

SITE ASSESSMENT WORKPLAN

Former Estero Bay Defense Fuel Supply Point

3300 Panorama Drive
Morro Bay, California

Site I.D. No. T10000014042

SUBMITTED TO:

Central Coast Regional Water Quality Control Board

Site Cleanup Program
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401

ATTN: Sarah Treadwell, Engineering Geologist

FOR:

Rhine LP & Morro94, LLC

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Fresno, CA 93711

ATTN: Mr. Chris Mathys

ACG JOB NO. I1612-1202

July 24, 2020



PREPARED BY

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INTRODUCTION

The subject property, a former Defense Fuel Supply Point, was a closed Central Coast RWQCB Military Cleanup Site. A new RWQCB case has been opened following removal of the aboveground fuel storage tanks and associated piping and equipment. The new case has been requested by the owners in order to obtain a site closure for unrestricted use.

Multiple subsurface site assessments were carried out by the US Navy prior to purchase of the property by the current owners, resulting in a low-risk closure for groundwater contamination in 1997. The objectives of this site assessment are to assess the current condition of previously identified impacts, to assess areas not previously investigated due to the presence of tanks and other improvements, and to provide information to support a Human Health Risk Assessment (HHRA).

The scope of work for this site assessment is:

- ◆ Drill and sample approximately 5 hollow-stem auger borings to a depth of 50 feet or refusal in the tank locations, the pump area, and the sump area. Collect groundwater grab samples from borings that encounter groundwater.
- ◆ Drill and sample approximately 8 hydraulic push soil borings to a depth of approximately 15 feet in areas of previously identified shallow soil contamination and in areas identified during demolition.
- ◆ Borings will be logged by a California Professional Geologist.
- ◆ Soil samples will be collected, preserved, transported, and analyzed in accordance with EPA SW-846 and California DTSC site assessment guidance.
- ◆ Submit soil and groundwater samples to California ELAP-accredited laboratory for analysis of total petroleum hydrocarbons and volatile organic compounds.
- ◆ Collect up to 50 surface soil samples for analysis of lead content. Submit samples to a California ELAP-accredited laboratory for analysis.
- ◆ Prepare a site assessment report including a map of borings, boring logs, laboratory results, findings, and a human health risk assessment for unrestricted use. The report will be signed and certified by the California Professional Geologist and Certified Industrial Hygienist.



SITE DESCRIPTION

The subject property is a former United States Government-owned facility located at 3300 Panorama Drive in the City of Morro Bay in San Luis Obispo County, California. The property is currently owned by Rhine LP and Morro94, LLC. The assessor's parcel number is 065-038-001. The 10.06-acre parcel is located at the north end of the City of Morro Bay, 2 blocks east of California Highway 1. The property is bounded on the west by Panorama Drive and Tuscan Drive with residences beyond, and on the west by vacant land used for cattle grazing. A small unnamed creek, about 1¼ mile long, runs along the northeast margin of the property. An environmentally-sensitive habitat area (ESHA) has been designated along the creek.

The report titled *Environmental Evaluation for Defense Fuel Supply Point – Estero Bay, Morro Bay, California, 1991*, dated September 23, 2016 by ECC, was reviewed for site information. This report is a summary of 7 previous site assessment reports for the site published between 1991 and 1996. Citations below are from the reports referenced in the ECC 2016 report.

The Facility included a 10-acre former bulk jet fuel (JP-5) tank farm containing two 125,000-barrel above ground storage tanks (ASTs; Tank 5 and Tank 6), one water storage tank, and one pumping station. An offshore mooring station was used to transfer JP-5 in Estero Bay through a pipeline (loading line) to ASTs located on the Facility. From there, the JP-5 was transferred through 98 miles of pipeline to the Lemoore Naval Air Station (NAS) in Lemoore, California.

The Facility was closed in 1991 and the loading line from the mooring station to the Facility was removed in March 1992 (GTI, 1994). At that time, the pipeline from the Facility to Lemoore NAS was purged of JP-5 and filled with pressurized nitrogen gas according to requirements of the California Fire Marshall (GTI, 1994). The Lemoore pipeline easement and the loading line easement are under different ownership and are not a part of the subject property.

The current owner demolished the ASTs, removed aboveground and underground piping, and removed the pumping equipment in 2018, under permit from the County of San Luis Obispo Public Health Department Environmental Health Services Division (EHS).

PREVIOUS WORK

The report titled *Environmental Evaluation for Defense Fuel Supply Point – Estero Bay, Morro Bay, California, 1991*, dated September 23, 2016 by ECC, was reviewed for site information. The report was a summary of 7 previous site assessment reports for the site published between 1991 and 1996. Citations below are from the reports referenced in the ECC 2016 report.

ECC performed a review of historical data in the referenced reports. A total of 183 soil samples from over 60 borings and over 40 groundwater samples from 32 monitoring wells were collected and analyzed during numerous environmental investigations completed at the Defense Fuel Supply Point – Estero Bay facility. Additionally, air respirometry, soil gas, and aquifer testing have been performed. These data collection and analysis activities meet or exceed the scope of most Phase II investigations. Analytical sampling suites were consistent with current EPA (RSL) and California RWQCB (ESL) guidance for TPH contaminated sites. Sampling results have clearly identified the contaminants of concern, impacted areas, and potential sources of environmental contamination. Interviews with GSA, GTI, and Rhine employees indicate that the site has not been used except for grazing and storage of equipment since the Environmental Quality



Survey was completed in 1991. Based on this assessment, there is no significant chance of additional releases of contamination to the subsurface since approval of the Risk-Based Closure (RBC) Report in 1996. As a result, the soil contaminant concentrations presented in the RBC Report likely represent a worst-case scenario since TPH naturally biodegrades in the subsurface. As stated by DTSC in their 1996 approval of the RBC Report, “DTSC concurs with RWQCB in the belief that natural biodegradation will continue to effectively reduce TPH concentration in soil and groundwater”. It has been more than 20 years since the RBC Report was approved over which time TPH biodegradation is likely to continue. Therefore, the current TPH concentrations are likely lower than when measured during the environmental assessments conducted between 1990 and 1996.

Available documents indicate benzene was not detected in soil at concentrations greater than the laboratory detection limits. Low concentrations were detected in groundwater in three monitoring wells; each was a single detection at the individual monitoring wells. Detected benzene concentrations were 0.4 µg/L, 0.6 µg/L and 25.8 µg/L. ECC concluded that benzene was included as a COPC in soil for the RBC health risk calculations based on the limited detections in groundwater. The risk calculations for soil presented in the RBC Report did not calculate cumulative risks and hazard quotients for measured COPC concentrations in soil. The RBC Report presents action level concentrations for COCs that were back-calculated based on chemical specific target risks and hazard quotients. Review of the available data indicate that benzene was not detected in soil above laboratory detection limits.

Following removal of the ASTs, piping, and equipment in 2018, Analytical Consulting Group, Inc. issued a report titled *Post-Removal Soil Assessment Report - Removal Of Aboveground Tank System, Former Navy Jet Fuel Storage Site, 3300 Panorama Drive, Morro Bay, California*, dated April 21, 2019.

Two 125,000-barrel aboveground storage tanks (AGTs; Tank 5 and Tank 6), one water storage tank, the fuel pumping station, and associated fuel piping were demolished and removed from the site between October 25, 2018 and December 14, 2018. The onsite section of the Lemoore pipeline adjacent to the ESHA boundary was abandoned in place to avoid potential disturbance to the ESHA. All other fuel piping, tanks, and equipment were removed up to the property lines. The concrete pad under the pumping equipment was also removed. The oiled sand bed beneath the AGTs was removed and 765 tons of sand were hauled to Cold Canyon Landfill in San Luis Obispo for disposal as petroleum-contaminated soil.

Soil sampling was conducted beneath the AGTs prior to removal, beneath the ESHA-adjacent portion of the Lemoore pipeline prior to abandonment-in-place, and beneath other piping as it was removed. Petroleum hydrocarbons and volatile organic compounds were non-detect in most samples. Three soil samples contained low levels of petroleum hydrocarbons or xylenes, but all were below soil screening levels. Metal concentrations did not indicate contamination due to a release from the AGT system.

Field evidence indicated probable minor releases of hydrocarbons in several locations beneath the piping but soil samples in those locations were non-detect for petroleum hydrocarbons and VOCs. The observed releases have degraded to non-detect levels.



CONCEPTUAL SITE MODEL

HYDROGEOLOGY

The report titled *Limited Site Assessment and Well Installation Report, DFSP Estero Bay Tank Farm Pump Pad and Oil/Water Separator Areas*, dated October 16, 1996 by Groundwater Technology Government Services, Inc., was reviewed for site geology and groundwater information.

The DFSP Estero Bay tank farm is located in the Coast Ranges of the California Geomorphic Province. The site is underlain by Mesozoic (Jurassic-Cretaceous) Franciscan Complex rocks, comprised of sandstone and siltstone with lesser shale, chert, limestone, and conglomerate. Ultramafic serpentinite rock containing chrysotile asbestos crops out in the eastern portion of the site. Recent alluvial/coastal plain sediments are present near the surface in the western portion of the site. The tank impoundment areas are cut-and-fill and the containment berms are fill derived from the native serpentinite bedrock.

Soils at the site consist primarily of clay, sandy clay, clayey sand, gravel, clay with gravel, and silty sand. A discontinuous layer of sand and sandy clay with occasional layers of gravelly clay from 5 to 10 feet thick occurs immediately above the bedrock. Bedrock was found approximately 50 feet below grade (bg) in GTW-6 (B-1).

The soil texture underlying the pump pad ranges from silt, clay to clayey sand with sand, silty gravel, and sandy clay. Groundwater is present in a gravelly clay, silt with sand, and sandy layer west of the Operations Building at a depth ranging from 25 feet to 43 feet bgs. East of the Operations Building groundwater was encountered approximately 40 feet bgs, interpreted as a thin “weep zone” of groundwater at the bedrock contact. An upper perched groundwater zone was identified at 24 feet bg in GTW-6 (B-1).

The tank farm is located within the drainage area of a small creek that empties directly into the Pacific Ocean (Estero Bay). The Toro Creek hydrologic basin lies to the north and the Morro Creek basin lies to the south. San Luis Obispo County contains 18 small coastal hydrologic basins similar to the Toro Creek and Morro Creek basins. Groundwater in these basins is present in unconsolidated alluvium and in older indurated sediments, including the Plio-Pleistocene Paso Robles Formation and the Pliocene Careaga Sand.

CONTAMINANTS OF CONCERN

The fuel stored in the ASTs on the subject property and transported through the pipelines was JP-5 jet fuel. JP-5 is a complex mixture of hydrocarbons with a carbon range of C8-C16 and a high flash point (min. 60 °C or 140 °F), containing alkanes, cycloalkanes, and aromatic hydrocarbons.

No other fuels are known to have been stored on the property other than in vehicle fuel tanks. Small quantities of lubricants and solvents may have been stored on site for maintenance purposes.

The large ASTs were placed on beds of oiled sand about 6 inches thick. The oiled sand beds are shown on as-built construction drawings of the tanks. The purpose of oiled-sand beds is to protect the underside of the steel tank floors from corrosion. The oiled sand was removed from the site and transported to a landfill following demolition of the tanks.



Lead-based paint was present on the ASTs, aboveground pipelines, equipment, and buildings. Lead from paint may have entered surface soils through weathering or through physical disturbance during maintenance and repair operations.

Metals other than lead are not contaminants of concern at this site. Jet fuel contains negligible concentrations of Title 22 metals. No releases of metal-bearing products other than lead-based paint are known or suspected at the site. High natural background concentrations of nickel and chromium are expected in soils derived from serpentinite.

Serpentinite bedrock is exposed on slopes in the eastern portion of the property and serpentinite clasts are abundant in fill soil. The serpentinite contains naturally-occurring asbestos (NOA). NOA is a potential hazard during grading operations but will not be further considered in this site assessment. Serpentinite also contains unusually high background concentrations of chromium and nickel.

CONTAMINANT SOURCES

Previous site assessments found limited areas of petroleum hydrocarbon impacts in soil. These impacts appear to be associated with spills and leaks from sumps, piping and equipment. Inspection of the tank interiors prior to demolition and the subgrade following demolition showed no indications of releases from the tanks. The tank bottoms were lined with epoxy.

The tanks, piping, and buildings at the site are potential sources for lead contamination in surface soil due to deterioration of lead paint.

No other contaminant sources are known or suspected to be present on the subject property.

RECEPTORS

Surface – Onsite

The site is currently vacant. There is an Environmentally Sensitive Habitat Area (ESHA) along the creek at the northwest margin of the site. The ESHA can receive runoff from the outer side of the containment berm. The creek is seasonally intermittent.

Following regulatory closure, the subject property will be available for future development, which may include residential development. In that case, receptors would include construction workers and residents.

Surface – Offsite

The site is bordered to the west by existing residential development and to the east by grazing land. Residences are located within 50 feet of the west property line. The nearest public school is located ½ mile to the south. A private preschool is located 0.2 mile to the south.

Groundwater

The site is located in a very small watershed, less than 1½ miles long from the drainage divide to the ocean, with a correspondingly small and local groundwater basin. There is no groundwater production in the vicinity and it is unlikely that a significant groundwater resource exists at or downgradient of the site. Properties in the area are served by the City of Morro Bay water department. The subject property received low-risk closure for groundwater contamination in 1997.



Exposure Pathways

Potential exposure pathways to be investigated in this site assessment include the following:

- Direct exposure of onsite construction workers or residents to contaminated surface and near-surface soil
- Exposure to contaminated runoff from surface soil
- Exposure to airborne dust from surface soil
- Ingestion exposure via food grown in contaminated soil
- Intrusion of vapor-phase contaminants from soil into buildings

DATA GAPS

Subsurface soil and groundwater at the site was well-characterized by site assessments conducted between 1991 and 1997, except for areas of the subsurface that could not be investigated due to the presence of the ASTs. The data collected was sufficient to support low-risk closure for the groundwater case.

Contaminant concentrations in the subsurface have probably decreased significantly due to natural attenuation. No releases of petroleum hydrocarbons or other organic contaminants are known or suspected to have occurred since the last site assessment. It is desired to determine the current contaminant concentrations in known impacted areas in order to develop a human health risk assessment.

Lead-based paint is known to have been present on site structures prior to demolition. No assessment of lead in surface soil has been made previously.



SAMPLING AND ANALYSIS PLAN

SOIL BORINGS

Five hollow-stem-auger (HSA) borings and eight direct-push (DP) borings will be located as shown on the attached **Proposed Boring Map**. Borings will be located to re-assess previously discovered areas of petroleum impacts and potential release locations not previously investigated. Historical sample results and the areas of concern (AOC) as summarized in Figure 3 from the 2016 ECC report are shown on the Proposed Boring Map. The proposed borings are described in the table below.

Boring Number	Type	Depth	Purpose
PB-1	HSA	50 ft or bedrock	Investigate potential release point – tank 5 water sump, water drain valves, and fuel valves. Reassess AOC 3.
PB-2	HSA	50 feet or bedrock	Investigate potential release point – tank 6 water sump, water drain valves, and fuel valves.
PB-3	HSA	50 feet or bedrock	Reassess AOC 2, known impacts associated with stormwater sump and clarifier.
PB-4	HSA	50 feet or bedrock	Reassess AOC 1, known impacts associated with pumping station and fuel pipe manifold vault.
PB-5	HSA	50 feet or bedrock	Reassess AOC 1, known impacts associated with surface drainage swale.
PB-6	DP	15 feet	Assess subsurface beneath tank
PB-7	DP	15 feet	Assess subsurface beneath tank
PB-8	DP	15 feet	Reassess AOC 3
PB-9	DP	15 feet	Reassess AOC 3
PB-10	DP	15 feet	Investigate potential release point – stormwater sump.
PB-11	DP	15 feet	Reassess AOC 1, potential impacts beneath pump pad.
PB-12	DP	15 feet	Reassess AOC 1, known impacts associated with surface drainage swale.
PB-13	DP	15 feet	Assess subsurface beneath loading line.

Borings will be excavated to bedrock or 50 feet (HSA) or 15 feet (DP) or to refusal. Soil samples will be collected at two feet and five feet below the ground surface and at intervals of five feet thereafter. Additional samples may be collected at horizons where field indications of contamination are observed. The borings will be logged by the undersigned Professional Geologist. Boring logs will be maintained in the field and included in the report.

Soil samples will be collected from hydraulic-push borings using a split-spoon or closed-tube sampler with acetate sample liners, or from hollow-stem borings using a split-spoon sampler with brass or stainless-steel sample liners. Soil samples will be sub-sampled in accordance with the EPA Method 5035 field extraction method, using a disposable soil syringe to extract 5-gram aliquots of soil and eject them



into preweighed VOA vials with sodium bisulfite solution. The sample liner will then be capped with teflon film and polyethylene caps. The 5035 sample vials and the capped liner will be labeled and placed in a chilled ice chest for transport to the laboratory.

Where groundwater is encountered in hollow-stem borings, a grab groundwater sample will be collected. A ½-inch or 1-inch slotted well casing will be placed in the hole and a groundwater sample will be obtained using a new disposable bailer. The sample will be decanted into 3 HCl-preserved VOA vials with teflon septa and a 1-liter amber glass bottle. No headspace will be allowed in the vials.

SURFACE SOIL SAMPLING

Surface soil samples will be collected to assess possible lead contamination in soil from lead-based paint on tanks, pipes, and buildings. Samples will be collected at approximate 50-60 foot intervals across the active areas of the site – within the AST containment areas and in the area of the pump equipment pad and support buildings. Samples will be collected around the AST perimeters and along aboveground pipe runs. Proposed lead sample locations are shown on the attached **Lead Sampling Map**.

One composite surface soil sample will be collected at each sample location. At each composite sample location, five sub-samples of soil will be collected from the corners and center of a 1-meter-square area. The top 50-75mm of soil will be sampled using a hand scoop, then the sub-samples of soil will be combined in a zip top plastic bag, labeled with the sample number, and manually homogenized. After homogenizing, the sample will be transferred to a 60-ml plastic digestion vial and then labeled with the sample number.

LABORATORY ANALYSIS

Soil and groundwater samples will be transported under chain of custody to Oilfield Environmental & Compliance in Santa Maria, California (ELAP No. 2438). Samples will be analyzed for total extractable hydrocarbons as JP-5 using GC/FID in accordance with EPA Method 8015M and for volatile organic compounds using GC/MS in accordance with EPA Methods 8260B/5035.

Surface soil samples will be analyzed for lead using ICP/AES in accordance with EPA Method 6010B.

The analytical laboratory will comply with all of the QA/QC procedures set forth in the laboratory's QA/QC manual and SOPs as submitted for CA-ELAP accreditation. QA/QC data shall be reported in summary form for all samples submitted.

DECONTAMINATION AND WASTE DISPOSAL

Sampling equipment will be decontaminated between testhole locations and between sampling events. Samplers will be washed with a detergent solution, rinsed with clean water, and final rinsed with distilled water. Augers will be pressure-washed with hot water between borings. Sample sleeves will consist of new stainless-steel or brass sleeves or acetate tubes. Soil and rinsate generated during the exploration process will be stored onsite, labeled in 55-gallon drums, and tested to profile for disposal.



REPORTING

The results of the subsurface site assessment will be provided in a final report. The report will include field observations, plot plans of boring and sample locations, laboratory reports, findings, and recommendations. A human health risk assessment will be prepared by the Certified Industrial Hygienist.

Field work will be performed by the undersigned Professional Geologist. The report will include the analytical laboratory reports and QA/QC documentation for all sample analyses. The report will be signed by the Professional Geologist.



ILLUSTRATIONS

Figure 1: Vicinity Map

Figure 2: Proposed Boring Map

Figure 3: Lead Sampling Map





SUBJECT
PROPERTY



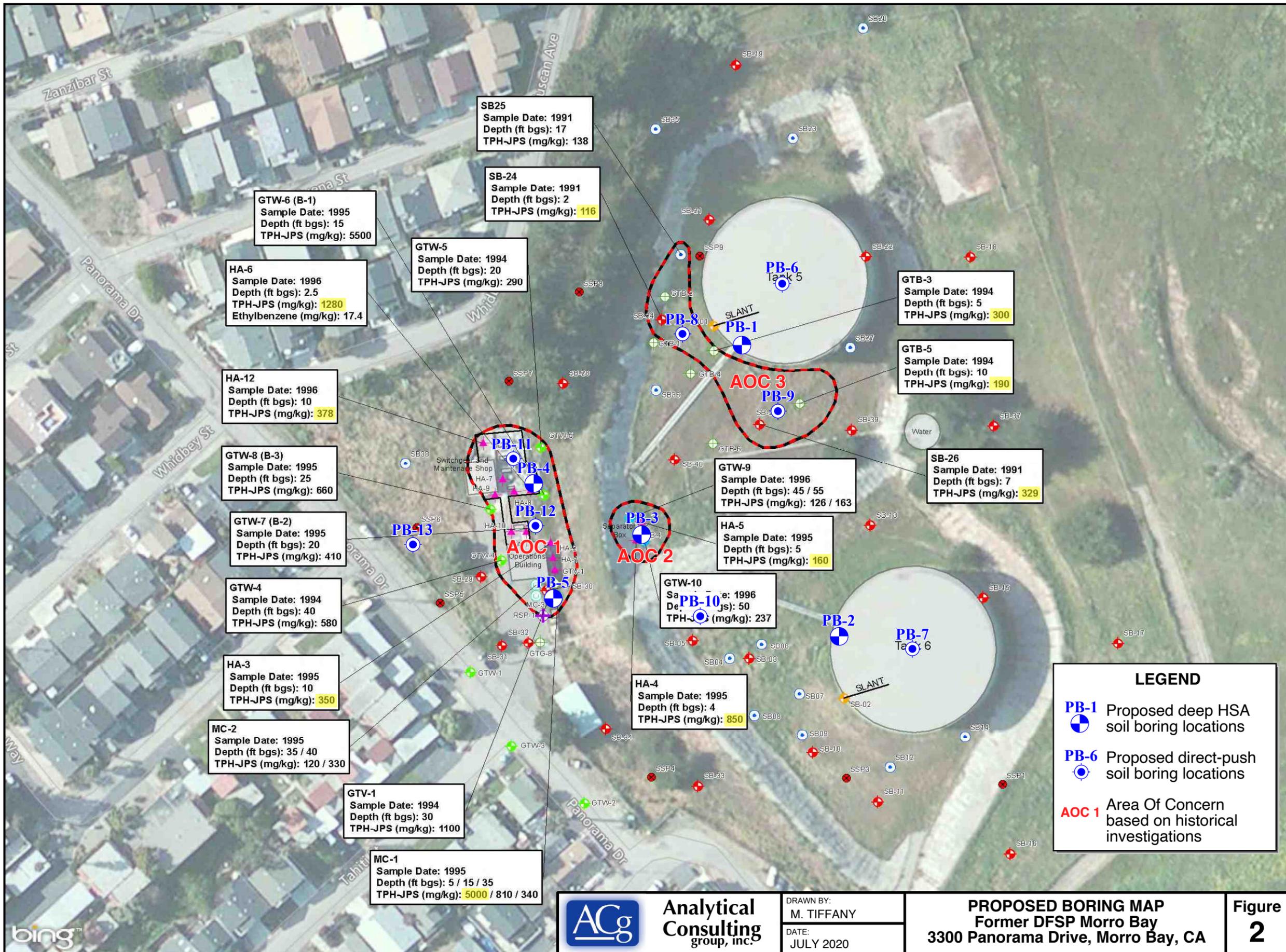
SCALE: 1 inch = 500 feet

ACg
Analytical
Consulting
group, inc.

DRAWN BY:
M. Tiffany
DATE:
July 2020

VICINITY MAP
DFSP Morro Bay
3300 Panorama Road, Morro Bay, California

Figure
1



- Legend**
- Surface Soil Sample (GTI, 1995)
 - ◆ Soil Boring, Converted to Monitoring Well (ECC, 1991)
 - ◆ Soil Boring, Converted to MW, 7/95
 - ◆ Soil Boring, Converted to MW 5/96
 - ◆ Soil Boring, Slanted, Converted to Monitoring Well
 - Soil Boring (ECC, 1991)
 - Soil Boring, 5/96
 - ◆ Soil Boring (GTB1 - GTB6, GTG8) (GTI 1994)
 - Soil Boring Converted to Vapor Monitoring Cluster, 7/95
 - ◆ Soil Boring Converted to Air Respirometry Well, 7/95
 - ◆ Hand Auger Location, 7/95 (GTI, 1995)
 - Approximate Area of Soil Concentrations that Exceed RSLs for TPH

NOTES:

References:

1. Environmental Chemical Corporation (ECC), Lakewood, Colorado, Environmental Quality Survey: Final Report, for Defense Fuel Supply Point- Estero Bay, July 1991.
2. Groundwater Technology Government Services, Inc. (GTI), Torrance, California, Site Assessment Groundwater Monitoring Report, DFSP Estero Bay Tank Area, May 25, 1994.
3. GTI, Torrance, California, Site Assessment/Groundwater Sampling Report, March 29, 1995.
4. GTI, Torrance, California, Site Assessment, Well Installation and Limited Feasibility Report, DFSP Estero Bay Operations Building Area, January 25, 1996.
5. GTI, Torrance, California, Surface Soil and Selected Groundwater Sampling Results, DFSP Estero Bay, May 28, 1996.
6. GTI, Torrance, California, Risk-Based Closure Report, DFSP Estero Bay, September 23, 1996.
7. GTI, Torrance, California, Limited Site Assessment and Well Installation Report, DFSP Estero Bay Tank Farm Pump Pad and Oil/Water Separator Areas, October 16, 1996.
8. California Regional Water Control Board, Central Coast Region, San Luis Obispo, Closure Report Acceptance Memorandum, October 16, 1996. From Roger Briggs, Executive Officer to Jose Salcedo, Department of Toxic Substances Control, Region 1, Sacramento, CA.
9. California Department of Toxic Substances Control Board, Sacramento, CA, Approval to Risk-Based Closure Report, Dense Fuel Supply Point - Estero Bay Facility, Morro Bay, California, December 20, 1996.

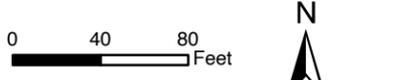
LEGEND

- PB-1** Proposed deep HSA soil boring locations
- PB-6** Proposed direct-push soil boring locations
- AOC 1** Area Of Concern based on historical investigations

TITLE

DFSP Historical Sample Results

Estero Bay Tank Farm
Estero Bay, California



Map Coordinates:
NAD 1983 SP
California Zone V (US Feet)

ECC DENVER
1746 Cole Blvd.
Bldg. 21, Ste. 350
Lakewood, CO 80401

Date Saved: September 19 2016
DWN BY: MJ CHKD BY:

FIGURE 3



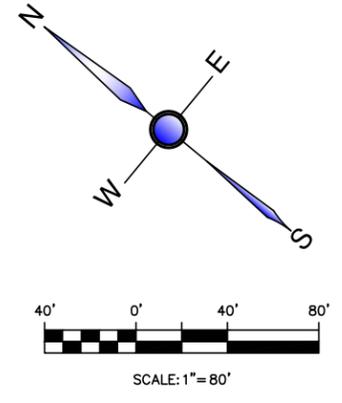
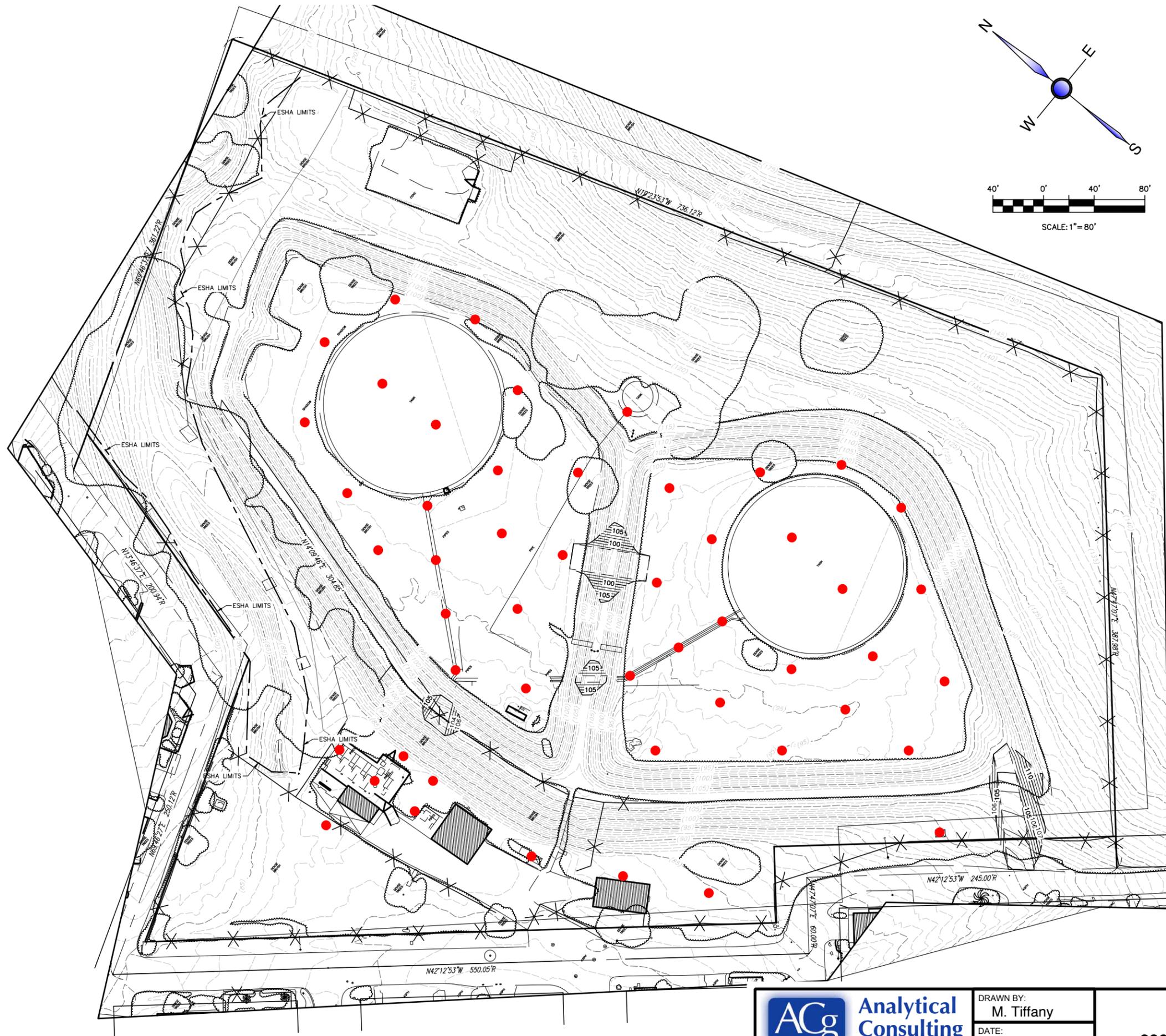
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M. TIFFANY

DATE:
JULY 2020

PROPOSED BORING MAP
Former DFSP Morro Bay
3300 Panorama Drive, Morro Bay, CA

Figure 2





LEGEND

● Location of planned composite soil samples