Geosyntec consultants

2100 Main Street, Suite 150
Huntington Beach, California 92648
PH 714.969.0800
FAX 714.969.0820
www.geosyntec.com

Technical Memorandum

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To: Mark Stanley, Los Angeles and San Gabriel Rivers and Mountains Conservancy, Los Cerritos Wetlands Authority Executive Director
Chris Kroll, California State Coastal Conservancy
Deborah Ruddock, California State Coastal Conservancy
Chris Webb, Moffatt & Nichol

From: Goodwin Wharton, G.I.T., Geosyntec Consultants
Mike Reardon, P.E., Geosyntec Consultants
Eric Smalstig, P.E., Geosyntec Consultants

Subject: Environmental Review – LCWA Phase I and Phase II Parcels
Los Cerritos Wetlands Restoration

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1. INTRODUCTION

In October 2016, Moffat & Nichol (M&N) retained Geosyntec Consultants, Inc. (Geosyntec) to assist the Los Cerritos Wetlands Authority (LCWA) with an environmental (i.e., contamination) review of the Los Cerritos Wetlands (the LCW; the Site) restoration project based on existing environmental documentation. The Site as defined for this scope of work (**Figure 1**) is a subarea of the planned approximately 565 acre Los Cerritos Wetlands Complex, consisting of approximately 163 acres of publicly-held land. This environmental review included the following parcels: LCWA Phase I parcel formerly known as the Bryant Parcel (36 acres) and Isthmus (34 acres), and the LCWA Phase II parcel formerly known as the Hellman property (93 acres). Over the past several years varying degrees of environmental assessment have been performed for certain portions of the Site. However, environmental assessment of the entire Site has yet to be completed. Data gaps regarding soil and groundwater quality and subsurface features or waste material from historical/current site uses need to be identified and addressed to support restoration planning for the Site.

Geosyntec's scope of work included the following:

- A site walk and meeting with LCWA staff;
- Document review of existing data held by the LCWA;
- Search and acquisition of additional data not held by LCWA;
- An environmental summary and data gaps memorandum (presented here-in); and
- Meetings and advisory discussion with LCWA staff.

2. SITE HISTORY

The Los Cerritos Wetlands Complex is comprised of parcels straddling the San Gabriel River and Los Cerritos Channel, approximately 1 mile upstream of the shore line in Long Beach and Seal Beach, California. The land has been modified by human activity since the early 20th century. Prior to the 1920s, the LCWA Phase II parcel was used as farm land. Oil production began in 1922 on both sides of the San Gabriel River (Phase I and Phase II parcels), and has been continuous since. According to California Division of Oil Gas and Geothermal Resources (DOGGR) records, over 100 oil wells have been drilled on the Phase I and Phase II parcels, many of which have been abandoned (plugged). Other features associated with petroleum production present on the Site include: pipelines, sumps, and physical hazards. Common physical hazards include abandoned drill rig equipment, such as guy-wires and force blocks ("deadmen").

Staring in 1961, the San Gabriel River was channelized in its current configuration as part of regional flood control improvements [California Resources Agency, 2007]. The following year, the cooling channel for the Haynes Power Plant adjacent to the river was dredged, and the excavated material was used to fill in historical wetlands on the LCWA Phase II parcel [California Resources Agency, 2007]. The elevated topography of the southern portion of the Site resulting from the dredge and fill operation remains today.

Between the 1950s and 1970s, the southwestern portion of the Phase II parcel was used as a landfill, primarily for construction and demolition (C&D) debris. Although modern waste disposal regulations would classify such material as inert debris, historically C&D waste was often a poorly documented mixture of wastes. Waste disposal on the LCWA Phase II parcel ended before regulations requiring landfill liners and other control systems were adopted in California. Results of previous investigations indicate that the base of waste at the landfill may be in contact with groundwater.

Redevelopment of the LCWA Phase II parcel with single-family residences and related improvements was first proposed in 1981. The so-called Hellman Ranch Specific Plan motivated a significant volume of study, including multiple rounds of sampling and Environmental Impact Reports (EIRs), until the early 2000s when Hellman Properties LLC stopped pursing the project. In 2006 the LCWA was convened as a Joint Powers Authority (JPA) between the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC), the California State Coastal Conservancy (CSCC), and the cities of Long Beach and Seal Beach, to acquire and restore wetland parcels along the San Gabriel River.

3. RECOGNIZED ENVIRONMENTAL CONDITIONS

Previous Investigations

As part of the scope of work, Geosyntec performed preliminary review of the 40 reports and files listed in **Table 1a**. Eight of the listed reports documented environmental investigations that included sampling of environmental media (soil, waste or groundwater) and laboratory testing (i.e., original data reports). An additional four documents listed in **Table 1a** are summary reports containing narrative descriptions of prior original data reports. Geosyntec's review of these documents indicates that there are at least nine additional original data reports for the Phase I or Phase II parcels not currently available to the LCWA, listed in **Table 1b**.

Investigations prior to 2004 focused on petroleum contamination in the vicinity of known operations. Investigations included borings and trenches to delineate former petroleum sumps, shallow soil sampling from hand augers and test pits, and few groundwater monitoring well installations. Most samples were analyzed for Total Petroleum Hydrocarbons (TPH), but small subsets were also tested for metals, Polycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), and waste characteristics. Recent investigations have included sample analyses for Polychlorinated Biphenyls (PCBs), and pesticides. This section summarizes existing original data reports that contribute to the characterization of the magnitude and extent of contamination at the Site, organized by land parcel.

LCWA Phase I Parcel (Formerly Bryant)

Most of the original reports and data sets for the LCWA Phase I parcel were assembled in the late 1980s and early 1990s on behalf of Texaco Exploration and Production, Inc. (TEPI). These reports have been reviewed and summarized on several occasions by outside consultants, and are not described in detail here. For narrative descriptions, refer to excerpts of the review memos of Geomatrix [1996] and Anchor Environmental [2006] provided in Attachments A and B.

The only additional data set from the LCWA Phase I parcel consists of eight (8) soil samples collected from Zedler Marsh, evaluated by Pacific Coast Environmental Conservancy on behalf of Tidal Influence in 2014. The eight (8) samples were collected in areas of suspected contamination from depths of approximately 6 inches below ground surface, and were tested for PAHs, PCBs, and pesticides. A summary of the findings of identified original data reports for the LCWA Phase I parcel are presented in **Table 2a.**

LCWA Phase II Parcel (Formerly Hellman)

Geosyntec has identified ten original data reports for the LCWA Phase II parcel, conducted by four different consultants between 1987 and 2006. Of these, only the most recent by Anchor Environmental [2004; 2006] are currently available to the LCWA. Narrative summaries of prior work by BCL Associates [1987], Converse Environmental West [1996-1998], and Geomatrix Consultants [2001], is summarized in a 2003 review memo by Anchor Environmental provided in **Attachment C**.

Data from the Anchor Environmental Hellman Ranch Supplemental Environmental Site Investigation [2004], and Groundwater Investigation [2006], includes analyses of soil samples from 33 soil borings, and groundwater samples from seven monitoring wells collected over four sampling events. Analyses of soil and groundwater samples included metals, PCBs, pesticides, and PAHs. A summary of the findings of identified original data reports for the LCWA Phase II parcel, are presented in **Table 2b**.

Although 14 of the 17 identified original data reports have been previously reviewed and summarized by several consultants, a comprehensive electronic database, merging the available laboratory analyses, has yet to be created. Moffatt & Nichol has begun creating a database of existing geospatial data sources, such as inventories of active and abandoned oil wells and groundwater wells, aerial photos, and mapped areas of contamination, but a significant volume of such data remains that has not been included.

Sources of Contamination

Previous environmental investigations have attempted to characterize contamination of the Site by addressing its magnitude (concentrations), and extent (sources). Sources of contamination identified at the Site include oil wells, pipelines, sumps and other oil production infrastructure, and the C&D landfill in the southwest Phase II parcel.

Oil Wells

Active or abandoned oil wells typically have associated soil contamination due to spillage resulting from normal production activities, blowouts, or well head failures. The existing GIS database for the LCW restoration includes the locations of active oil wells on the Phase I parcel (**Figure 2**), but does not include abandoned wells or wells on the Phase II parcel.

Oil Pipelines

Pipeline ruptures are another common source of environmental contamination associated with oil production activities. A handful of pipelines on the Phase I parcel are shown in the existing project database (**Figure 2**), but those on the Phase II parcel and any others historically in use are not included. Free product was identified on the Phase II parcel in 2004, in contact with groundwater in a monitoring well drilled in the landfill area [Anchor Environmental, 2004]. Further investigation revealed that the plume was likely not related to a source within the waste fill, but rather emanated from a rupture in a nearby previously unknown buried pipeline.

Petroleum Sumps

Early oil production techniques included the use of unlined settlement ponds, known as sumps, dug into the earth. Oil extracted from wells was diverted into the sumps, and heavy material was allowed to settle out before the economic light portion was loaded onto trucks or trains. The heavy petroleum sludge built up on the bottom of sumps and to some extent slowed the migration of organic compounds into the soil, but "halos" of contamination are commonly found around former sumps – even where visible petroleum material was removed.

Previous investigations have attempted to delineate former sump areas on both the Phase I [Camp Dresser & McKee, 1991b], and Phase II [Anchor Environmental, 2004], but only the resulting Phase II parcel map has been incorporated into the Site project database (**Figure 3**).

Area 18

Previous investigations have identified an area in the southeast corner of the LCWA Phase II parcel, dubbed "Area 18," where asphalt-like material (ALM) was stockpiled and buried (**Figure 3**). ALM is commonly "tank bottom sludge" – heavy petroleum material removed from the bottom of tanks or sumps, which has been mixed with sand or other aggregate and used for improvised road paving. ALM is typically of lesser concern than other petroleum related contamination, as the heavy long-chain molecules it is comprised of are relatively immobile.

C&D Landfill

The C&D landfill in the southwest corner of the Phase II parcel, identified as a possible source of contamination at the Site, has been delineated by with borings and trenching [Anchor Environmental 2004; 2006]. The resulting map of the extent of waste has been digitized in the Site project database (**Figure 3**).

Potential Constituents of Concern

Environmental site assessments characterize the magnitude of contamination with analyses of the concentration of Potential Constituents of Concern (PCOCs) present in the soil, groundwater, and other media. Previous investigations have identified seven classes of PCOCs present at the LCWA Phase I and Phase II parcels: TPH (or TRPH – Total Recoverable Hydrocarbons), metals, PAHs, PCBs, pesticides, VOCs, and SVOCs. The most significant PCOCs, and the volume of data available on each are presented in this section. The findings of identified original data reports, including number of analyses and maximum concentration measured, are presented in **Table 3**.

TPH

Previous environmental soil sampling at the LCWA Phase I and Phase II parcels has focused on petroleum compounds, grouped either as TPH or TRPH. The LCWA is in possession of the results of 214 TPH and 533 TRPH analyses from prior studies - 595 from the Phase I parcel, and 129 from the Phase II Parcel. The maximum concentrations recorded are 189,000 mg/kg TRPH on the Phase I parcel, and 149,000 mg/kg TPH on the Phase II parcel. The LCWA is also in possession of the results of 31 TPH and TRPH groundwater analyses from prior studies - 19 from the Phase I parcel, and 12 from the Phase II Parcel.

Metals/ Lead

The existing data sets available to the LCWA include 313 metals analyses of soil - 225 from Phase I and 77 from Phase II. Twenty groundwater samples have been analyzed for metals, all from the Phase II parcel. Lead is likely to be of greatest concern to regulatory agencies, and has been measured at concentrations up to 381 mg/kg in soil on the Phase I parcel, and 240 mg/kg on the Phase II parcel.

Other PCOCs

The existing soil data also includes 87 PAH analyses – ten (10) from Phase I and 77 from Phase II, 85 PCB analyses – eight (8) from Phase I and 77 from Phase II, 85 pesticide analyses – eight (8) from Phase I and 77 from Phase II, and 129 VOC/SVOC analyses - 125 from Phase I and four (4) from Phase II. Groundwater data includes 50 VOC/SVOC analyses – 15 from Phase I and 35 from Phase II, and 14 analyses for PAHs – all from the Phase II parcel.

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4. DATA GAPS

Data Integration / Apparent Data Gaps

The existing environmental data sets available to the LCWA and reviewed by Geosyntec appear to substantially characterize the magnitude and extent of TPH contamination in soil at the LCWA Phase I and Phase II parcels. However, due to the varying age, condition, and availability of the reports containing the data, the significance of the data is difficult to synthesize. There are also a number of spatial data resources that have not been incorporated into the existing GIS database. This lack of data integration may give the appearance that environmental conditions at the Site are less well characterized than they are – an apparent data gap.

One apparent data gap is the location of abandoned oil wells. DOGGR maintains a geospatial database of all permitted oil and gas wells drilled in California. The database includes active and abandoned historical wells, and is available online in GIS ShapeFile format. **Figure 4**, from the DOGGR website, shows the location of all known active or abandoned oil wells in the LCW project area.

Sump delineation is another apparent data gap for the Phase I parcel, however LCWA is in possession of hard copy maps of identified sumps created through an extensive trenching investigation (**Figure 5**) [Camp Dresser & McKee, 1991b].

The field investigation components of some of the original data reports included installation and sampling of groundwater monitoring wells. Many, or all of these wells still exist at the Site, but an inventory of their locations, construction and current condition has not been completed.

Data Gaps

Although TPH contamination of soil has been well characterized at the Site, data gaps exist, especially for other media. Key findings are described below.

Soil

Although the combined TPH soil concentration data set for the Phase I and Phase II parcels is extensive, other PCOCs have not been given the same volume of analyses. PAHs, PCBs, and pesticides, in particular, will likely require additional sampling. At the Phase I parcel these three classes of PCOCs have only been measured ten, eight, and eight times, respectively; and in the case of PCBs and pesticides, all Phase I parcel analyses were located at Zedler Marsh [Pacific Coast, 2014]. **Figure D-1**, located in **Attachment D**, provides a visual representation of the relative quantity of soil concentration data, for each class of PCOC, in four sub-areas of the Site.

Groundwater

Previous groundwater investigations have been more limited than soil contamination investigations. Groundwater characterization will likely need to be updated, both from an environmental remediation perspective and from a design perspective. If supportive of redevelopment efforts, observations or measurements from the existing groundwater well network, once inventoried, can be made to assess groundwater elevation and gradient salinity, tidal influence, presence of floating or free product or dissolved impacts. Additional groundwater well installations may be desired to further refine the existing groundwater condition data.

Surface Water

The LCWA Phase II parcel includes a tidally influenced surface water body bisecting the property from east to west that is hydraulically linked to the San Gabriel River by a culvert that traverses around the south end of the Haynes Cooling Channel, through the San Gabriel River levee. Surface water quality is an element of the Los Cerritos Wetlands restoration, and the current condition of surface water may provide an indication of the relative mobility of petroleum-associated, and other, contaminants present at the Site. Geosyntec was unable to locate any existing studies containing surface water analyses for TPH, metals, or other PCOCs from the Site.

Other Potential Gaps

Sampling and analyses of other media are sometimes required for Phase II Environmental Site Assessment, or for Ecological Risk Assessments, based on agency direction and/or guidance. Pore water is a commonly identified as an ecological exposure pathway and may need to be analyzed. Similarly, site biota represent secondary exposure pathways for bioaccumulative contaminants. Tissue samples of organisms including plants, invertebrates, and fish are commonly collected as a part of ecological risk assessments (for example, these data were collected to support restoration activities at the nearby Bolsa Chica wetlands, which agencies may consider as a template for the LCWA work).

5. RECOMMENDATIONS

Pursuant to the findings of the above described document review and data gaps analysis, Geosyntec is pleased to present the following recommendations to the LCWA for consideration in development of a Phase II Environmental Site Assessment Work Plan and interconnected project design and permitting decisions.

Integrate existing data into geospatial database

There is already a large volume of environmental data available to the LCWA from the Phase I and Phase II parcels. Unfortunately, the data are spread across several reports dating back to the late 1980s. The condition of paper files and inconsistency of presentation makes it difficult to assess the existing data set as a whole, and limits the LCWA's ability to demonstrate to regulatory agencies that the environmental contamination at the Site is already well understood. Geosyntec recommends a proactive investment of effort to digitize and georeference existing environmental data, along with other existing data elements such as abandoned oil well locations, sump delineation mapping, and historical aerial photos.

Moffatt & Nichol have already begun the process of developing a geospatial database, and have incorporated active oil well and pipeline locations on the Phase I parcel (**Figure 3**), as well as delineated sump areas on the Phase II parcel (**Figure 4**). Expanding this database to include PCOC concentration data points and other existing data elements, including Phase I parcel sump delineation maps, will simplify data analysis and presentation throughout the duration of the project, and will streamline discussion with regulatory agencies.

Select design alternative with consideration of existing environmental data

Once existing environmental data have been incorporated into the geospatial database, maps overlaying concentration data for PCOCs on proposed design alternatives may be generated to guide restoration design selection. Choosing a grading plan that avoids areas of known contamination has dual benefits – it reduces surprises during construction and reduces the cost of excavation and soil removal, and also mitigates the risks to worker and environmental safety by reducing unnecessary exposure to impacted materials.

Initiate EIR, Develop Phase II ESA Work Plan

There is no fixed order of reports the LCWA is required to take to satisfy the regulatory agencies under the CEQA process. A potential option for next steps in the process include first initiating the Environmental Impact Report (EIR) process, to build familiarity with the project within the regulatory community and begin to generate feedback from the agencies involved before

finalizing a work plan for a Phase II Environmental Site Assessment. This approach will allow the LCWA to better gauge the volume of supplemental environmental sampling that will be needed, and reduce the potential for additional sampling requirements or mobilizations prescribed following completion of scheduled Phase II field investigation. Some work, such as the groundwater well inventory, could be expedited if it is deemed useful to design selection.

Anticipated Phase II Work Plan Elements

The Bolsa Chica Wetlands Ecological Preserve, just five miles south of the LCW complex in Huntington Beach, California, may serve as a useful comparison site to set expectations for the additional effort that may be needed to complete a Phase II ESA for the LCW Phase I and Phase II parcels. Like the Los Cerritos Wetlands, Bolsa Chica was a coastal oil field for more than 50 years before its restoration to wetland habitat. The Phase II Environmental Site Assessment for the entire 930 acre site [Tetra Tech, 1996] included soil, groundwater, surface water, sediment, and biological samples. As a means of comparison, a total of over 500 environmental samples (soil, groundwater, surface water/ sediment) were collected from nearly 400 locations. From these samples, over 1,500 analyses were performed to characterize the set of PCOCs at the site. Additional biological tissue sampling was later conducted for the site Ecological Risk Assessment [CH2MHill, 2002]. Scaling this sampling program by site area, a comparable analytical density for the LCW Phase I and Phase II parcels would be achieved with approximately 100 environmental samples. Existing data sets for the LCW complex include more than 100 samples, but data age and inconsistencies in the analytical suites tested will likely necessitate some targeted and random additional sampling.

Although Geosyntec does not recommend developing a detailed Phase II Environmental Site Assessment Work Plan at this stage in the design and permitting process. For long term budgetary and scheduling consideration, we have identified expected or possible elements of an eventual Phase II Work Plan provided herein (an example of a Phase II work plan table of contents is included at **Attachment D**).

Soil confirmation sampling

Although extensive environmental sampling of soil at the Phase I and Phase II parcels has been conducted for previous Phase II Environmental ESA's, much of the data dates to the late 1980s and early 1990s, and the existing data sets contain primarily TPH concentration data. Confirmation sampling for TPH targeting previously identified and delineated petroleum sumps and related features will likely be needed to support the validity of prior work. The scope of this additional sampling might include one composite sample from each area of known

contamination analyzed for TPH and metals, and a subset of samples analyzed for additional PCOCs.

Supplemental soil sampling

Additional soil sampling and analyses will be needed to address known data gaps identified in this memo. Persistent data gaps include a dearth of analyses for particular PCOCs (e.g. PCBs and pesticides), and an uneven distribution of sample points. Supplemental soil sampling would likely include on the order of 30 samples statistically distributed across the Phase I and Phase II parcels. The analytical suite would include all PCOCs – TPH, metals, PAHs, PCBs, pesticides, VOCs and SVOCs, with higher analysis frequency for PCOCs that have previously been less well characterized.

Groundwater sampling

A groundwater sampling program would likely include two or three quarterly sampling events for PCOCs. After an initial sampling event utilizing the existing well network, additional wells might be desired to characterize identified contaminant plumes, and the analytical suite might be reduced to exclude any PCOCs not detected site-wide.

Ecological Risk Assessment

It is expected that an Ecological Risk Assessment report will be requested by regulatory agencies involved in the review of an EIR for the Los Cerritos Wetlands Project. To avoid duplicative effort and limit the number of field crew mobilizations, it behooves the LCWA to identify the sampling requirements the US Fish & Wildlife Service is likely to have for such a report, prior to initiating Phase II ESA sampling. Sample media required for the ERA might include surface water, sediment, pore water, or biota tissue, none of which have previously been sampled at the Site. Sampling events could be readily organized to address multiple media during the same mobilization.

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6. CLOSURE

Given the above, Geosyntec has prepared an example Table of Contents for a Hypothetical Phase II Environmental Site Assessment Work Plan and an accompanying data quantity map, both provided in **Attachment D**. The Example Table of Contains is a rough representation of the type and degree of preparation that will be needed to implement a Phase II Environmental Site Assessment for this project. The soil data quantity map, **Figure D-1**, provides a qualitative representation of where additional sampling efforts may need to be focused for each suite of PCOCs. The intent of these materials is to provide guidance to the LCWA to inform scoping and project planning for the Los Cerritos Wetlands Restoration going forward. Not addressed in this memorandum are permitting requirements of any Phase II work. The LCWA will have to secure permits from potentially multiple agencies to conduct borings and sampling of materials from the site. The permitting effort will need to be determined once the scope of Phase II work is determined.

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List of Attachments:

Table 1a – List of Documents Reviewed
Table 1b – List of Significant Missing Documents
Table 2a – Summary of Original Data Reports, LCWA Phase I Parcel
Table 2b – Summary of Original Data Reports, LCWA Phase II Parcel
Table 3 – Existing Environmental Data by Medium

Figure 1 – Los Cerritos Wetlands Complex Map
Figure 2 –LCWA Phase I Parcel, Integrated Data Sources
Figure 3 –LCWA Phase II Parcel, Integrated Data Sources
Figure 4 – DOGGR Oil Well Map
Figure 5 – Phase I Parcel Sump Map

Attachment A – Excerpt from Geomatrix (1996)
Attachment B – Excerpt from Anchor Environmental (2006a)
Attachment C – Excerpt from Anchor Environmental (2003)
Attachment D – Example Phase II ESA Work Plan Table of Contents, and Data Quantity Figure

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TABLES

Table 1a - List of Documents Reviewed
Los Cerritos Wetlands Environmental Review
Long Beach and Seal Beach, California

Count	Orignial Data Report	Review Report	Study	Year	Month	Prepared By	Prepared For	Page Count	Purpose
1	X		Site Investigation at Texaco Bryant Lease, Seal Beach, California	1988	April	The Earth Technology Corporation	Texaco Exploration and Production, Inc.	48	Investigate petroleum release
2	X		Phase I Environmental Site Assessment Results and Proposal to Perform Phase II Assessment of Bryant (Texaco) Property	1988	September	International Technology Corporation	Bixby Ranch Company	44	Metals and BTEX contamination investigation
3			Draft Supplemental Environmental Impact Report, Hellman Ranch Specific Plan	1989	March	Michael Brandman Associates, Inc.	City of Seal Beach	434	Assess environmental impact of development alternatives
4	X		Report of Preliminary Subsurface Environmental Assessment, Bryant Property, Long Beach, California	1989	August	Engineering Enterprises, Inc.	Kaufman and Broad of Southern California, Inc.	144	Assess soil and groundwater contamination
5	X		Environmental Audit, Texaco - Bryant Lease, Seal Beach, CA	1991	April	Camp Dresser & Mckee, Inc.	Texaco Exploration and Production, Inc.	47	Contamination investigation, proposed sampling plan
6	X		Phase II Environmental Site Assessment, Texaco - Bryant Lease, Seal Beach Oilfield, Seal Beach, CA	1991	November	Camp Dresser & Mckee, Inc.	Texaco Exploration and Production, Inc.	392	Investigate environmental contamination
7		X	Comments on Draft Soil Remediation Plan	1995	February	Ullom Associates	Rutan & Tucker, LLP	13	Comments letter on Texaco work plan
8			Jurisdictional Delineation of Wetlands and Waters of The United States on the Hellman Ranch Property in Seal Beach	1996	June	Chambers Group, Inc.	Coastal Resource Management	128	Wetland delineation
9		X	Comments on January 1995 Draft Remedial Action Plan, Bryant Lease, Los Angeles County, California	1996	August	Geomatrix Consultants, Inc.	Rutan & Tucker, LLP	11	Comments letter on Texaco work plan
10		X	Soil Remediation Plan, Bryant Lease near Long Beach, California	1996	September	Texaco Exploration and Production, Inc.	Texaco Exploration and Production, Inc.	15	Remediation work plan
11			Hellman Ranch Specific Plan, Seal Beach, California	1996	October	Hellman Ranch Specific Plan Project Team	Hellman Properties, LLC; City of Seal Beach	117	Property development plan
12			Biological Technical Report, Hellman Ranch Specific Plan	1996	November	Michael Brandman Associates, Inc.	Hellman Properties, LLC	72	Assess biological resources
13			Final Conceptual Wetland Restoration Plan for the Hellman Ranch Specific Plan	1996	November	Moffatt & Nichol Engineers, et al.	Hellman Properties, LLC	87	Wetland restoration plan
14			Waste Discharge Requirements & Monitoring and Reporting Program	1996	Ocotber	LA RWQCB	Texaco Exploration and Production, Inc.	14	WDR + M&RP
15			Byant Lease Abandonment and Restorations	1996	Unknown	Texaco Exploration and Production, Inc.	Texaco Exploration and Production, Inc.	17	Property restoration plan
16			Hellman Ranch Specific Plan Draft Environmental Impact Report, Volume I	1997	April	P&D Consultants	City of Seal Beach	640	Assess environmental impact of development alternatives
17			Hellman Ranch Specific Plan Final Environmental Impact Report, Volume V	1997	August	P&D Consultants	City of Seal Beach	682	Comments on EIR
18		X	Review of Environmental Site Investigation Reports and Recommendations for Future Evaluations, Hellman Ranch Property, Seal Beach, California	2003	June	Anchor Environmental, Everest International Consultants	California State Coastal Conservancy	32	Summarize prior work
19	X		Hellman Ranch Supplemental Environmental Site Investigation	2004	April	Anchor Environmental	California State Coastal Conservancy	46	Identify COCs and assess extent of contamination (final report)
20			Phase II Environmental Site Assessment, Alamitos EPTC Parcel 3-4	2004	December	CH2M Hill	Southern California Edison	376	Determine if soil/GW impacted, assess extent of contamination
21		X	Re: Hellman Ranch Meeting Summary	2005	May	Anchor Environmental	California State Coastal Conservancy	5	Summary of remediation issues

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Long Beach and Seal Beach, California

Count	Orignial Data Report	Review Report	Study	Year	Month	Prepared By	Prepared For	Page Count	Purpose
22			Report Review Letter: Final Phase II Environmental Site Assessment Report, Alamitos EPTC Parcel 3-4	2005	May	DTSC	SoCal Edison	1	Approval of site assessment
23		X	Memorandum Re: Bryant Property Document Review	2006	May	Anchor Environmental	California State Coastal Conservancy	4	Summarize prior work
24		X	May 22, 2006 E-mail	2006	May	Mary Small - California Coastal Conservancy	LCWA/JPA (Joint Powers Authority)	1	Summarize findings of Anchor's review
25	X		Hellman Ranch Groundwater Assessment	2006	June	Anchor Environmental	Hellman Properties, LLC	43	Groundwater quality investigation
26			Feasibility Report for Wetland Mitigation Use of Bryant Parcel (APN# 7237-020-007)	2008	January	UltraSystems Environmental	County of Orange	20	Assess potential for wetland restoration
27			Investigation of the Presence of Wetlands Subject to Regulation under the California Coastal Act, Bryant Long Beach Property, Long Beach, California	2008	December	Huffman-Broadway Group, Inc.	Rutan & Tucker, LLP	295	Delineate wetlands on property
28			LCW PCB Superfund Removal Site Long Beach City Council Meeting	2009	November	USEPA, Region 9	Long Beach City Council	20 slides	PCB investigation related to transformers on site
29			Soil Characteristics Report (Site and Pedon Descriptions)	2009	December	USDA Natural Resources Conservation Service	LCWA	8	Detailed soil descriptions
30			LCW Oil Operators - Letter Report, 6433 E. 2nd Street, Long Beach, Los Angeles County, California	2010	May	Ecology and Environment, Inc.	USEPA, Region 9	10	Oversee PRP oil spill cleanup activties
31			Los Cerritos Wetlands Habitat Enhancement Plan for Zedler Marsh: A[n] Ecological Study for Developing a[n] Enhancement Design	2010	May	Cal State Long Beach ECO Team		69	Restoration plan for Zedler Marsh
32			OTD Parcel Wetlands Feasibility Study	2010	Unknown	Tidal Influence	LCWA	66	Present land use alternatives
33			OTD Parcel Wetlands Feasibility Study Exhibits	2010	Unknown	Tidal Influence	LCWA	114	Supplements to body of study
34		X	Soil Contamination and Grain Size Characteristics Report	2012	June	Kinnetic Laboratories, Inc.	LCWA; Moffatt & Nichol	57	Summary of contaminants pesent, and current knowledge of extent
35		X	Status of Soil Characterization Studies in the Los Cerritos Wetlands - Entire Complex - and Recommendations for Future Studies	2013	April	Kinnetic Laboratories, Inc.	LCWA; Moffatt & Nichol	11	Identify add'l contamination data from parcels outside base project
36			Re: Parcel Number 7237-02-901/ Los Cerritos Wetlands Authority Long Beach, California	2013	September	City of Long Beach, Bureau of Environmental Health	Signal Hill Petroleum	1	Letter confirming completion of tank removal investigation
37	X		Assessment of PAHs, PCBs and Pesticides in Sediment from Zedler Marsh and the State Lands Parcel at Los Cerritos Wetlands	2014	December	Pacific Coast Environmental Conservancy	Tidal Influence	42	Assess concentrations of contaminants
38			Los Cerritos Wetlands Final Conceptual Restoration Plan	2015	August	Moffatt & Nichol Engineers, et al.	LCWA	367	Restoration alternatives analyses
39			Phase I Environmental Site Assessment for LCWA Property North of 2nd St and East of Studebaker Road, County of Los Angeles, Long Beach, CA	2016	April	Advanced Environmental Concepts Inc.	Beach Oil Mineral Partners	33	Identify recognized contamination/release
40			Appendices: Phase I Environmental Site Assessment for LCWA Property North of 2nd St and East of Studebaker Road	2016	April	Advanced Environmental Concepts Inc.	Beach Oil Mineral Partners	483	Supplements to body of study

Table 1b - List of Significant Missing Documents
Los Cerritos Wetlands Environmental Review
Long Beach and Seal Beach, California

Count	Study	Year	Month	Prepared By
1	Environmental Audit and Field Investigation	1987	June	BCL Associates
2	Environmental Assessment and Review	1995	September	CRC Environmental Risk Assessment
3	Interim Progress Report Environemental Site Assessment and Review	1996	December	Converse Environmental West
4	Addendum to Soils Report Binder, Volume 1, Additional Assessment of Oil Field Sumps and Fill Area	1997	May	Converse Environmental West
5	Site Investigation Report - Southern California Edison Right-of-Way	1998	January	Converse Environmental West
6	Corrective Action Plan (Soil Placement Plan)	1998	March	Converse Environmental West
7	Workplan and Cost Estimates for Environmental Site Investigations	2001	February	Geomatrix Consultants, Inc.
8	Remediation of Hydrobcarbon Impacted Soil, Regulatory and Cost Evaluation	2001	February	Geomatrix Consultants, Inc.
9	Preliminary Review of the Residual Oil Production Property	2001	September	Geomatrix Consultants, Inc.

Table 2a - Summary of Original Data Reports
LCWA Phase I Parcel
Long Beach and Seal Beach, California

Author	Report Title	Data Availability	Testing Scope	Key Findings
Earth Technology Corporation	Site Investigation at Texaco Bryant Lease, Seal Beach, California (1991)	Full Report	7 borings 3 monitoring wells 2 temporary monitoring wells 11 soil samples 7 groundwater samples TPH, BTEX	5 soil TPH detections up to 3,300 mg/kg 1-3 mg/l TPH in all GW samples (5) 1 Benezene detection in GW (6.4 ug/l) TEX detections in 2 GW samples
	Hydrologic Investigation at Texaco Bryant Lease, Seal Beach, California (1988b)	Not Available		
International Technology Corporation	Phase I Environmental Site Assessment Results and Proposal to Perform Phase II Assessment of Bryant (Texaco) Property (1988)	Full Report	18 borings Unknown # of soil samples 5 metals and BTEX	Max concentrations: As = 25 ppm Ba = 7300 ppm Cr = 1198 ppm Pb = 381 ppm Va = 177 ppm
Engineering Enterprises Inc.	Report of Preliminary Subsurface Environmental Assessment, Bryant Property, Long Beach, California (1989)	Full Report	32 borings 10 monitoring wells Unknown # of soil samples Unknown # of GW samples Soil TPH, BTEX, PAHs GW TPH, BTEX	Soil Max TPH ~ 189,000 ppm Max BTEX - 12; 82; 21; 217 ppm Max PAH 489 ppb Groundwater TPH >3000 ug/l in 5 locations Max BTEX - 79; 407; 323; 1573 ug/l
Camp, Dresser & McKee	Environmental Audit, Texaco - Bryant Lease, Seal Beach, CA (1991a)	Full Report	Trenches/ hand auger in 29 locations Unknown number of soil samples TRPH; TPH; metals; BTEX; PAHS; waste characteristics	TPH/TRPH > 1000 ppm at 20 locations Pb > STLC in 2 samples PAHs detected in all (2) samples tested
	Phase II Environmental Site Assessment, Texaco - Bryant Lease, Seal Beach Oilfield, Seal Beach, CA (1991b)			
Pacific Coast Environmental Conservancy (2014) - Zedler Specific	Assessment of PAHs, PCBs and Pesticides in Sediment from Zedler Marsh and the State Lands Parcel at Los Cerritos Wetlands (2014)	Full Report	8 soil samples from Zedler (6in depth) 2 soil samples outside project area PAHs, PCBs, Chlorinated Pesticides	PAH concs "significantly lower than those… 19 years ago" 1995 data source not cited… PAHs ~1-150 ppb (1995 = 50-40,000 ppm) PCBs mostly ND, Max= 6.6 ppb Pest mostly ND, Max= 23.2 ppb Dieldrin

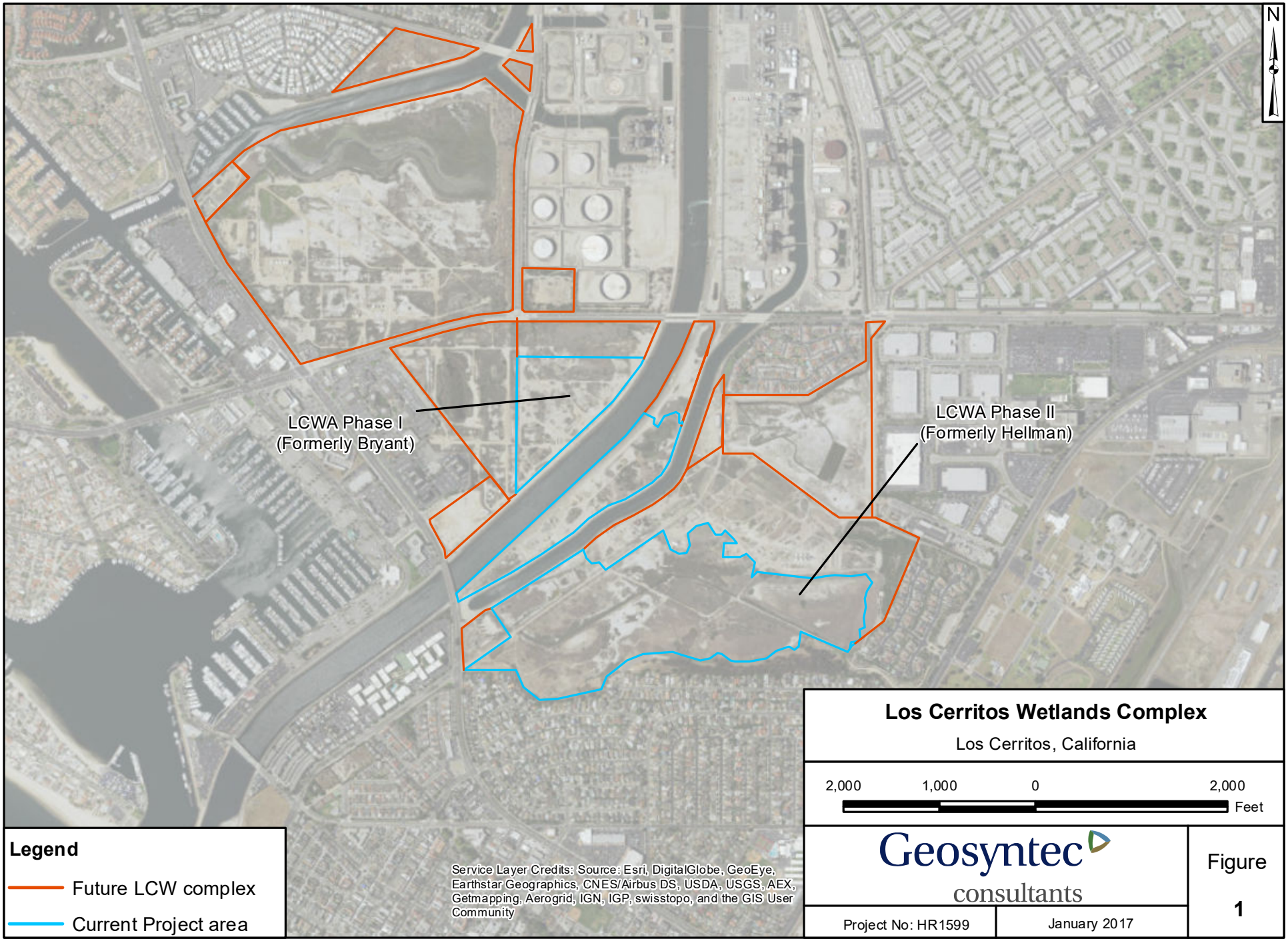
Table 2b - Summary of Original Data Reports
LCWA Phase II Parcel
Long Beach and Seal Beach, California

Author	Report Title	Data Availability	Testing Scope	Key Findings
BCL Associates	Environmental Site Audit and Field Investigation (1987)	Summary	FID/PID Monitoring 23 soil samples for TPH 2 soil samples for SVOCs, aq. Tox 11 soil samples for metals	TPH >1,000 ppm in 7 areas TPH >100,000 ppm in 2 samples SVOCs not detected All metals <STLC and TTLC Metals > screening levels (Anchor)
Converse Environmental West	Interim Progress Report Environmental Site Assessment and Review (1996)	Not Available	FID/PID Monitoring 6 trenches in former landfill area 2 soil samples: SVOCs, dioxin, furans 6 groundwater monitoring wells 6 GW samples for TPH, 1 for VOCs	Soil samples ND for all analytes GW ND for TPH-D and TPH-Mo 220-440 ug/L TPH-G in 4/6 GW samples VOCs ND
	Addendum to Soils Report Binder, Volume 1, Additional Assessment of Oil Field Sumps and Fill Area (1997)			
	Site Investigation Reports - Southern California Edison Right-of-Way, Hellman Ranch Property (1998a)			
	Corrective Action Plan (Soil Placement Plan) (1998b)			
Geomatrix Consultants	Workplan and Cost Estimates for Environmental Site Investigations (2001a)	Summary	10 Trenches to define landfill extent 9 Trenches in Area 18 61 TPH analyses 9 Samples for Metals, PCBs, PAHs, Butylins, TOC	Landfill Area: TPH in 9/46 samples, 100-6,000 ppm Metals below ERMs, 3 above As/Pb ERL 2 PCBs in 1 sample; PAHs ND Area 18: TPH in 11/32 samples, 10-81,000 ppm Metals<ERLs, PCBs and PAHs ND
	Remediation of Hydrocarbon Impacted Soil, Regulatory and Cost Evaluation (2001b)			
	Preliminary Review of the Residual Oil Production Property (2001c)			
Anchor Environmental	Hellman Ranch Supplemental Environmental Site Investigation (2004)	Full Report	19 sump area soil borings 14 open area soil borings 3 GW wells in landfill area ~2 soil samples per boring	Pb> ERL associatated with sumps As, Hg, Se> ERL not correlated w/ sumps Pesticides> ERL corr. w/ open areas Free product in MW-2 boring
	Hellman Ranch Groundwater Assessment (2006)	Full Report	4 groundwater wells 2 groundwater sampling events VOCs, SVOCs, PAHs, Metals	Free product in the vicinity of former landfill Exceedences of California Toxics Rule in vicinity of plume Little downgradient plume migration

Table 3 - Existing Environmental Data by Media
Los Cerritos Wetlands Restoration
Long Beach and Seal Beach, California

PCOC	Soil				Groundwater			
	Study	Parcel	# of Samples	Max Concentration	Study	Parcel	# of Samples	Max Concentration
TPH	ETC,1988	Bryant	7	3,300 mg/kg	ETC, 1988	Bryant	7	18 mg/l
	EEI, 1989	Bryant	55	189,000 mg/kg	EEI, 1989	Bryant	10	>3,000 mg/l
	CD&M, 1991	Bryant	533 (TRPH)	81,916 mg/kg	Converse, 1997	Hellman	6	0.44 mg/l
	BCL, 1987	Hellman	23	149,000 mg/kg	Anchor, 2004	Hellman	6	1.5 mg/l TPH-G
	Geomatrix, 2001	Hellman	61	81,000 mg/kg				
	Anchor, 2004	Hellman	68	68,000 mg/kg				
Metals	ITC, 1988	Bryant	203	381 mg/kg Pb	Anchor, 2004	Hellman	6	18 ug/l Cu
	CD&M, 1991	Bryant	22	100 mg/kg Pb	Anchor, 2006	Hellman	14	20 ug/l Cu
	BCL, 1987	Hellman	11	28.5 mg/kg Pb				
	Geomatrix, 2001	Hellman	9	67.9 mg/kg Pb				
	Anchor, 2004	Hellman	68	240 mg/kg Pb				
PAHs	CD&M, 1991	Bryant	2	2 Detections	Anchor, 2006	Hellman	14	399 ug/l Naphthalene
	Pacific Coast, 2014	Bryant	8	150 ug/kg				
	Geomatrix, 2001	Hellman	9	Non-detect				
	Anchor, 2004	Hellman	68	1.4 mg/kg Naphthalene				
PCBs	Pacific Coast, 2014	Bryant	8	6.6 ug/kg				
	Geomatrix, 2001	Hellman	9	Non-detect				
	Anchor, 2004	Hellman	68	Non-detect				
Pesticides	Pacific Coast, 2014	Bryant	8	23.2 ug/kg Dieldrin				
	Geomatrix, 2001	Hellman	9	150 ug/kg Dieldrin				
	Anchor, 2004	Hellman	68	49 ug/kg Chlordane				
VOCs/SVOCs/ BTEX	ITC, 1988	Bryant	69	4.9 mg/kg Xylenes	ETC, 1988	Bryant	5	6.4 ug/l Benzene
	EEI, 1989	Bryant	15	217 mg/kg Xylenes	EEI, 1989	Bryant	10	1,573 ug/l Xylenes
	CD&M, 1991	Bryant	23	32 mg/kg Benzene	Converse, 1997	Hellman	1	Non-detect
	BCL, 1987	Hellman	2	Non-detect	Anchor, 2004	Hellman	6	1 ug/l Benzene
	Converse, 1997	Hellman	2	Non-detect	Anchor, 2006	Hellman	28	2 ug/l Benzene

FIGURES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LCWA Phase I
(Formerly Bryant)
LCWA Phase II
(Formerly Hellman)
Legend
Future LCW complex
Current Project area
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Los Cerritos Wetlands Complex
Los Cerritos, California
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Geosyntec consultants
Figure
1
Project No: HR1599
January 2017
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Legend
Oil Wells
Power Poles
Oil Pipelines
Underground Pipelines
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
LCWA Phase I Parcel
Integrated Data Sources
Los Cerritos, California
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Geosyntec consultants
Project No: HR1599
January 2017
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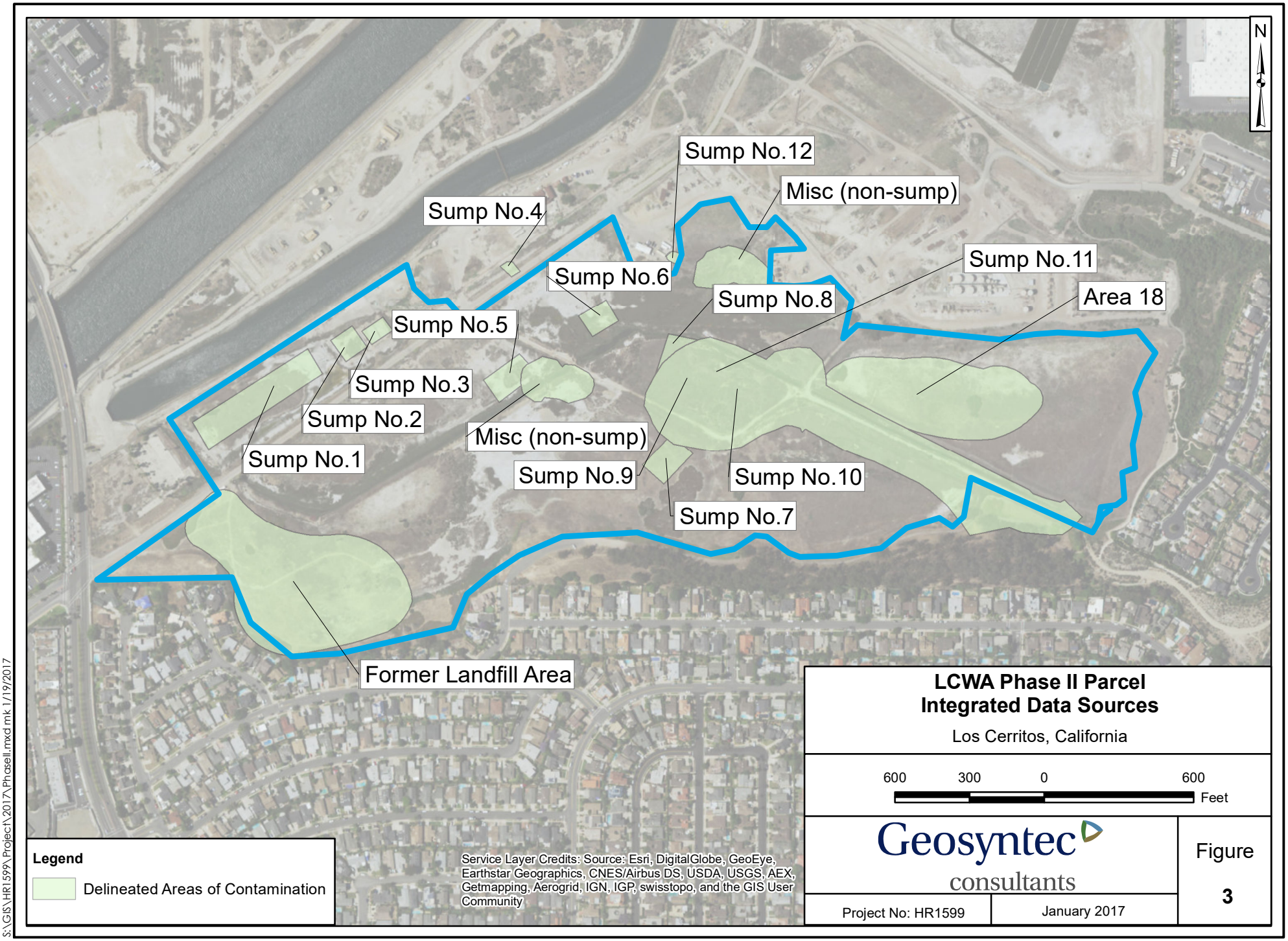
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Sump No.12
Misc (non-sump)
Sump No.4
Sump No.11
Sump No.6
Sump No.8
Area 18
Sump No.5
Sump No.3
Sump No.2
Misc (non-sump)
Sump No.1
Sump No.9
Sump No.10
Sump No.7
Former Landfill Area
Legend
Delineated Areas of Contamination
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
LCWA Phase II Parcel
Integrated Data Sources
Los Cerritos, California
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Geosyntec consultants
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January 2017
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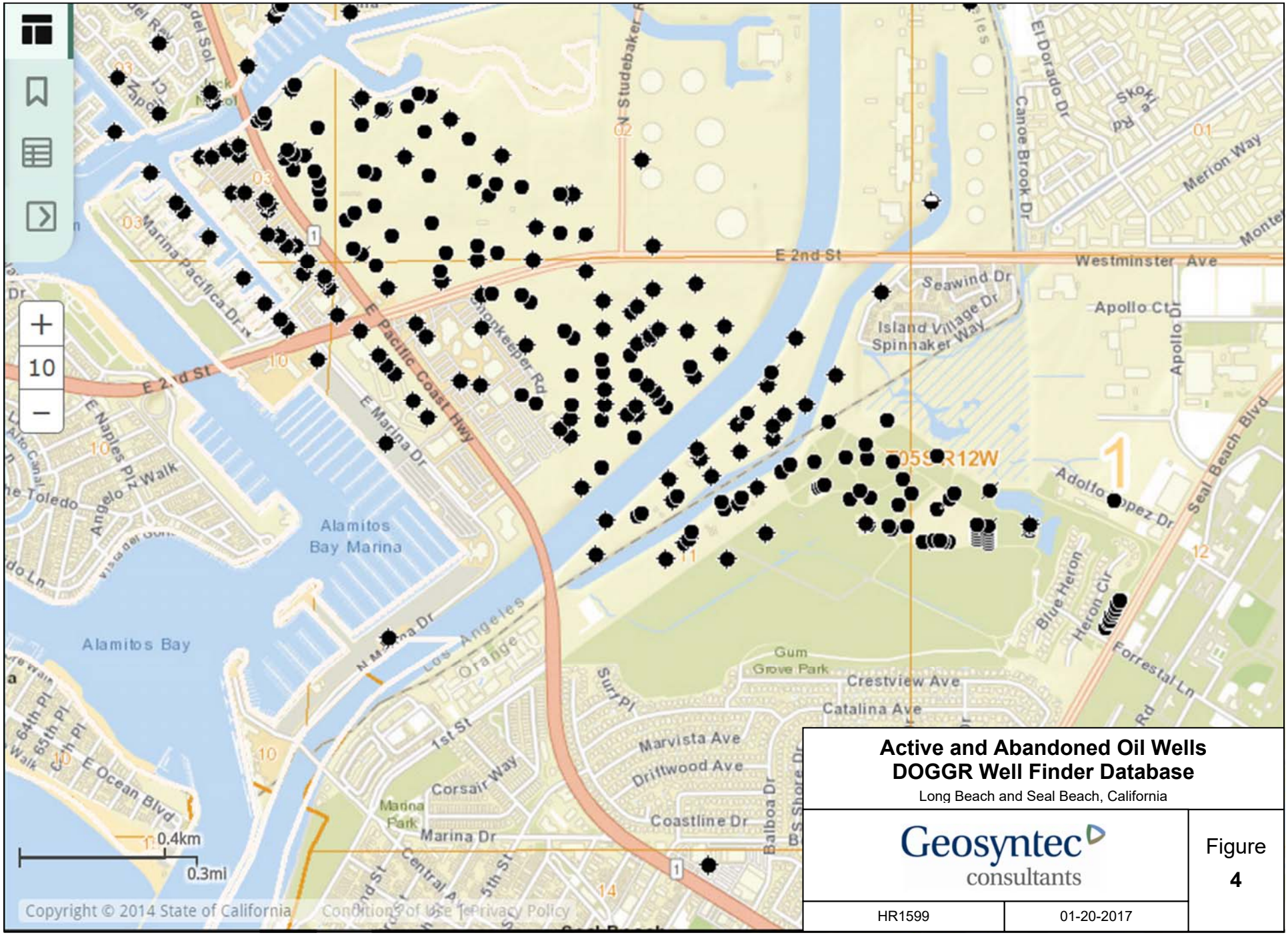
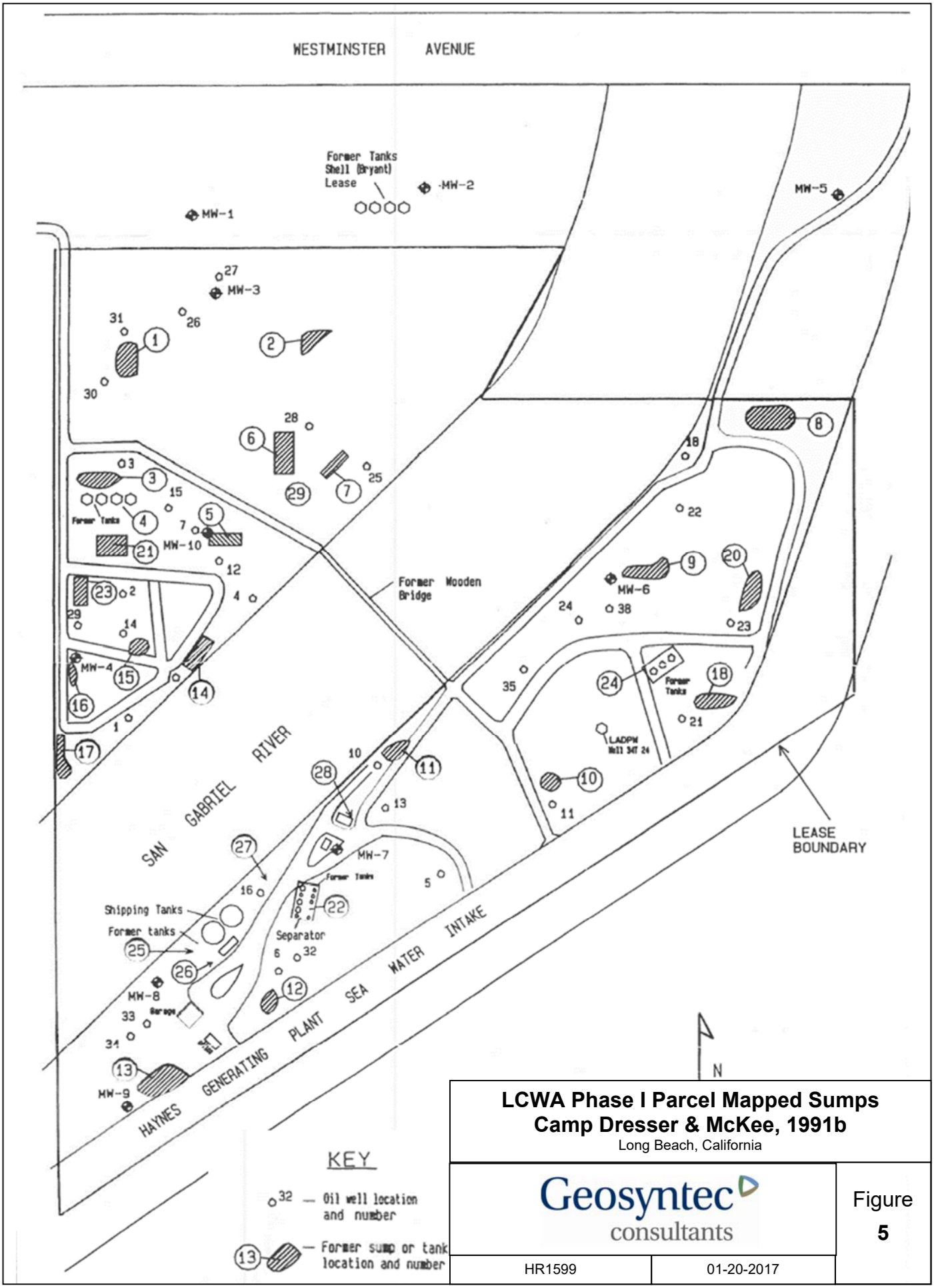


Active and Abandoned Oil Wells
DOGGR Well Finder Database
Long Beach and Seal Beach, California

Geosyntec consultants

Figure **4**

HR1599	01-20-2017



LCWA Phase I Parcel Mapped Sumps
Camp Dresser & McKee, 1991b
Long Beach, California

Geosyntec consultants

Figure **5**

HR1599	01-20-2017

ATTACHMENT A

Excerpt from Geomatrix (1996)

20201 S.W. Birch Street, Suite 150
Newport Beach, California 92660
(714) 474-9181 • FAX (714) 474-9064

GEOMATRIX

August 6, 1996
S3612

Mr. Kevin Brazil
Rutan & Tucker
611 Anton Boulevard, Suite 1400
Costa Mesa, California 92626

SUBJECT: COMMENTS ON JANUARY 1995 DRAFT REMEDIAL ACTION PLAN
Bryant Lease, Los Angeles County, California

At the request of Rutan & Tucker, Geomatrix Consultants, Inc. (Geomatrix), has prepared this letter summarizing results of previous site assessments performed by others and our comments regarding the January 1995 draft Soil Remediation Plan (RAP) prepared by Texaco Exploration and Production Inc., Denver Producing Division (TEPI) for the Bryant Lease in the County of Los Angeles, California (the site). These comments are based on information obtained from the RAP and other documents provided by Rutan & Tucker.

BACKGROUND

Geomatrix reviewed the following documents to develop an understanding of environmental site conditions as based on previous site assessments:

- The Earth Technology Corporation, 1988, Letter Report of Site Investigation at Texaco Bryant Lease, Seal Beach, California, Project Number 87-656-0010, January 28.

- The Earth Technology Corporation, 1988, Final Draft Letter Report of Site Investigation at Texaco Bryant Lease, Seal Beach, California, Project Number 87-656-0010, April 22.

- The Earth Technology Corporation, 1988, Hydrologic Investigation at the Texaco Bryant Lease Facility, Seal Beach, California, October.

- International Technology Corporation, 1988, Phase I Environmental Assessment Results and Proposal to Perform Phase II Assessment of Bryant (Texaco) Property, September 27.

- Engineering Enterprises, Inc., 1989, Report of Preliminary Subsurface Environmental Assessment, Bryant Property, Long Beach, California, Project No. 512-395, August 22.

- Camp Dresser & McKee Inc., 1991, Environmental Audit, Texaco - Bryant Lease, Seal Beach, CA, April 19.

- Camp Dresser & McKee Inc., 1991, Final Phase II Environmental Assessment, Texaco - Bryant Lease, Seal Beach Oilfield, Seal Beach, CA, November 15.

The scopes of work and key results of these previous assessment activities are briefly summarized in the following paragraphs.

The Earth Technology Corporation (TETC), January 28, 1988; TETC, April 22, 1988; and, TETC, October 28, 1988.

These three documents summarize drilling, soil sampling, monitoring well installation, groundwater sampling, and groundwater gradient evaluation activities performed by TETC at the site during 1987 and 1988. The work performed by TETC addressed soil and groundwater quality conditions in the vicinity of a former sump on the eastern portion of the site. The 404-gallon concrete sump, which reportedly held produced water, crude oil, lubricating oil, and rain water, had been removed by Texaco prior to June 1987. During these activities, total recoverable petroleum hydrocarbons (TRPH; analyzed using EPA Method 418.1) were detected at concentrations as great as 3000 milligrams per kilogram (mg/kg) in soil samples from the former sump area. A sheen or greater thickness of liquid-phase hydrocarbons was detected in each of the three groundwater monitoring wells (MW-1, MW-2, and MW-3) installed near the former sump location. TRPH was detected in groundwater samples from these three wells at concentrations of 2 to 3 milligrams per liter (mg/l), and dissolved-phase benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected at concentrations as great as 6.4 micrograms per liter (ug/l), 2.3 ug/l, 1.8 ug/l, and 2.3 ug/l, respectively. In addition, TRPH was detected at concentrations of 13 and 18 mg/l in groundwater samples from two temporary wells (MW-4 and MW-5) installed at distances greater than 200 feet east and southeast of the former sump location. The source(s) of the dissolved-phase petroleum hydrocarbons detected in the groundwater samples from these temporary wells was not identified. TETC concluded that groundwater flow directions beneath the site were tidally influenced and variable. They recommended that additional groundwater samples be collected from the wells in the former sump area, and that recommendations for additional monitoring and/or remediation be developed and implemented.

International Technology Corporation (IT), 1988

IT performed a Phase I site assessment in 1988 that included excavation and sampling of 157 shallow (2 feet deep) soil borings and 23 deeper (10 feet deep) soil borings, and collection and analysis of selected soil samples for certain metals (arsenic, barium, chromium, lead, and vanadium) and BTEX. They reported that concentrations of one or more metals exceeded

"background" or "normal" values in several areas, with maximum detected concentrations of the metals analyzed for as follows: lead, 381 parts per million (ppm); arsenic, 25 ppm; vanadium, 177 ppm; barium, 7300 ppm; and, chromium, 1198 ppm. IT also indicated that the scope of work for its Phase I assessment included a records search and geophysics; however, the results of these activities were not reported in the document we reviewed. IT proposed additional (Phase II) assessment activities for the site, including drilling and logging of borings, collection of soil and groundwater samples, and analysis of soil and groundwater samples for total petroleum hydrocarbons, selected metals, and volatile organic compounds.

Engineering Enterprises, Inc. (EEI), 1989

EEI performed an assessment that included: reviewing aerial photographs, previous investigations, and agency records; drilling 32 borings and completing 10 of the borings as groundwater monitoring wells; and, collecting and analyzing soil and groundwater samples. Soil samples from four of EEI's borings yielded TRPH concentrations greater than 1000 ug/g (equivalent to mg/kg or ppm), with a TRPH concentration of 189,568.1 ug/g reported in a sample from their boring B-8. This same sample yielded BTEX concentrations of 11.90, 81.94, 21.14, and 217.25 ug/g, respectively. Eight polynuclear aromatic hydrocarbons (PAHs), including benzo(a)pyrene at a concentration of 489 ug/kg, were detected in a soil sample from their boring B-7. TRPH or total petroleum hydrocarbons (TPH) were reported at concentrations greater than 3000 ug/l in groundwater samples from four wells and one boring. In one of these groundwater samples, BTEX were reported at concentrations of 79.1, 407.3, 323.3, and 1573.7 ug/l, respectively.

Camp Dresser & McKee (CDM), April 19, 1991, and CDM, November 15, 1991

In 1991, CDM performed an Environmental Audit and a subsequent Phase II Environmental Assessment (Phase II EA) at the site. Together, these projects included: review of aerial photographs, agency records, and previous investigations; site reconnaissance; planning and implementation of a field exploration program consisting of trenching and hand auger borings; field screening soil samples for TRPH and volatile organics; and laboratory analyses for TRPH, TPH by carbon range, California Code of Regulations (CCR) Title 22 metals, BTEX, halogenated volatile organics, PAHs and other semi-volatile organics, and waste characteristics. Their field investigation focused on 29 identified former sump or tank farm locations. Their laboratory analyses detected TRPH and/or TPH at concentrations greater than 1000 mg/kg in one or more soil samples from at least 20 separate areas at the site. In addition, they detected lead at soluble concentrations of 5 mg/l or greater in two soil samples. These concentrations of soluble lead equal or exceed the Soluble Threshold Limit Concentration (STLC) listed for lead in CCR Title 22. Only two soil samples were analyzed for PAHs; one or more PAHs were detected in each of

these samples. Based on the results of the Phase II EA, CDM recommended a biotreatability study, preparation of a remedial action plan, and a groundwater sampling plan.

COMMENTS ON THE JANUARY 1995 DRAFT RAP

For this project, we reviewed the January 1995 draft RAP prepared by TEPI. A drawing titled "Bryant Lease Potential Land Treatment Units and Excavation Locations" (TEPI drawing number 94-155-3) is listed as an attachment to the RAP and was also provided for our review.

The RAP describes TEPI's proposal to bioremediate approximately 70,000 cubic yards of hydrocarbon contaminated soil at the site. The proposed remediation approach involves: excavation of the contaminated soil; spreading the soil in land treatment units; adding nutrients, air, and water to stimulate biodegradation of hydrocarbons using indigenous bacteria; and backfilling the excavations with the treated soil. The estimated duration for remediation activities is two years after receipt of permits. Based on our review of the RAP, it appears that TEPI's proposed remedial activities address soil contamination only; groundwater remediation does not appear to be part of the proposed remedial activities.

The RAP is a relatively brief and general document that may be suitable for use as the framework for a final RAP. However, the RAP should be expanded in the following key respects:

- The RAP does not appear to reflect all existing site assessment data, and it is not clear that previous site assessments have addressed all on-site areas of potential concern. The RAP should demonstrate that adequate characterization of site soil or groundwater has been completed, or describe what additional activities will be performed prior to or during remediation to provide adequate characterization.

- It should provide a basis for the remediation objectives proposed, should address the potential need to establish remediation objectives for chemicals other than TPH in soil, and should address the need for remediation objectives for chemicals in groundwater.

- It should clarify the presence of elevated concentrations of TRPH, TPH, BTEX, and possibly other chemicals in soil in the vicinity of CDM trench 17, which lies within an area designated as a wetland area under the jurisdiction of the U.S. Army Corps of Engineers (U.S.A.C.O.E.).

ATTACHMENT B

Excerpt from Anchor Environmental (2006a)

ANCHOR ENVIRONMENTAL, L.L.C.

Anchor Environmental, L.L.C.
1423 3rd Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131

Memorandum

To: Mary Small

From: Shawn Hinz

CC: Steve Cappellino

Date: May 22, 2006

Re: Bryant Property Document Review

Summary

This memorandum summarizes the results of a review of available site assessment documents for the Bryant Property located in Seal Beach, CA based on the findings of a document review of Bryant Property records conducted at the Law Offices of Rutan & Tucker on April, 25th 2006. The State Coastal Conservancy hired Anchor Environmental to conduct this review because the Conservancy is currently involved in negotiations for the purchase of the Bryant Property and seeks information about future environmental liabilities associated with the site.

Many environmental studies have been completed on the Bryant Property, including Phase I and II preliminary site investigations, a hydrologic study, surface and subsurface soil testing, and a proposed design for soil remediation. These studies primarily focused on total petroleum hydrocarbons (TPH) soil contamination with limited testing occuring beyond areas associated with the oil and gas operation. Most of the studies were paid for by Chevron-Texaco. The contaminants that were identified are all associated with existing and historic oil and gas operations, these include: metals, lead, arsenic, vanadium, barium, chromium, BTEX (benzene, toluene, ethylbenzene, and xzylene a group of volatile organic compounds (VOCs) found in petroleum hydrocarbons), polyaromatic hydrocarbons (PAH), and total petroleum hydrocarbons (TPH).

Cursory screening of these studies indicates that many sumps on the site have soil TPH concentrations above promulgated criteria levels. Benzo(a)pyrene and lead, which are likely associated with TPH contamination, were also found in soil samples at concentrations above promulgated criteria levels. Free –product with Benzene concentrations above promulgated

criteria was found in limited groundwater testing on the property which suggests that TPH contamination is not just limited to soil. A further evaluation of groundwater would likely be necessary to characterize the extent of contamination and to identify possible sources. There was no data with regard to sediment contamination in the San Gabriel river adjacent to the property or in the Haynes generating station channel.

Soil Contamination

Four separate studies were conducted on the Bryant property that evaluated soil contamination. Soil samples were spatially distributed across most areas of the site (see attached Figure 1), although sample density was greater in the Southwest section of the site near a former tank facility and samples were less dense in the Northwest area of the site were industrial activity was minimized. Sample locations were mainly limited to former sumps with little to no assessment of source features such as pipelines, production wells, gas compressors, or storage tanks.

The soil studies were primarily focused on petroleum with limited testing for co-occurring contaminants such as PAH's and metals. TPH concentrations were detected on the property as high as 3,000 mg/kg in the TETC 1988 study and at concentrations up to 189,568 mg/kg in the EEI 1989 study. The California Environmental Screening Level (ESL 2005) for TPH in soil in a residential use area is 500 mg/kg. The PAH carcinogenic compound, Benzo (a) pyrene, was detected at a concentration of 489 ug/kg in one soil boring (EEI 1989). The California Environmental Screening Level (ESL 2005) for Benzo (a) pyrene in soil in a residential use area is 38 ug/kg. Limited analysis of metals, lead, arsenic, vanadium, barium, and chromium in surface soils found concentrations above "background" in several areas in the eastern area of the site. Soluble concentrations of lead were also detected in multiple soil samples from the site at concentrations above the Soluable Threshold Limit (STL) listed for lead in CCR Title 22. No soil testing was completed for pesticides and/or PCBs, although the Phase 1 environmental assessment did not identify a former site activity that justified testing of such contaminants.

Boring and trenching logs from previous investigations generally characterized the surface and subsurface soils at the site as SM – sands with some silts. No documentation was found regarding the placement of dredge materials or construction debris on the site. The neighboring

Hellmann property was known to have taken dredge materials on area 18 of the site and these dredge materials were generally characterized as silts with some clay. No documented geophysical surveys have been done at the site to identify underground obstacles such as pipes, USTs, or foundations that may effect the characterization of soil contamination.

In summary, existing soil testing indicates that soil throughout the property has residual TPH concentrations that are greater than promulgated ESLs with a maximum exceedance factor 380 times the appropriate ESL. Limited locations that have soil lead concentrations above the STLs and soil Benzo (a) pyrene concentrations above ESLs.

Groundwater

Evaluation of groundwater contamination was limited to petroleum and BTEX and sampling was focused primarily on sumps in the Southwestern portion of the site. Free product associated with Benzene and light-end TPH's was observed in three monitoring wells on the eastern portion of the site. Benzene was detected in groundwater in this area at concentrations up to 6.4 ug/l in the TETC 1988 study and at concentrations up to 1573.7 ug/L in the EEI 1989 study. The California Environmental Screening Level (ESL 2005) for Benzene in groundwater that is not a potential drinking source is 46 ug/L. No source for this product was identified although Geomatrix (1996) suggested the possibility that underground storage tanks associated with oil extraction activities may be a source for this free-product. The Geomatrix (1996) review of the RAP identifies groundwater contamination as a major data gap in the site assessment and remedial planning. In summary, existing groundwater testing has been limited, but does indicate that benzene has been found at concentrations greater than 30 times the promulgated ESL.

Sediment

None of the studies reviewed discussed sediment sampling or an evaluation of its necessity. Because the site is adjacent to the San Gabriel River, issues such as source loading to bedded sediments may exist, although much of the existing river in vicinity to the site appears to be rip-rap and the flow in this area may prevent sedimentation from occurring in the channel proper. The Haynes Generating Station Inlet Channel on the southwest corner of the property has also not been evaluated for potential contamination.

Current and On-going Activities at the Site

Currently no environmental assessment or remediation is on-going at the site. A draft Remedial Action Plan (TEPI 1996) was put together in 1996 which proposed for the land farming of 70,000 cubic yards of soil with TRPH concentrations greater than 1,000 mg/kg. A number of design issues were identified with this RAP including the basis for the 70,000 cubic yard estimate, the exclusion of groundwater contamination from the design, and a clear argument for the selected remediation goal of 1,000 mg/kg.

References

Camp Dresser & Mckee Inc., 1991, Environmental Audit, Texaco- Bryant Lease, Seal Beach, CA April 19

Camp Dresser & Mckee Inc., 1991, Final Phase II Environmental Assessment, Texaco – Bryant Lease, Seal Beach Oilfield, Seal Beach, CA November 15

Earth Technology Corporation 1988, Hydrologic investigation at the Texaco Bryan Lease Facility, Seal Beach, California, October

Engineering Enterprises, Inc. 1989, Report of Preliminary Subsurface Environmental Assessment, Bryant Property, Long Beach, CA

Geomatrix, 1996, Letter providing review comments on the 1995 Texaco Draft Remedial Action Plan for the Bryant Lease, submitted to Kevin Brazil, Rutan & Tucker

International Technology Corporation, 1988, Phase 1 Environmental Assessment Results and Proposal to perform Phase II assessment of Bryant Property

ATTACHMENT C

Excerpt from Anchor Environmental (2003)

2.0 DOCUMENT REVIEW/SUMMARIES

The following provides a brief summary of the primary data and conclusions presented from past investigations and reports at the Hellman Ranch.

2.1 Summary of Investigations by BCL Associates, CRC and Converse Environmental West

BCL Associates (June 1987) identified that total petroleum hydrocarbon (TPH) impacted soils in excess of 1,000 mg/kg existed in Areas 5, 6, 9, 10, 11, 15, and 18 (Figure 2). Two stained areas of surface soil were sampled from Area 18 and analyzed for TPH, semi-volatile organic compounds (SVOCs), and used in aquatic toxicity testing. The analyses showed TPH concentrations of 149,000 ppm and 122,000 ppm. SVOC concentrations were below the detection limit in both samples, and the samples were non-toxic in the aquatic toxicity test. Ten samples from different areas of the site were submitted for metals analyses. No metals were detected at concentrations exceeding the Soluble Threshold Limit Concentration (STLC), or the Total Threshold Limit Concentrations (TTLC), and BCL Associates concluded that soil contamination due to metals was not a concern in the areas tested. Although the metals testing conducted by BCL Associates passed TTLC and STLC standards for the State of California, concentrations of cadmium, copper, nickel and mercury consistently exceed ER-L and SSLs (Table 2).

The CRC (1995) investigation was similar to a Phase I site assessment that focused on historical site information, environmental record research, and visual site inspection. CRC reviewed and summarized the contents of previous BCL Associates and Earth Technology Corporation reports as part of their work. Their primary conclusions and recommendations included:

- Additional testing in BCL Associates-identified areas requiring remediation because of TPH contamination

- Remediaton of areas contaminated with petroleum hydrocarbons to concentration levels that would meet Orange County Environmental Health Care Agency (OCHCA) guidelines. Note that these guidelines do not necessarily represent levels that are appropriate for an ecological restoration project.

Table 2. Results of Total Threshold Limit Concentration (TTLC) Analyses in Testing of Hellman Ranch Soils by BCL Associates (1987).

Elements	TTLC mg/kg	Ecological Soil Screening Levels mg/kg	Ecological Effects Range Low (ERLs) mg/kg	Sample Number 34 Area 1-4	50 Area 5	57 Area 12	72 Area 7&8	82 Area 7&8	97 Area 14	155 Area 15,16,17	171 Area 15.16.17	226 Area 15,16,17	264 Area 18	265 Area 18
Antimony	500	21	NA	5.3	5.96	5.18	3.88	8.02	7.76	7.76	3.62	6.47	3.10	5.69
Arsenic	500	NA	8.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	25.8	<0.5
Beryllium	75	NA	NA	0.2	0.09	0.32	0.49	0.32	0.46	0.24	0.19	0.39	<.05	<0.05
Cadmium	100	110	1.2	**4.3**	**2.79**	**6.82**	**6.94**	**5.89**	**7.17**	**4.55**	**3.02**	**6.17**	**2.11**	**2.94**
Chromium, total	2500	NA	81	36.7	26.9	43.1	46.9	39.7	51.3	37.0	24.6	47.0	13.3	18
Chromium, hexavalent	500	330	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Copper	2500	61	34	34.0	17.3	**47.9**	**42.1**	25.1	**42.6**	27.6	12.6	**34.9**	11.2	12.6
Lead	1000	NA	46.7	19.5	22.1	6.87	<0.5	<0.5	<0.5	<0.5	<0.5	5.13	22.0	28.5
Mercury	20	NA	0.15	**0.3**	**0.19**	**0.3**	**0.18**	0.07	**0.18**	**0.3**	**8.76**	**2.88**	**2.05**	**2.26**
Nickel	2000	NA	20.9	**21.5**	14.2	**26.6**	18.6	**22.6**	**30.3**	**26.9**	12.5	**23.2**	**25.3**	**38.2**
Selenium	100	NA	NA	<0.5	<0.5	<0.5	0.73	<0.5	0.69	<0.5	22.9	<0.5	<0.5	<0.5
Silver	500	NA	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	700	NA	NA	20	15	25	25	35	40	30	30	40	20	15
Zinc	5000	120	150	74.8	48.9	136	95.3	113	77.7	55.7	34.2	78.1	24.7	47.5
Barium	1000	NA	NA	251	58.3	129	107	98.7	116	91.1	36	94.6	97.1	676
Cobalt	8000	32	NA	13.2	5.72	17.3	18.1	14.3	16.4	12.4	9.06	17	3.08	7.76
Molybdenum	3500	NA	NA	1.2	0.87	0.87	0.9	2.03	1.43	0.58	1.05	1.47	2.12	2.9
Vanadium	2400	NA	NA	42	20.5	52.9	60.5	46.3	58.7	36.6	31.8	54.2	13.6	30.5

NA - not available

Bold - exceeds Ecological Effects Range Low (ERLs) concentrations

Converse Environmental West (1997) excavated six trenches in the former landfill area. Various debris, including pieces of concrete, wood, and asphalt were observed in material removed from the trenches. Discolored soil or petroleum odors were not noted. Two soil samples were collected from the trenches and analyzed for semivolatile organic compounds and for dioxins and furans. None of these compounds were found above the laboratory detection limit.

Converse also installed and sampled six groundwater monitoring wells in the central and eastern portions of the proposed wetland restoration. The data shows that no petroleum hydrocarbons in the range of diesel fuel through motor oil were detected. Low levels of non-specific petroleum hydrocarbons, ranging in concentration between 220 – 440 micrograms per liter were detected in 4 of 6 wells. One groundwater sample taken from a well at the eastern edge of the wetland restoration area was tested for VOCs. The results show that none of the 67 VOCs detectable in the EPA 8260 test method were present above the laboratory detection limit.

A summary of the BCL Associates and Converse sampling and analyses (Table 3) shows that the focus of those investigations was to delineate the extent of petroleum hydrocarbon contamination in soils. The most commonly used method by BCL Associates and Converse for hydrocarbon impacted soils was to test for hydrocarbon emissions using a photo ionization detector (PID) and flame ionization detector (FID).

The poor quality of the figures presented in the BCL Associates report make it difficult to discern exact sampling locations in most cases; however the written descriptions indicate that trenching and field observations focused on oil production areas and facilities including sumps, wells, tank farms, pipelines and known spills. The locations of the borings, test pits and monitoring wells completed by Converse are shown on Figure 2.

Table 3. Summary of BCL Associates and Converse Sampling and Analysis.

Analyte	Number of BCL Associates Samples	Number of Converse Samples
Field test for TPH	0	42
FID/PID Measurements	265	45
TPH/TEH (EPA 8015M)	23	9
STLC Metals	11	0
TTLC Metals	10	0
Total Chromium (EPA 6010)	0	1
pH	4	0
Aquatic toxicity tests	2	0
Dioxins/Furans	0	1
VOCs (EPA 8260B)	0	1
SVOCs (EPA 8270C)	2	1

2.2 Summary of Investigations by Geomatrix

Geomatrix completed the most thorough review of previously existing site data and reports prior to 2001. Based on their review of previously collected data, Geomatrix (February 21, 2001) recommended additional soil samples from other locations in the former landfill and Area 18. The analyses performed in the Geomatrix investigations are summarized in Table 4.

Table 4. Summary of Geomatrix Sampling and Analysis.

Analyte	Method	Number of Soil Samples Analyzed	
		Former Landfill	Area 18
TPH	EPA 8015M	46	15
TRPH	EPA 418.1	0	21
Metals	EPA 6010B	4	5
PCBs, Pesticides	EPA 8081A and 8082	4	5
PAHs	EPA 8270C	4	5
Butylins	GC/FPD	4	5
TOC	Gaudette et.al.	4	5
Moisture	EPA 160.3	4	5

2.2.1 Former Landfill

Geomatrix excavated ten trenches in the former landfill boundary to assess its extent and contents (Figure 2). The trenches were approximately 2 feet wide and

extended to a maximum depth of 16 feet where conditions permitted. Observations recorded during the trench excavations indicate the presence of petroleum impacted soils within the former landfill area. Discolored soils were observed to depths of about 15 feet below ground surface (bgs). Various debris, including asphalt, coarse gravel, and concrete were encountered in most trenches. Observations made during the trenching operations did not indicate the presence of a cap over the former landfill. Construction debris, which comprised 10 to 40 percent of the excavated trench volumes, extended to the ground surface. The site visit conducted as part of this scope of work was able to verify some of these observations (Figure 3). Chemical analyses for different compounds in the Geomatrix work at the former landfill are summarized below. Analytical results are provided in Appendix A.

- Petroleum Hydrocarbons:
  Results in the Geomatrix testing program indicated the presence of some petroleum hydrocarbon impacted soil within the estimated former landfill boundary. Carbon chain analyses show detections in the C10 to C22 and C22 to C33 ranges, and are consistent with crude oil impacts. TPH was detected in nine of 46 samples, in four of ten trenches, at concentrations ranging from 96.8 to 5,900 mg/kg.

- Metals:
  One soil sample collected from a depth of 1 foot bgs in Trench T2 contained copper and lead at concentrations (36.8 ppm and 67.9 ppm) slightly exceeding respective ER-Ls (34 and 36.7 ppm). One sample from trench T4 also contained concentrations of arsenic and nickel that exceeded the respective ER-L values (8.2 and 20.9 ppm). Metals concentrations were below applicable ER-M concentrations, and do not appear to be related to crude oil impacts because petroleum hydrocarbons were not detected in the samples.

- Pesticides and PCBs:
  Endosulfan I (0.077 ppm) and dieldrin (0.15 mg/kg) were detected in a sample collected from Trench T2. No ER-L or ER-M values are available for these compounds, but the Florida Department of Environmental Protection has published similar sediment chemistry values for dieldrin of 0.000715 ppm (ER-L equivalent) and 0.0043 mg/kg (ER-M equivalent) (FDEP, 1994). Dieldrin concentrations in Trench T2 exceed both of these screening values.

- PAHs:
  No PAHs were detected above laboratory reporting limits in samples from the former landfill.

- Butylins:

Low concentrations of monobutylins (0.0022 to 0.0028 mg/kg) were reported in all four samples analyzed. Dibutylin was detected at a concentration of 0.001 mg/kg in one sample from Trench 2.

2.2.2 *Area 18*

Geomatrix also excavated nine trenches in the estimated boundaries of Area 18 (Figure 2). Trench locations were selected to assess the horizontal and vertical extent of petroleum hydrocarbon impacted soils. Trenches in Area 18 were approximately 2 feet wide and extended to a maximum depth of 16 feet where conditions permitted. Observations recorded during trenching indicated the presence of petroleum hydrocarbon impacted soils within Area 18. Discolored soils were observed in all trenches and material resembling tank bottom sludge was noted on the ground surface within the area investigated. It should be noted that discolored soils and tank bottom sludge were also readily apparent on the surface of Area 18 during our site visit (Figure 4). Very little debris was encountered in Area 18 trenches. Chemical analyses for different compounds in the Geomatrix work at Area 18 are summarized below and in the attached appendix:

- Petroleum Hydrocarbons:
  Petroleum hydrocarbons were detected in 11 of 32 soil samples analyzed from Area 18. Reported TRPH concentrations range from 10 to 81,100 ppm. The highest concentration contained apparent tank bottom material.

- Metals:
  No metals were detected at concentrations exceeding their respective ER-L values in the soil samples analyzed from Area 18.

- Pesticides and PCBs:
  Pesticides and PCBs were not detected at concentrations above laboratory reporting limits in soil samples analyzed.

- PAHs:
  No PAHs were detected above laboratory reporting limits in samples from Area 18.

- Butylins:
  Low concentrations of dibutylins (0.0015 and 0.0016 ppm) and monobutylins (0.0014 to 0.0029 ppm) were reported in soil samples from Area 18.

Geosyntec consultants

ATTACHMENT D

Example Phase II ESA Work Plan Table of Contents and Data Quantity Figure

HYPOTHETICAL
LOS CERRITOS WETLANDS PHASE II ENVIRONMENTAL SITE ASSESSMENT WORK PLAN
LCWA Phase I and Phase II Parcels
Long Beach and Seal Beach, California

Geosyntec consultants

EXAMPLE TABLE OF CONTENTS

EXAMPLE TABLE OF CONTENTS (Continued)

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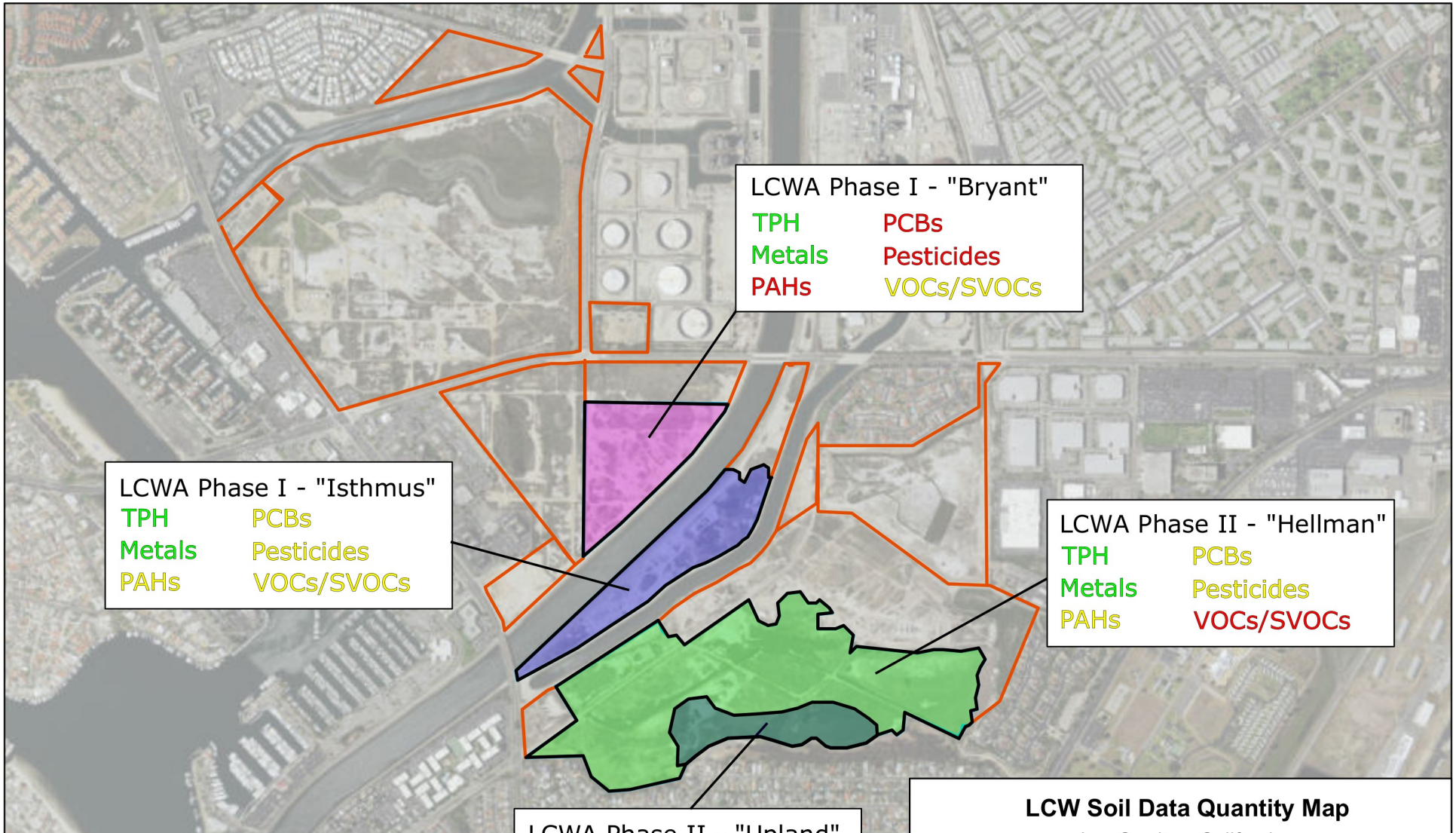

LCW Soil Data Quantity Map

Los Cerritos, California

2,000 1,000 0 2,000

Geosyntec consultants

Project No: HR1599

January 2017

Figure D-1

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