East 220th Street	SWEEPS UST, CA FID UST, CERS HAZ WASTE	0.249	NNW	No
Standard Metals		AST			No
Torrance Iron And Metal Co Inc		HIST UST, SWEEPS UST			No
Timco	2020 East 220th Street	HIST CORTESE	0.254	NNW	No
Johns-Manville Carson Plant Site	22401 South Alameda Street	WMUDS/SWAT, SWF/LF	0.274	E	Yes
Dominguez Channel	Not Listed	Notify 65	0.280	W	No

Table 1
EDR Database Listings
Former Stauffer Chemical Company Facility
2112 East 223rd Street
Carson, California, 90745

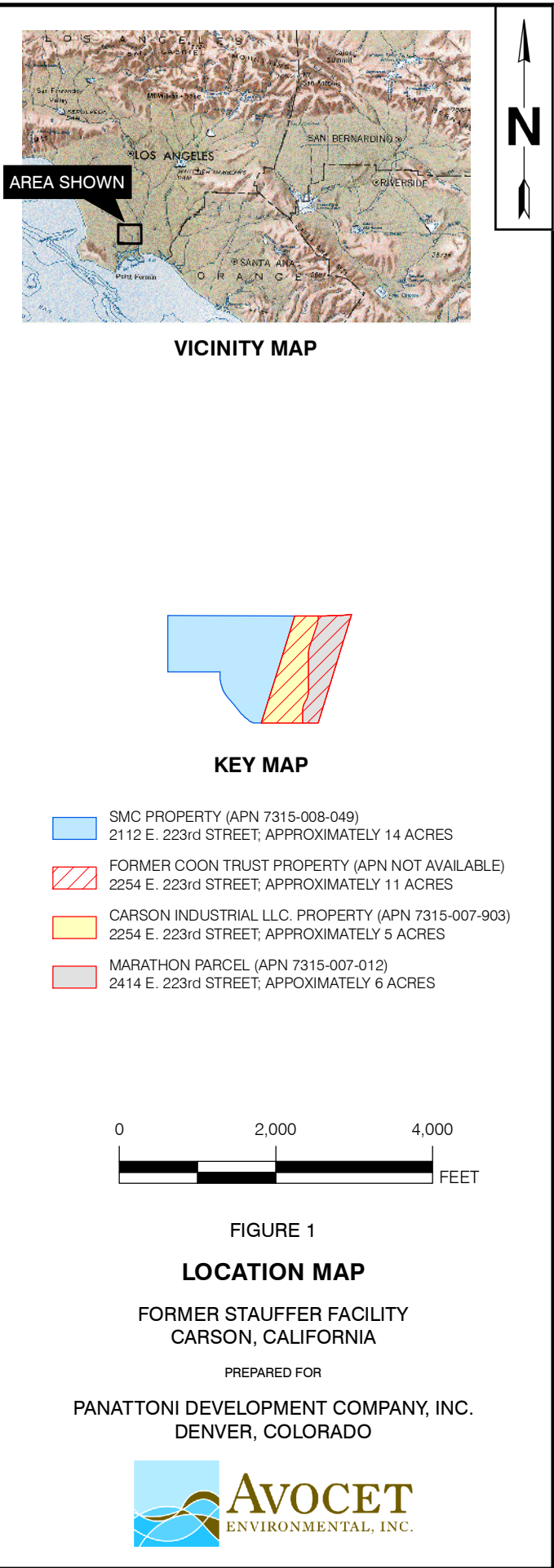
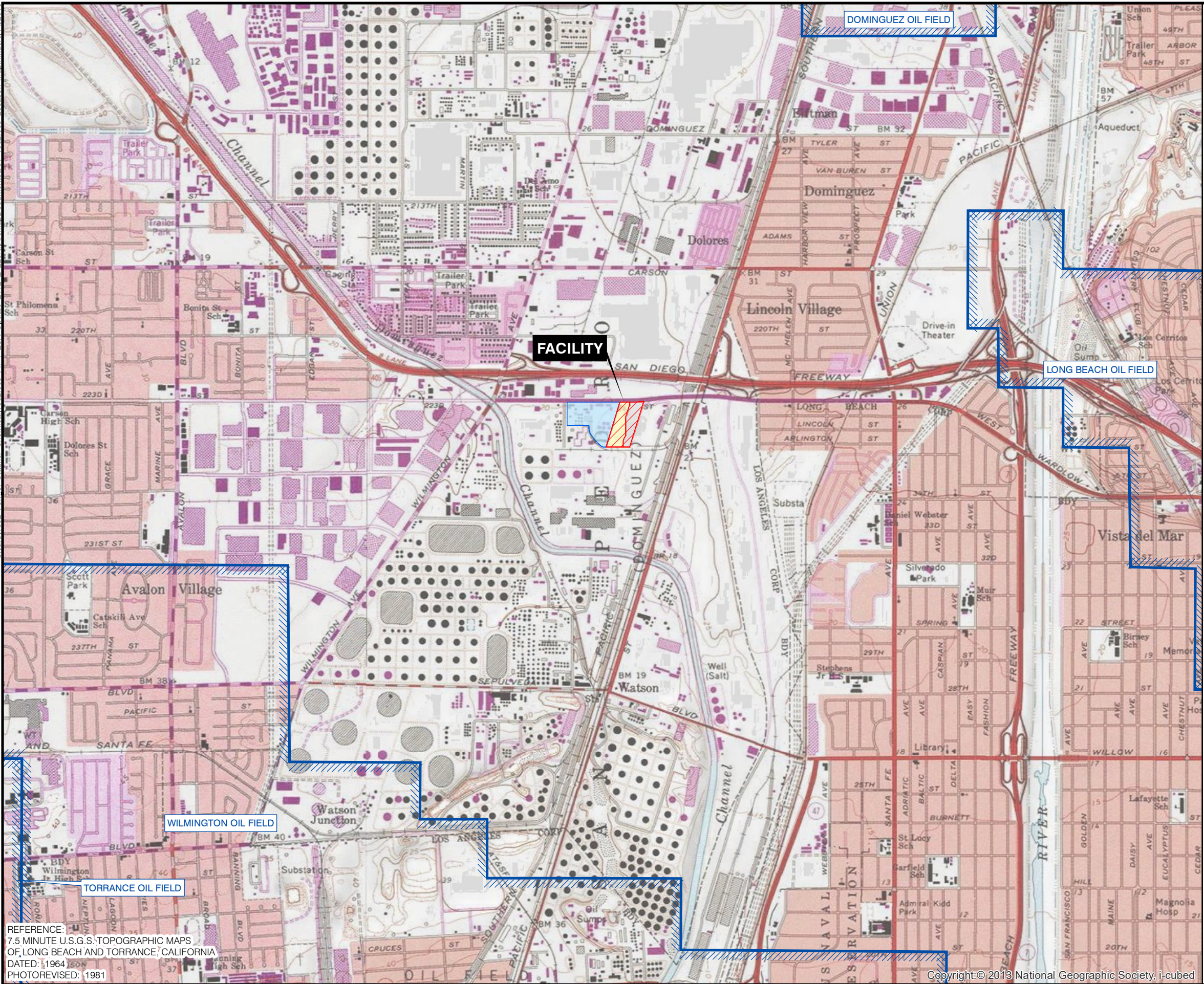
Site Name	Address	Database Acronyms	Distance (miles)	Direction	Discussed in Text
Clean Steel Inc.	2061 East 220th Street	LUST, ENVIROSTOR	0.285	NNW	No
Hardwick Disposal Pits - Watson Land Co.	22400 South Alameda Street	WMUDS/SWAT	0.286	E	No
Matlack Inc	22422 Alameda	HIST CORTESE	0.287	ESE	No
Commercial Carriers Inc	22440 South Alameda Street	LUST, HIST CORTESE	0.288	ESE	No
Dominguez Energy Reyes (Well No. 27)	22010 Wilmington	CPS-SLIC	0.291	NW	No
State Salvage	22500 South Alameda Street	LUST, HIST CORTESE	0.291	ESE	No
Acta South - Parcel Se-351	South Alameda Street	CPS-SLIC	0.294	ENE	No
Wakunaga Of Amer Co Ltd	22010 South Wilmington Avenue	CPS-SLIC	0.295	NW	No
Alameda Street Landfill	22700 South Alameda Street	SWF/LF, LOS ANGELES CO LF METHANE, WMUDS/SWAT	0.297	SE	No
Cassidy & Crisman-Carson		WMUDS/SWAT			No
State Salvage Inc	22500 South Alameda Street	SWRCY, PROC	0.300	ESE	No
Hardwick's Disposal Pit	22620 South Alameda Street	SWF/LF, WMUDS/SWAT	0.302	SE	No
Allco Recycling Inc		SWF/LF	0.302	SE	No
Former Shell #204-1312-0401	22251 South Wilmington Avenue	LUST, HIST CORTESE	0.305	WNW	No
Alameda St San Ldfl	22700 South Alameda Street	SEMS, ENVIROSTOR	0.316	SE	No
Matlack Inc.	22422 South Alameda Boulevard	LUST, ENVIROSTOR	0.325	E	No
Acta Parcel Pch-1552	East Alameda Street	CPS-SLIC	0.329	ENE	No
Acta Parcel Pch-1554	East Alameda Street	CPS-SLIC	0.329	ENE	No
Acta Parcel Pch-1553	East Alameda Street.	CPS-SLIC	0.329	ENE	No
Ventura Transfer Company	2418 East 223rd Street	LUST	0.342	SSE	No
Alpert & Alpert Iron & Metal	21930 South Wilmington Avenue.	ENVIROSTOR	0.359	NNW	No
Arco #5093	21943 Wilmington Avenue	HIST CORTESE, LUST, Cortese	0.363	NW	No
Leonard Property	22351 Wilmington Avenue	CPS-SLIC, LUST, HIST CORTESE	0.403	W	No
Gandm Oil 19		CPS-SLIC			No
Acta South - Parcel Se-352/353	South Alameda Street.	CPS-SLIC	0.459	SSE	No
Pacific 9 Transportation Inc.	21900 South Alameda	LUST	0.473	NE	No
Westrux International	1505 East 223rd Street	CPS-SLIC	0.477	W	No
Texaco	232000 South Alameda	Notify 65	0.539	SSE	No
Commonwelath Aluminum Carson Rolling M	2211 East Carson Street.	ENVIROSTOR	0.555	NNE	No
Tesoro Refining & Marketing Company-Sulfur Recovery Plant	23208 South Alameda Street	ENVIROSTOR	0.566	SSE	No
Sulfur Recovery Plant		HWP	0.566	SSE	No
Tesoro Refining & Marketing Company Llc-	23208 South Alameda Street	CORRACTS	0.566	SSE	No
Air Products & Chemicals Inc	23320 South Alameda Street	ENVIROSTOR	0.693	S	No
Wilmington Cla & Hold Yd	Not Listed	FUDS, ENVIROSTOR, UXO	0.844	SE	No
Del Amo Elementary School	21228 Water Street	ENVIROSTOR	0.845	NNW	No
Chemical Rainbow Tank Lines	21119 Wilmington Avenue	CORRACTS, ENVIROSTOR, HWP	0.905	N	No
Bp Carson Refinery	1801 East Sepulveda Boulevard	ENVIROSTOR	0.973	SSW	No
Tesoro Carson Refinery		HWP, ICE, CORRACTS	0.973	SSW	No

Notes:

Gray shading indicates database listing is hydraulically downgradient or crossgradient

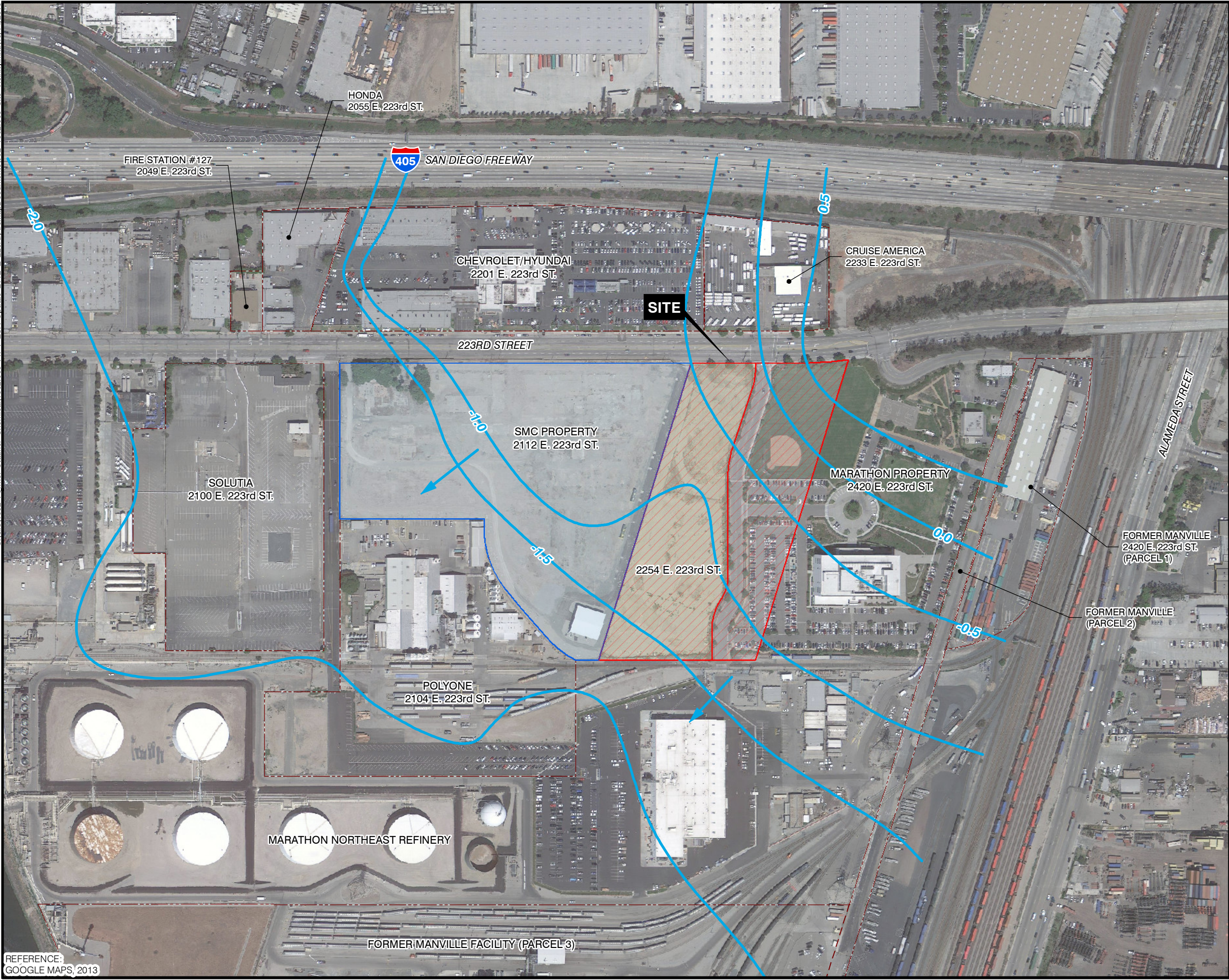
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Figures

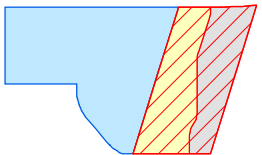


REFERENCE:
7.5 MINUTE U.S.G.S. TOPOGRAPHIC MAPS
OF LONG BEACH AND TORRANCE, CALIFORNIA
DATED: 1964 (SON)
PHOTOREVISED: 1981

S:\GIS\1362 Former Stauffer Chemical\1362.005 Ph 1 ESA Update 2112 E 223rd\ArcMapDocuments\002_1362.005 Site Vicinity.mxd 10/14/2019



REFERENCE:
GOOGLE MAPS, 2013



KEY MAP

EXPLANATION

- 0.5 — INTERPRETED GROUNDWATER ELEVATION CONTOUR
IN UNIT A APRIL 2008 (FEET ABOVE MEAN SEA LEVEL)
- ← GROUNDWATER FLOW DIRECT ARROW
- SMC PROPERTY
- FORMER COON TRUST PROPERTY
- CARSON INDUSTRIAL LLC PROPERTY
- MARATHON PROPERTY

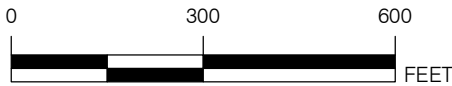


FIGURE 2

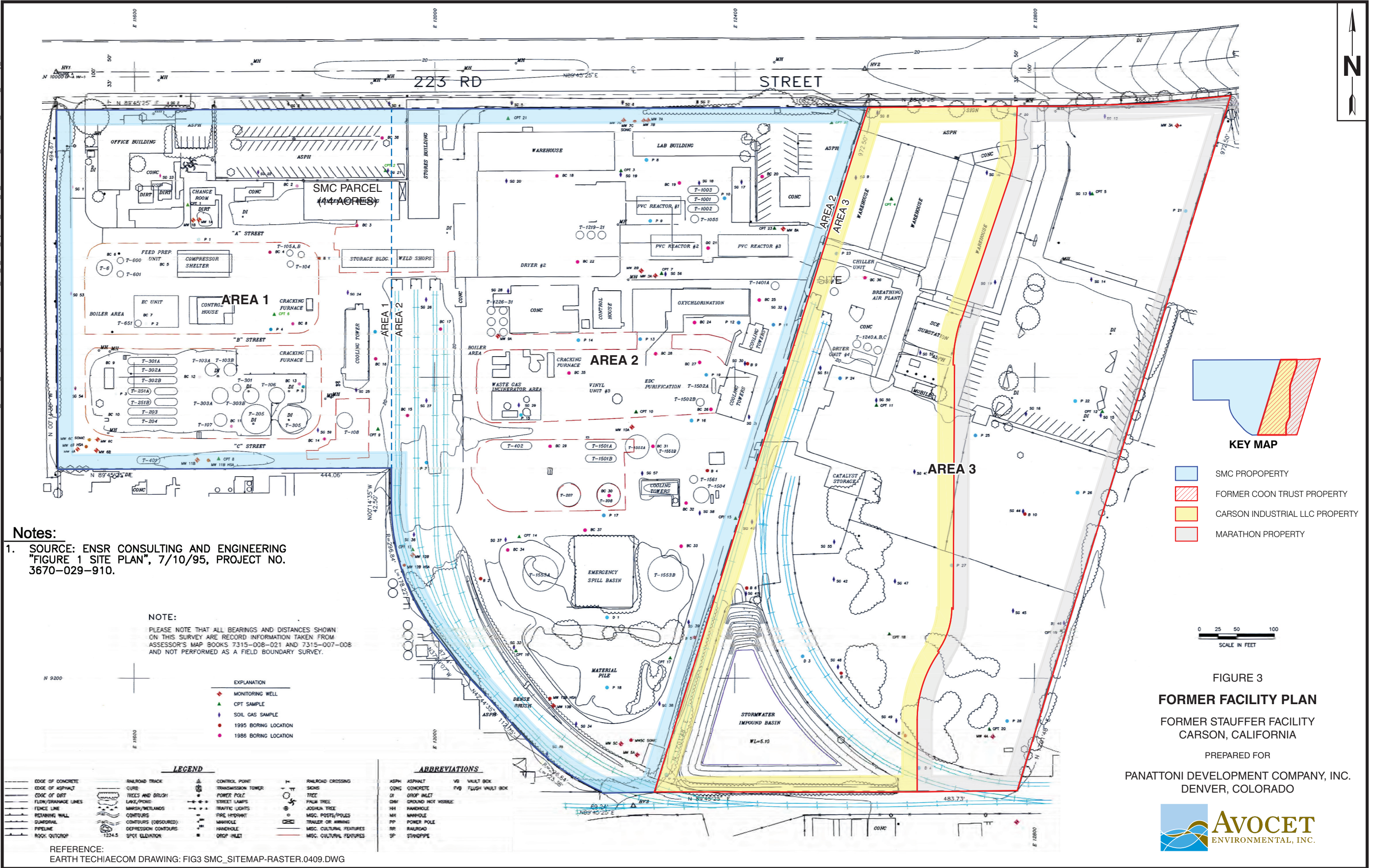
VICINITY MAP

FORMER STAUFFER FACILITY
CARSON, CALIFORNIA

PREPARED FOR

PANATTONI DEVELOPMENT COMPANY, INC.
DENVER, COLORADO







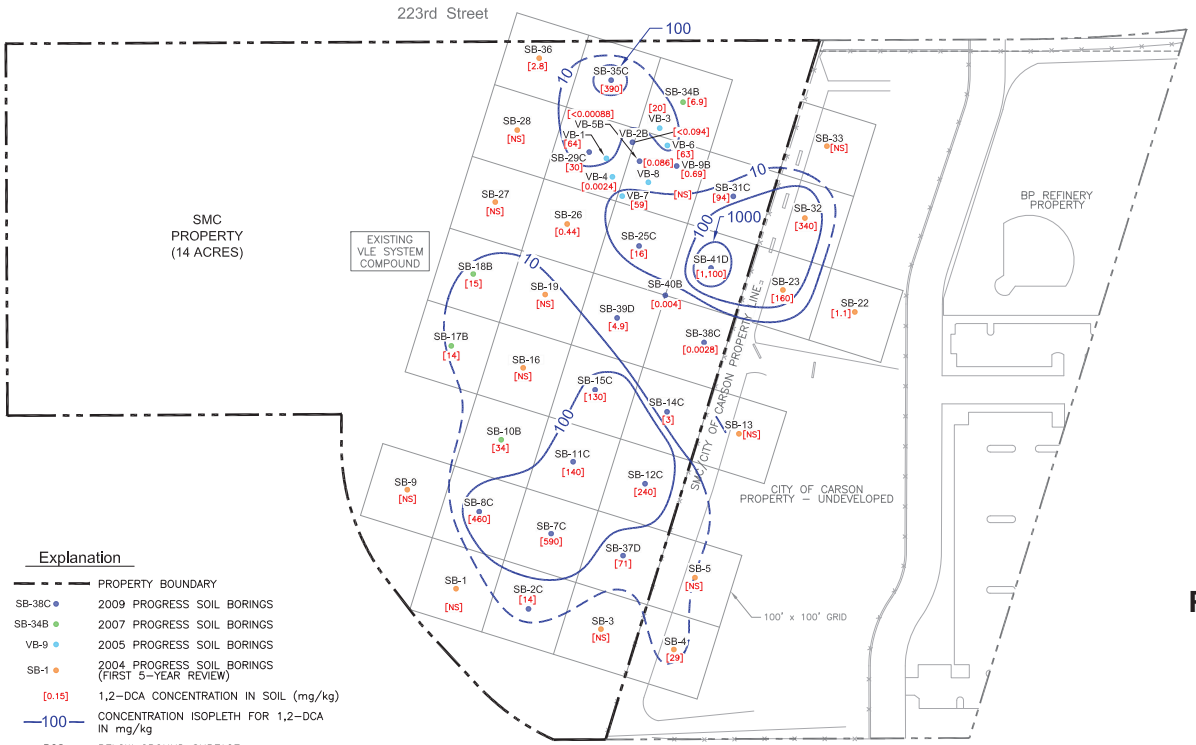
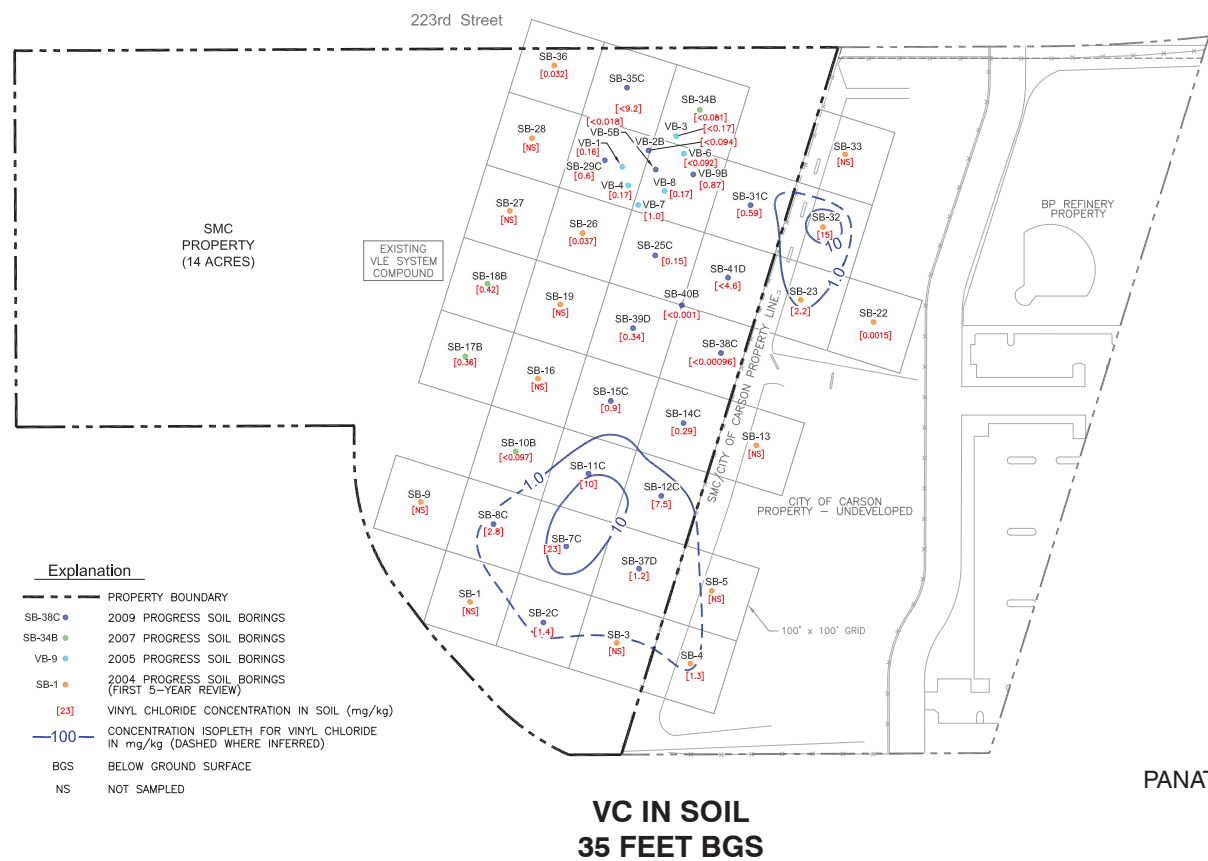
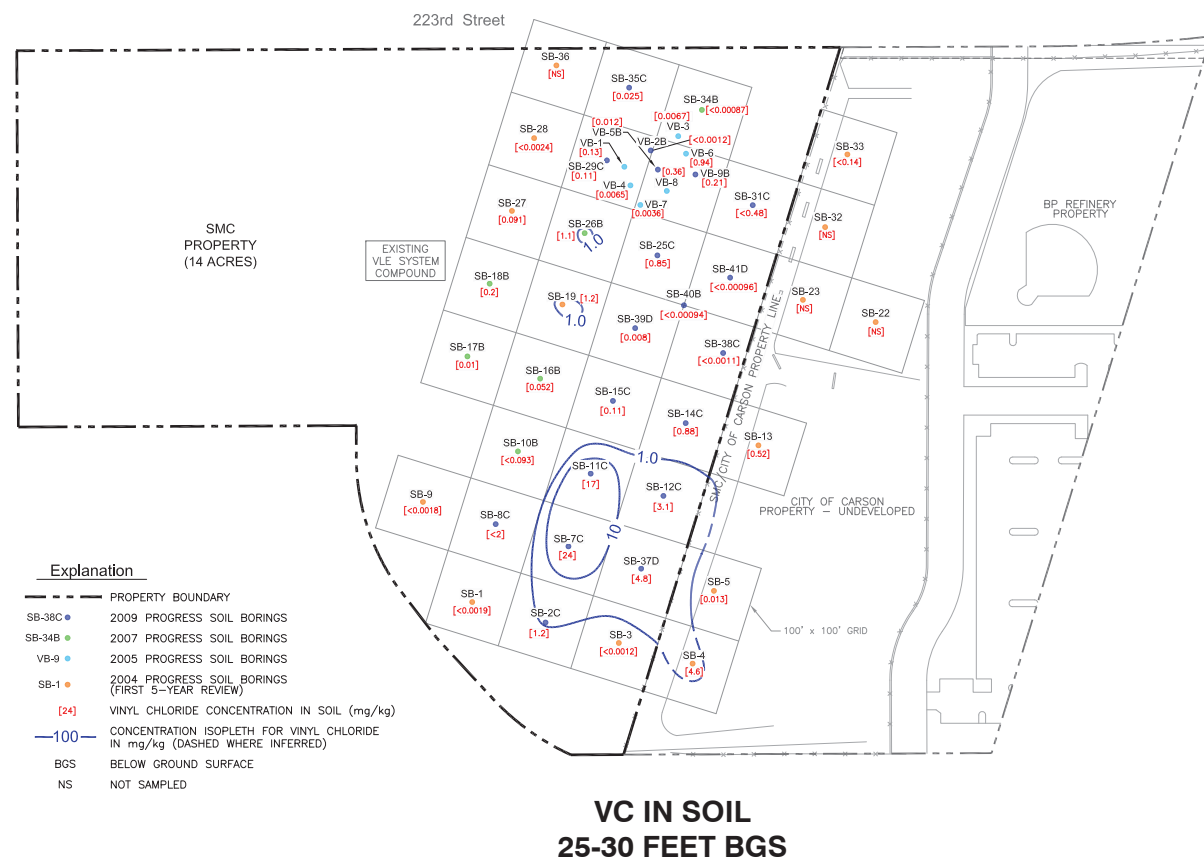
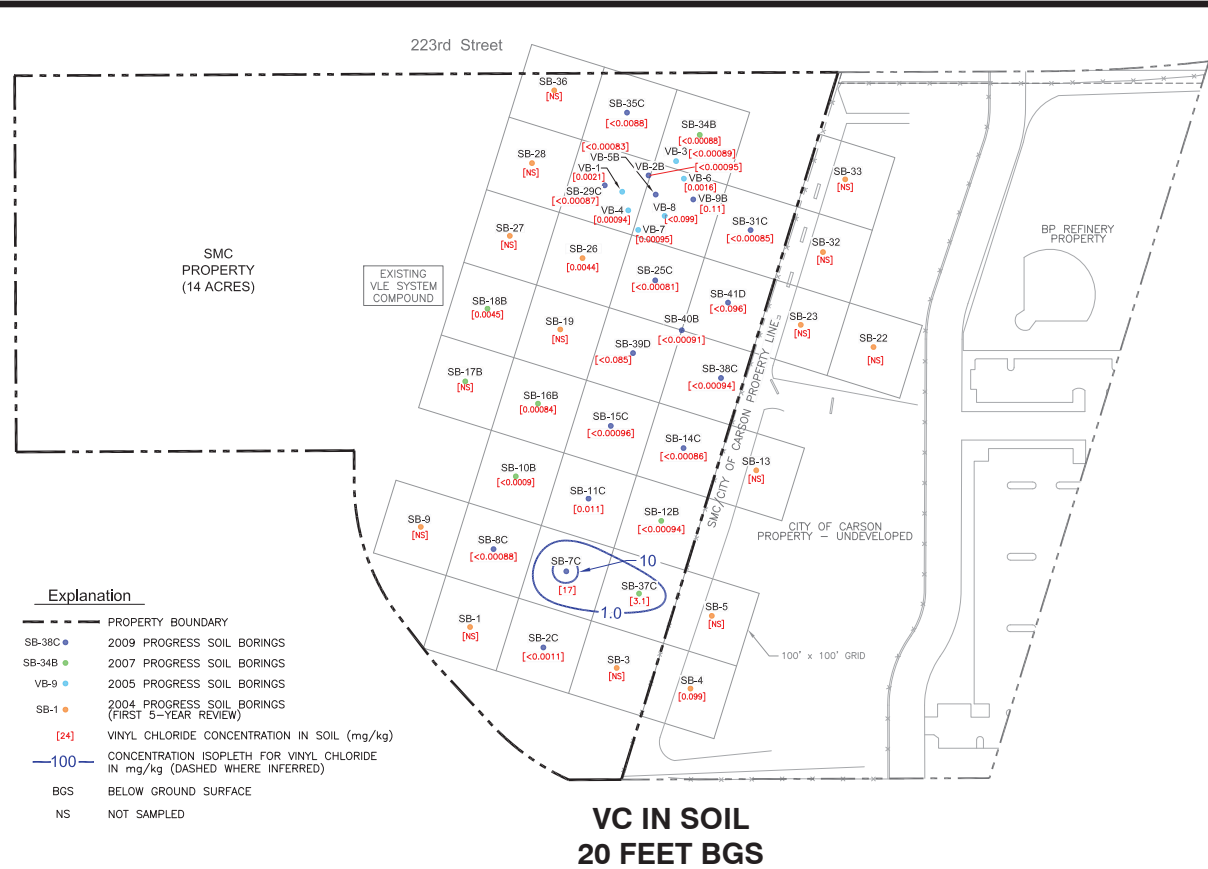
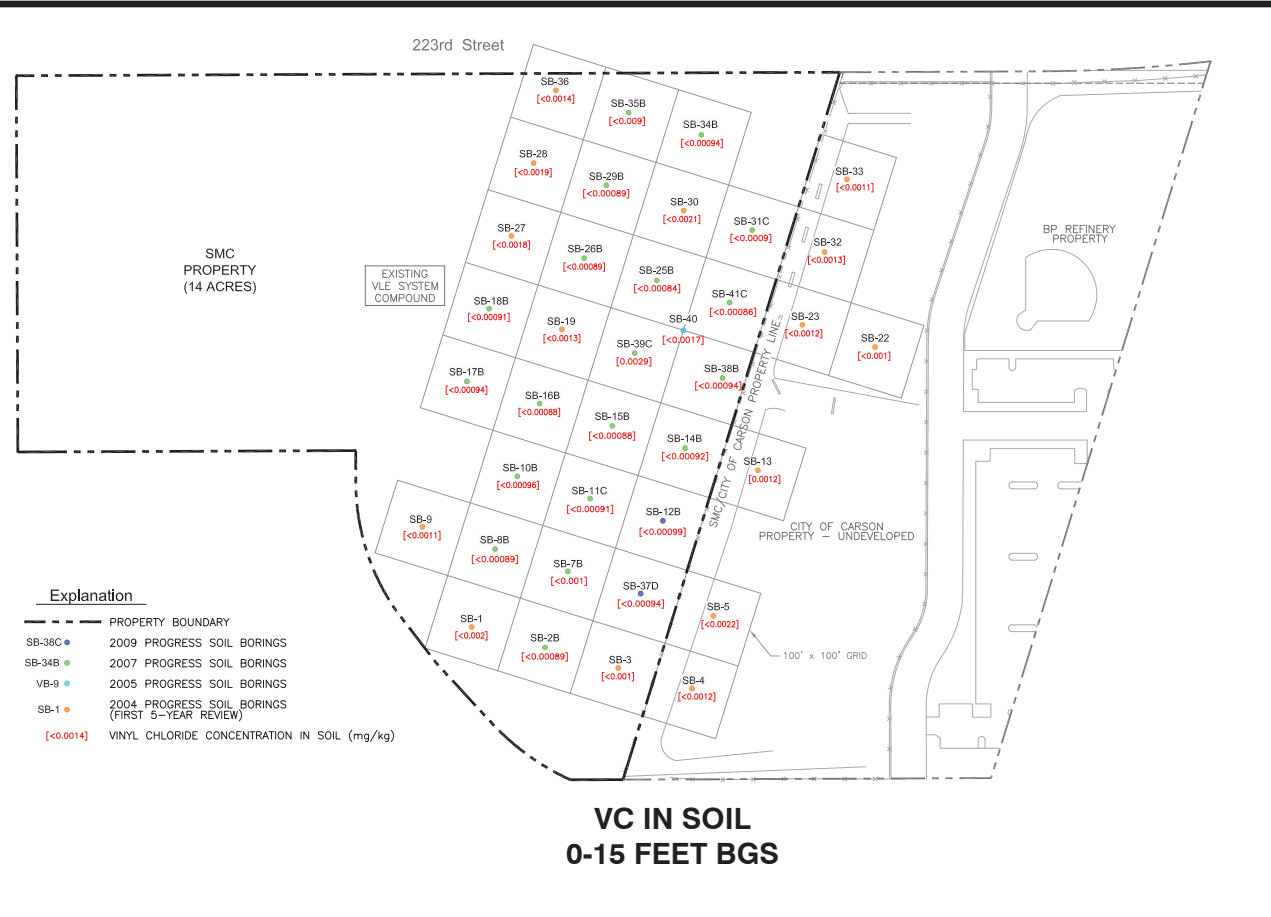


FIGURE 5
RESIDUAL 1,2-DCA IN SOIL
FORMER STAUFFER FACILITY
CARSON, CALIFORNIA
PREPARED FOR
PANATTONI DEVELOPMENT COMPANY, INC.
DENVER, COLORADO



SOURCE:
AECOM DRAWINGS; 60134535.FIG12 SMC.2ND 5YR.0111.DWG,
60134535.FIG13 SMC.2ND 5YR.0111.DWG,
60134535.FIG14 SMC.2ND 5YR.0111.DWG,AND
60134535.FIG15 SMC.2ND 5YR.0111.DWG



0 120 240
APPROXIMATE SCALE IN FEET

FIGURE 6
RESIDUAL VC IN SOIL
FORMER STAUFFER FACILITY
CARSON, CALIFORNIA

PREPARED FOR
PANATTONI DEVELOPMENT COMPANY, INC.
DENVER, COLORADO



SOURCE:
AECOM DRAWINGS; 60134535.FIG16 SMC.2ND 5YR.0111.DWG,
60134535.FIG17 SMC.2ND 5YR.0111.DWG,
60134535.FIG18 SMC.2ND 5YR.0111.DWG,AND
60134535.FIG19 SMC.2ND 5YR.0111.DWG

223rd Street

Explanation

- SITE PROPERTY/BOUNDARY LINE
- EASEMENT/RIGHT-OF-WAY
- MW-28B ⊕ MONITORING WELL LOCATIONS
- EX-8A ⊕ EXTRACTION WELL LOCATIONS
- IN-16A ⊕ INJECTION WELL LOCATIONS
- APPROXIMATE WELL VAULT LOCATION
- APPROXIMATE PULL BOX LOCATION
- FENCE LINE
- EXTRACTION PIPING AND CONDUIT
- INJECTION PIPING AND CONDUIT
- ▨ PROPOSED 223RD STREET EXPANSION
- ▨ PLANNED LANDSCAPING AREA
- ▨ PAVED ACCESS ROAD
- BP BRITISH PETROLEUM
- EISB ENHANCED IN-SITU BIOREMEDIATION
- SMC STAUFFER MANAGEMENT COMPANY LLC



Notes:

1. BASEMAP LINEWORK DERIVED FROM: SATELLITE IMAGERY COLLECTED JUNE 17, 2015 DOWNLOADED FROM U.S.G.S. EARTH EXPLORER™. IMAGE IS A 1-FOOT RESOLUTION GROUND SAMPLE DISTANCE (GSD) ORTHORECTIFIED COLOR (RGB) WITH THE PROJECTION OF NAD83 STATE PLANE, ZONE 5, U.S. FOOT MEETING THE NATIONAL MAP ACCURACY STANDARDS (95% ACCURACY); AND LOS ANGELES COUNTY ASSESSOR'S OFFICE ONLINE GEOGRAPHIC INFORMATION SYSTEM DATABASE, COPYRIGHT 2017.
2. WELL LOCATIONS SURVEYED BY DULIN & BOYNTON, SURVEYS CONDUCTED BETWEEN 2002 AND 2015. ADDITIONAL SURVEYS CONDUCTED BY W.M. SURVEYS INC., FEBRUARY AND MARCH 2011, JANUARY AND JULY 2012. CALVADA SURVEYING, INC., FEBRUARY 2015, APRIL 2016 AND JULY 2017.

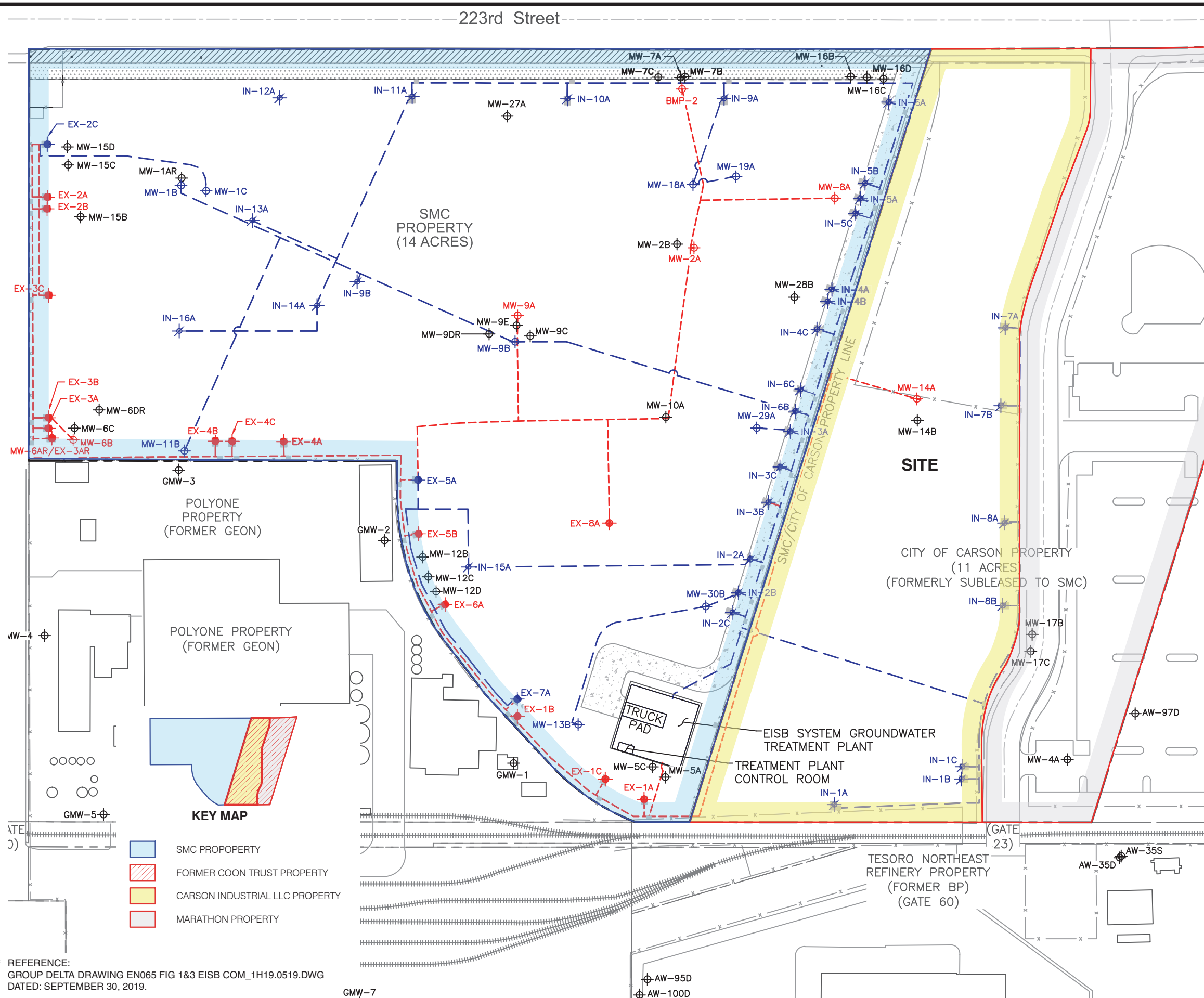
FIGURE 7

EISB SYSTEM LAYOUT

FORMER STAUFFER FACILITY
CARSON, CALIFORNIA

PREPARED FOR

PANATTONI DEVELOPMENT COMPANY, INC.
DENVER, COLORADO



REFERENCE:
GROUP DELTA DRAWING EN065 FIG 1&3 EISB COM_1H19.0519.DWG
DATED: SEPTEMBER 30, 2019.

GMW-7

AW-95D
AW-100D

TESORO NORTHEAST
REFINERY PROPERTY
(FORMER BP)
(GATE 60)

(GATE
23)

AW-35D
AW-35S

MW-4A

MW-17B
MW-17C

IN-8A

IN-7A
IN-7B

CITY OF CARSON PROPERTY
(11 ACRES)
(FORMERLY SUBLEASED TO SMC)

SITE

EISB SYSTEM GROUNDWATER
TREATMENT PLANT

TREATMENT PLANT
CONTROL ROOM

TRUCK
PAD

GMW-1

GMW-5C
MW-5A

EX-1A
EX-1B

EX-7A
EX-1C

EX-5A
EX-5B

GMW-2

GMW-3

GMW-6C
MW-6B

EX-4A
EX-4B
EX-4C

MW-9A
MW-9B
MW-9C

MW-2A
MW-2B

MW-18A
MW-19A

MW-7A
MW-7B
MW-7C

MW-27A

IN-10A

IN-11A

IN-12A

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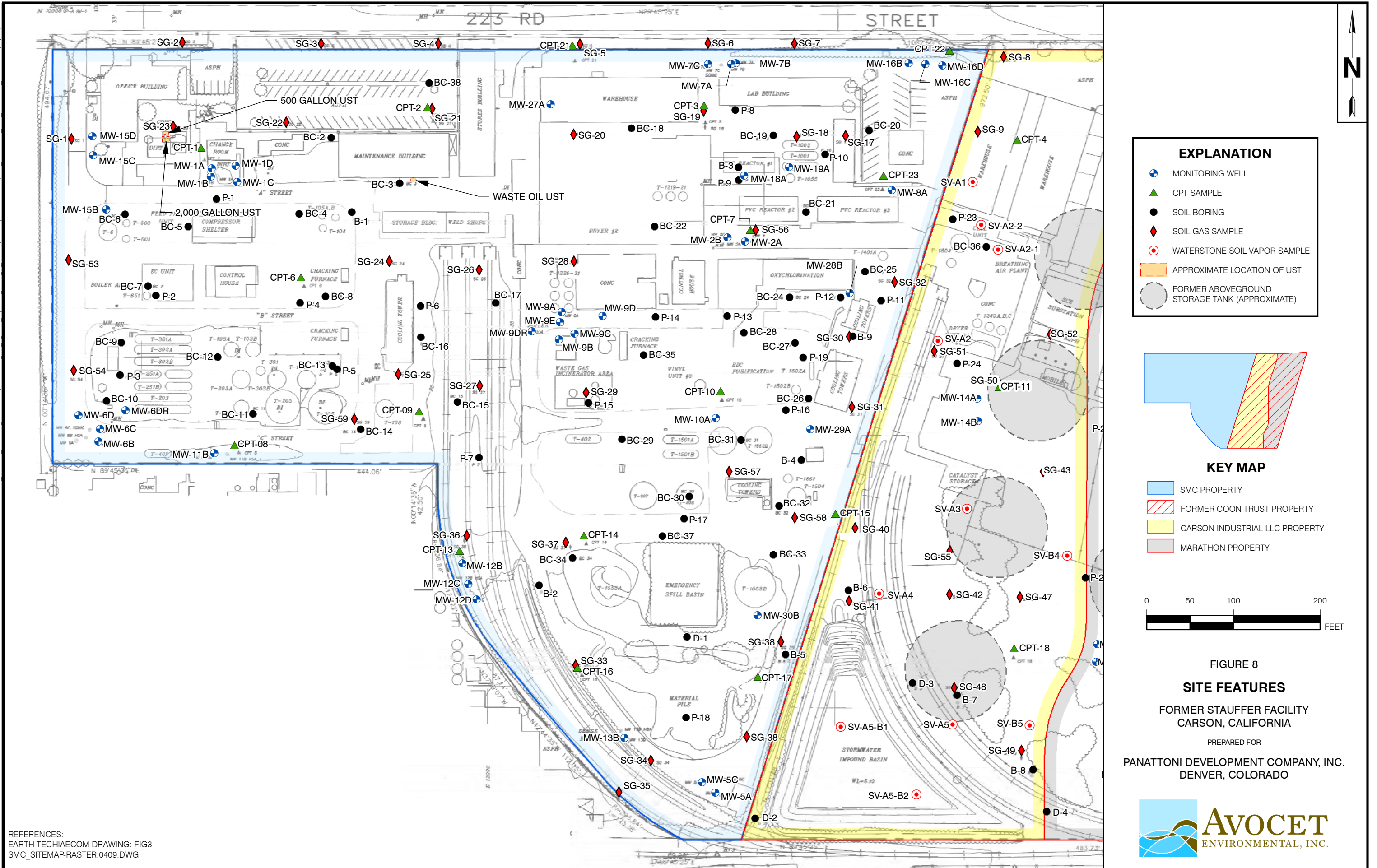
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Please see enclosed CD for Appendices to the Phase I ESA