ZONE 7 WATER AGENCY
5997 Parkside Drive
PLEASANTON, CA. 94588

Phone 484-2600
FAX 462-3914

LETTER OF TRANSMITTAL

DATE	6/30/94	REF.
ATTENTION	Eva Chu	
RE		

TO Alameda County Department
Of Environmental Health
80 Swan Way, #200
Oakland, CA 94621

ENCLOSED ARE THE FOLLOWING ITEMS:

COPIES	DATE	DWG. NO.	DESCRIPTION
2			Site Investigation Workplan
			Del Valle Water Treatment Plant,
			Livermore

THESE ARE TRANSMITTED AS CHECKED BELOW:

☐ For your use ☑ As requested ☑ For approval ☐ For review and comment

REMARKS

Please feel free to contact me if you have any questions regarding this matter

Thank you

COPY TO

SIGNED: Jaime Rios

If enclosures are not as noted, kindly notify us at once.

WEST ASSOCIATES
ENVIRONMENTAL ENGINEERS, INC.

June 27, 1994

Alameda County Flood Control and Water Conservation District
Zone 7
5997 Parkside Dr.
Pleasanton, CA 94588
Attn: Mr. Jaime Rios

SUBJECT: SUBMITTAL OF FINAL "SITE INVESTIGATION WORKPLAN, DEL VALLE WATER TREATMENT PLANT, LIVERMORE"

Dear Mr. Rios,

West & Associates Environmental Engineers, Inc., is pleased to submit three copies of our final "Site Investigation Workplan" for the Del Valle Water Treatment facility. The final workplan includes revisions as indicated by your review of our draft workplan.

We believe our workplan will be approved by the Alameda County Health Care Agency. Upon their approval, West & Associates would be interested in submitting a bid for workplan implementation.

For any additional information please contact me at (707) 451-1360.

Yours truly,

Brian W. West

Brian W. West PE
President
West & Associates Environmental Engineers, Inc.

BWW/es

Enclosure: Site Investigation Workplan (3 copies)

PROPOSED SITE ASSESSMENT WORKPLAN

ZONE 7 WATER AGENCY
DEL VALLE WATER TREATMENT PLANT
601 EAST VALLECITOS ROAD
Livermore, California
STID 4138

Submitted to:

ALAMEDA COUNTY
HEALTH CARE SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
Oakland

Prepared for:

ZONE 7 WATER AGENCY
5997 PARKSIDE DRIVE
Dublin, California

Prepared by:

WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS, INC.
Vacaville

June, 1994

ACKNOWLEDGEMENTS

This workplan was prepared under authorization of the Zone 7 Alameda County Flood Control and Water Conservation District. The Zone 7 project contact is Mr. Jaime Rios; 5997 Parkside Drive, Dublin, CA 94588, (510) 484-2600, ex 245.

At the Del Valle Water Treatment Plant, Mr. Gerald De Witt is the site contact; 601 E. Vallecitos Road, Livermore, CA 94588, (510) 447-6704.

The lead regulatory agency for the Del Valle Water Treatment plant is the Alameda County Health Care Agency, Department of Environmental Health. Ms. Eva Chu, Hazardous Materials Specialist, is the staff person assigned. The Department of Environmental Health is located at 80 Swan Way, Room 200, Oakland, CA 94621; (510) 271-4320.

In the preparation of this workplan reliance was made on past site work performed by; Woodward-Lundgren & Associates (Oakland); Light Air & Space (Morgan Hill) and All Chemical Disposal, Inc. (San Jose).

This workplan was prepared by West & Associates Environmental Engineers, Inc. West & Associates is located at 112 Pepperell Court, Vacaville, CA 95688; mailing address, PO Box 5891, Vacaville 95696; (707) 451-1360. Principal author is Mr. Brian W. West PE. (Registered California Civil Engineer No. 32319 - expires 12/31/96).

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

This workplan describes proposed site investigation activities to be performed at the Del Valle Water Treatment Plant in Livermore. Site investigation is proposed at the former underground diesel fuel tank location. In this Section, the project scope and objectives are described along with a presentation of selected background material.

1.1 Scope

The scope of this workplan includes presentation of proposed work, methods, equipment and materials for performance of sub-surface investigation at the former underground diesel tank site.

Specific scope items proposed in this workplan include:

- Completion of soils borings and associated soil sampling
- Monitoring of existing groundwater wells
  - Depth to groundwater measurements
  - Groundwater sample collection
- Laboratory analysis of soil and groundwater samples
- Hydrologic analysis
- Preparation of a written report of findings

The site investigation report will include recommendations for further site investigation or remedial action, as appropriate.

1.2 Objectives

It is the objective of the Zone 7 Water Agency to comply with all local, Regional, State and Federal regulations pertaining to environmental protection and remediation. The overall objective of investigative work at the former underground tank installation is to develop sufficient technical data to design an effective and efficient remediation program.

The specific objectives of site investigation proposed in this workplan include:

- Fully define the extent of soil contamination near the former underground diesel tank
- Determine the proximity to groundwater at the former diesel tank location
- Assess the potential for possible groundwater impact
- Develop recommendations for further action

Proposed site investigation activity to accomplish these objectives is described in Section 4.0.

1.3 Summarized Background

The Del Valle Water Treatment Facility in Livermore was formerly equipped with an underground fuel tank to supply diesel to an emergency generator and to a building space heater. The tank was of 2,000 gallon capacity, fiberglass and approximately 18 years old.

In 1993 the Zone 7 Water Agency decided to replace the underground tank with an above ground tank. The underground tank was not thought to be leaking. A precision leak test was performed on the underground tank in April 1993. The tank and piping successfully passed the precision test. There was no unexplained product loss based on inventory monitoring.

Based on fuel delivery records it appears that product throughput was approximately 10,000 gallons per year. An average of 12 product deliveries per year were recorded. More deliveries took place during the winter months than during the summer.

The underground tank was removed on December 21, 1993. No visual holes or cracks were noted in the tank or piping. Two soil samples (SS-1 & SN-2) were obtained from the tank pit bottom at 9 feet below ground surface (BGS). A diesel odor and staining were noted in soil obtained from the north end of the tank pit.

Both tank pit bottom soil samples contained detectable concentrations of diesel fuel contaminants. In an attempt at remediation, 80 yd^3 of soil was overexcavated from the tank pit. One soil sample (S-1) was collected from the bottom of the overexcavation at 16 feet BGS. S-1 also contained a detectable concentration of TPH-diesel (75 PPM).

The tank excavation has now been backfilled with clean imported soil. An above ground diesel tank has been installed near where the former underground tank was located.

2.0 SITE CHARACTERISTICS

In this Section, physical site characteristics pertinent to the proposed site investigation are presented.

2.1 Topography and Surface Runoff

The Del Valle Water Treatment facility location is indicated on Figure 1. The site is within Alameda County and is located in the San Francisco Bay Water Quality Control Region.

The site is in the hills bordering the south side of the Livermore Valley. Site topography slopes moderately from northeast to southwest. Local topography has been modified by grading for construction of the water treatment facility. Figure 2 illustrates the site layout.

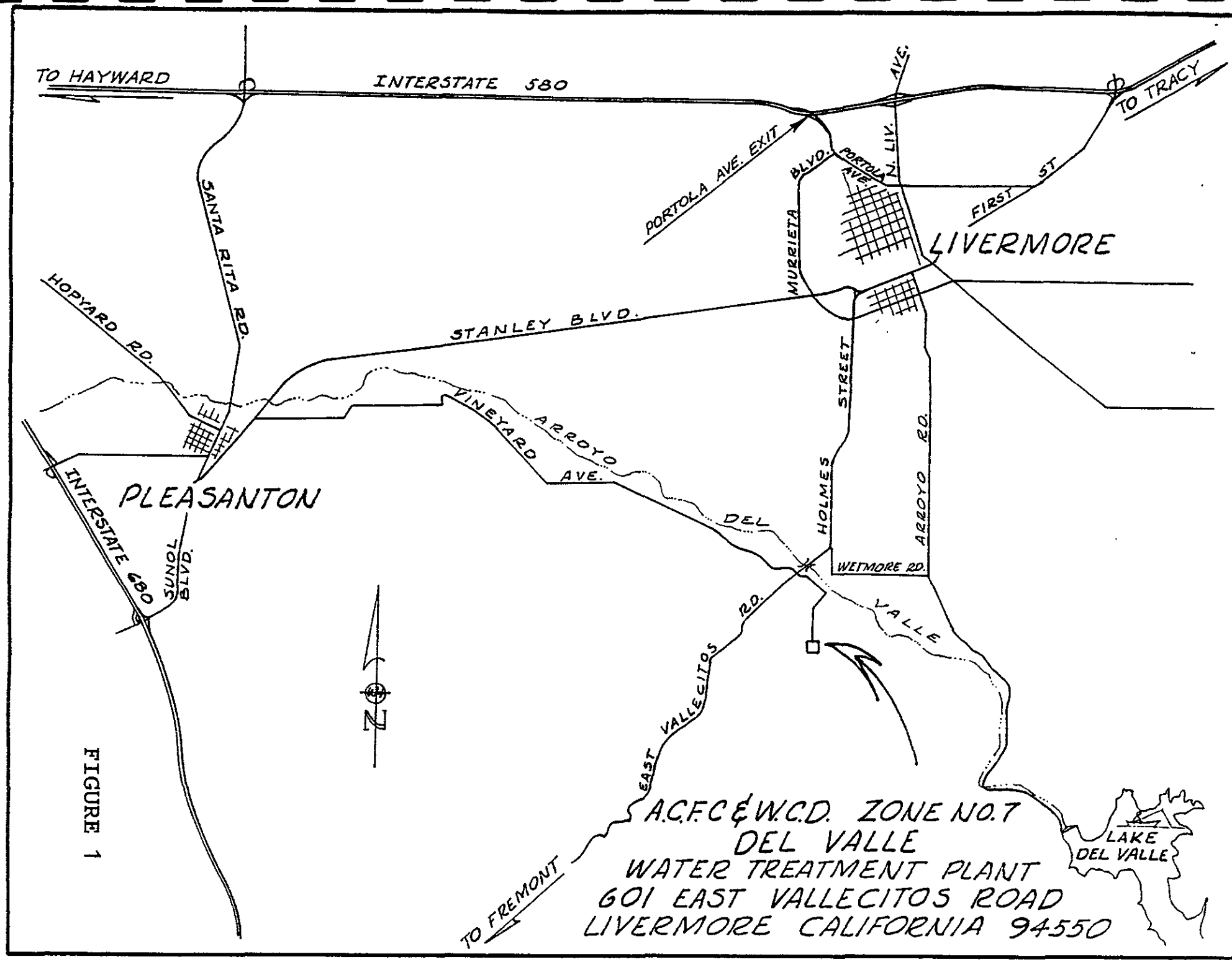

TO HAYWARD
INTERSTATE 580
TO TRACY
PORTOLA AVE. EXIT
PORTOLA AVE.
N. LIV. AVE.
FIRST ST
LIVERMORE
MURRIETA BLVD.
SANTA RITA RD.
HOPYARD RD.
STANLEY BLVD.
LEE
VINEYARD AVE.
ARROYO DEL VALLE
HOLMES STREET
ARROYO RD.
WETMORE RD.
PLEASANTON
INTERSTATE 680
SUNOL BLVD.
EAST VALLECITOS RD.
TO FREMONT
LAKE DEL VALLE
A.C.F.C.&W.C.D. ZONE NO.7
DEL VALLE
WATER TREATMENT PLANT
601 EAST VALLECITOS ROAD
LIVERMORE CALIFORNIA 94550

FIGURE 1

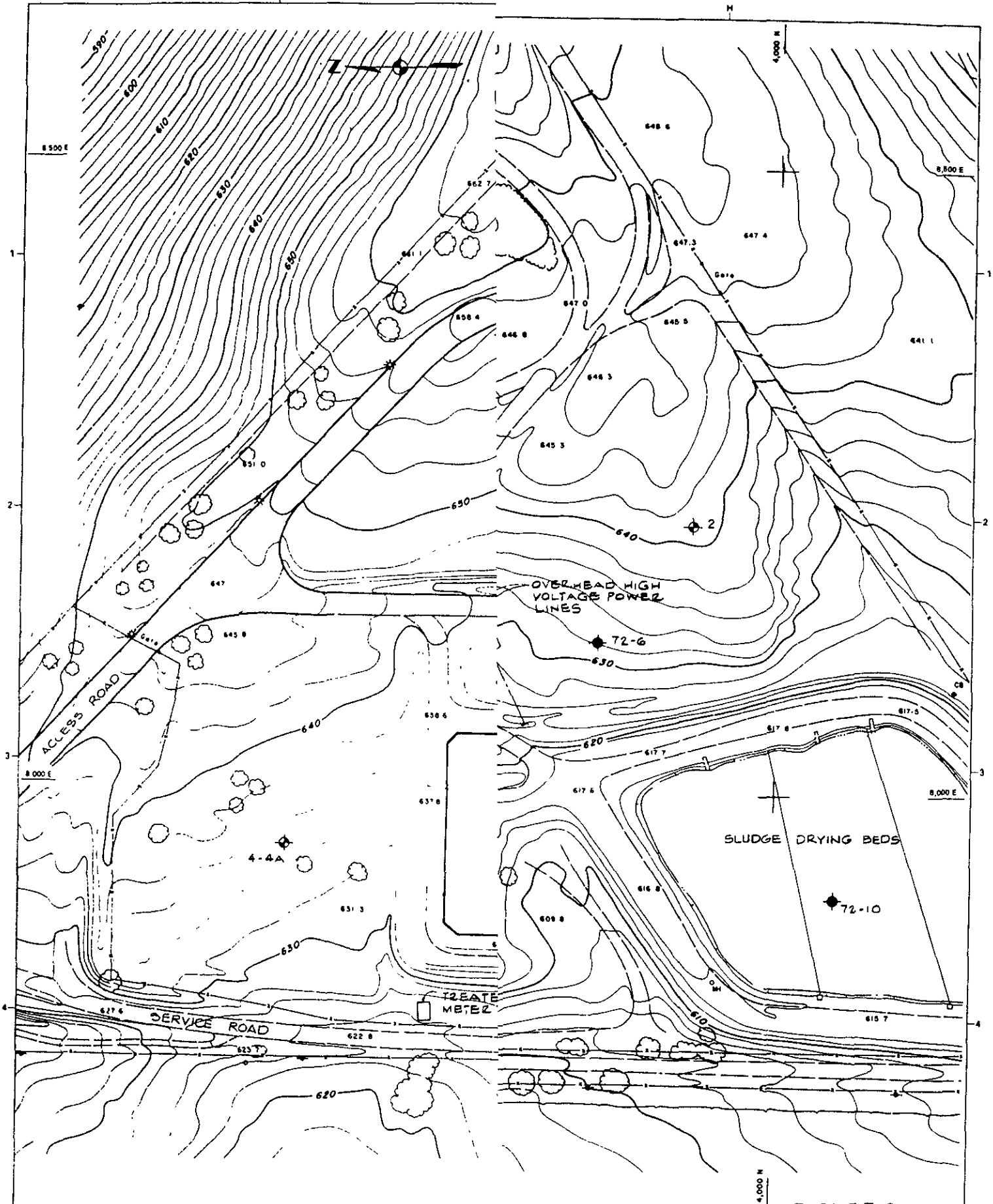


FIGURE 2

Revised	Description	Submit	Appr'd	Date

Refer to Tracing for Latest Revision

Reference Information and
GRID IS BASED ON CALIFO
FIELD SURVEY CONTROL B
ELEVATIONS ARE BASED O
SCALE 1"=50' CONTOUR IN
DATE OF PHOTOGRAPHY J
2. FOR ADDITION
ORIGINAL PLA
1977, AND THE
OFFICES.

Del Valle Water Treatment Plant Expansion

EXISTING SITE PLAN
SOIL BORING LOCATION

Scale	1"=50'
Job No	870143
Sheet	C-1
FILE No	CC 42

The site is in a rural area. Surrounding land use includes a vineyard and grazing land. High voltage transmission line right of ways bisect the locality.

Drainage in and around the project site has been modified to promote runoff around water detention basins and buildings. Storm water eventually drains to Arroyo Del Valle and thence to Alameda Creek and the Bay.

2.2 Soils

In 1972 a geotechnical investigation[1] was performed at the site as a part of the facility design process. In the course of the geotechnical investigation, ten soils borings were completed. Two borings (No. 4 & 5) were close to the former underground diesel tank location (50 & 150 feet, respectively). The location of geotechnical borings No. 4 & 5 are indicated on Figure 2 (coded 72-4 & 72-5).

The following description of site soils is excerpted from the Woodward-Lundgren report:

> "The upper 1 to 2 feet of surface soils are medium dense dry gravelly silts, then very stiff to hard gravelly clays to dense coarse sandy silty gravels."
>
> "The permeability of the on-site soils is probably about 10^{-3} to 10^{-4} cm/sec, and all soils have a balanced clay, silt and sand content."

Boring No. 4 was advanced to 20.5 feet BGS and No. 5 to 41 feet BGS. Copies of the boring logs for borings 4 & 5 appear as Figures 3 & 4.

2.3 Hydrology

Hydrology at the site is influenced by percolation from the facility sludge drying beds. A series of de-watering wells have been installed downgradient from the sludge drying beds to maintain groundwater levels below the root zone of the adjacent vineyard.

The former underground tank site is 25 vertical feet upslope from the sludge drying beds. No groundwater was encountered at 41 feet BGS during the 1972 geotechnical investigation (boring 5). No groundwater was encountered at 16 feet BGS in the tank excavation during the tank removal in 1993.

It is assumed that groundwater flow is essentially in conformance with surface topography except where influenced by percolation from the sludge drying beds.

[1] "Soil Investigation for the Proposed Del Valle Water Treatment Plant" Woodward-Lundgren Associates, Oakland, 1973

Project:
DEL VALLE WATER TREATMENT PLANT

Log of Boring No. 4

Date Drilled: 8-25-72 & 8-27-72 Hammer Weight: 140 Lbs.

Type of Boring: 6" AUGER Remarks:

Depth, Ft	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
			Surface Elevation:			
	1	23	SILTY CLAY VERY STIFF, DRY, BROWN-GRAY DAMP	15	112	15,930
5	2	52	CLAYEY GRAVEL DENSE, DRY, GRAY-BROWN SILTY GRAVEL	3	126	
10	3	60	SAND & GRAVEL DENSE, DRY, BROWN SILTY	3	119	
15	4	80				
			CLAYEY GRAVEL VERY DENSE, MOIST, BROWN			
20	5	100+				
			Bottom of Hole @ 20.5', Dry			

Job No S-12669 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 3

Project:
DEL VALLE WATER TREATMENT PLANT

Log of Boring No. 5

Date Drilled: 8-25-72
Type of Boring: 6" AUGER
Hammer Weight: 140 Lbs.
Remarks:

Depth, Ft	Samples	Blows/Ft.	DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
			Surface Elevation:			
			FINE SANDY SILT MEDIUM DENSE, DRY, BROWN			
	1	62	CLAYEY SILT DENSE, DRY TO DAMP, BROWN, WITH TRACES OF GRAVEL	7	115	5485
5			CLAYEY GRAVEL DENSE, DAMP, BROWN			
	2	96	VERY DENSE	5	134	5975
10						
	3	80	MOIST	9	127	2965
15						
	4	57	CLAYSTONE DENSE, DAMP TO MOIST, OLIVE-GRAY	23	106	10,160
20			SILTSTONE VERY DENSE, DAMP, GRAY TO OLIVE-GRAY			
	5	72		23	106	10,770

Job No S-12669 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 4

DEL VALLE WATER TREATMENT PLANT

Log of Boring No. 5

Samples	Blows/Ft	DESCRIPTION (CONTINUED:)	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength, psf
		CLAYSTONE			
6	56	DENSE, DAMP, OLIVE-GRAY	25	103	11,255
7	80		22	107	8330
8	48	SILTY SANDSTONE	24	103	4225
		BOTTOM OF HOLE @ 41', DRY			

Job No. S-12669 | WOODWARD-LUNDGREN & ASSOCIATES | Figure 4 (CONT.)

3.0 CONTAMINANT PROFILE

3.1 Soil

Three soil samples were collected from the former underground tank excavation. In addition, two soil samples were collected from the soil stockpile. Figure 5 illustrates the pit soil sample locations. Table 1 summarizes all soil sample analytical results.

TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS
DIESEL TANK REMOVAL - DECEMBER 1993

should be: north end, south end, south end

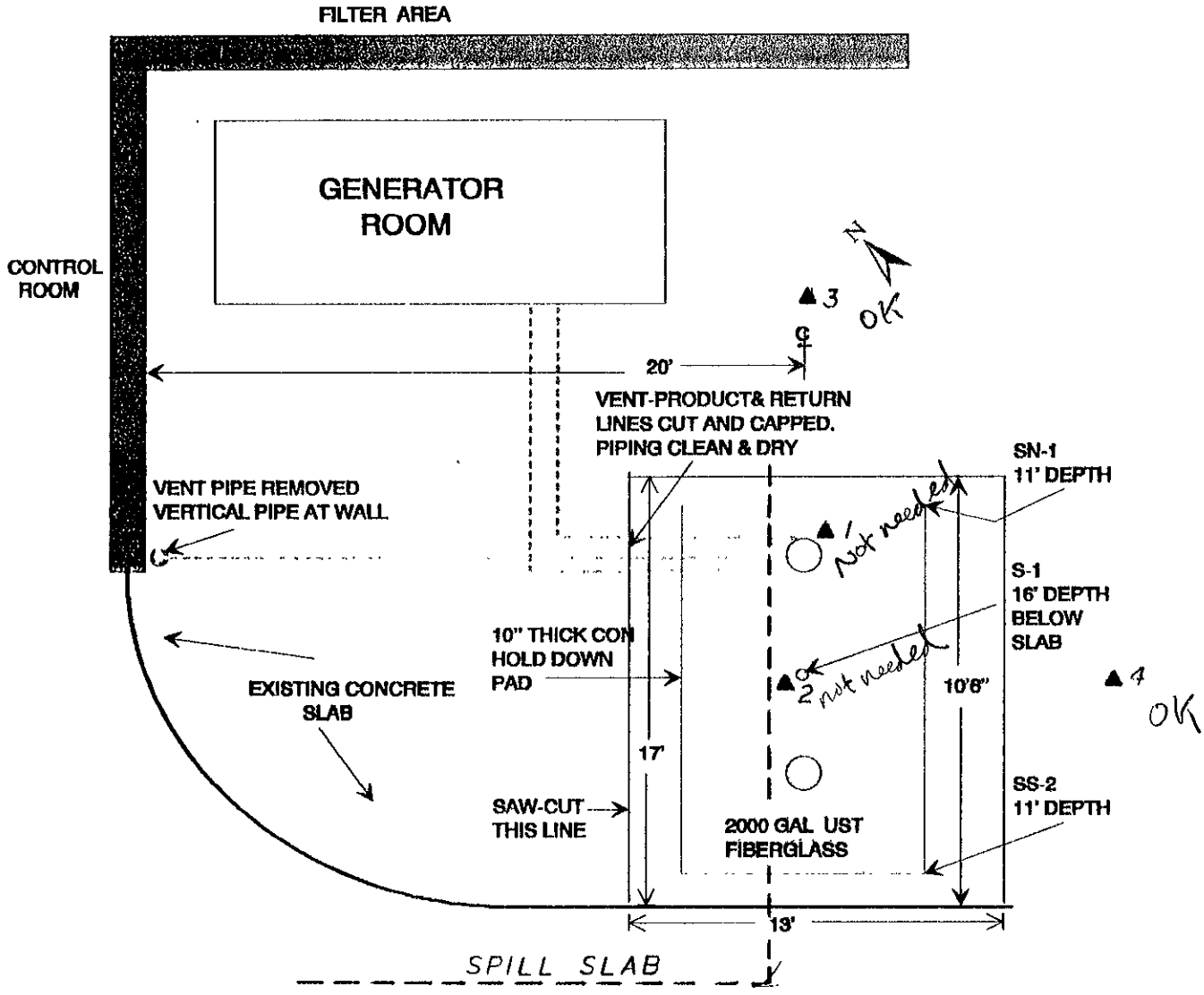
Soil sample	STP-1	STP-2	SS-1	SN-2	S-1
location	stock pile	stock pile	South end of tank	North end of tank	North end of tank
depth	6"	6"	11'bgs	11'bgs	16'bgs
TPH D	5.3ppm	6.3ppm	2.5ppm	120ppm	75ppm
Benzene	N.D.	N.D.	N.D.	N.D.	N.D.
Toluene	11ppb	N.D.	N.D.	27ppb	N.D.
Ethyl Benzene	N.D.	N.D.	N.D.	N.D.	N.D.
Xylene	N.D.	N.D.	N.D.	N.D.	N.D.
method detect limit	TPH D 1ppm BTEX 5ppb	TPH D 1ppm BTEX 5ppb	TPH D 1ppm BTEX 5ppb	TPH D 1ppm BTEX 5ppb	TPH D 1ppm BTEX 5ppb
date of sampling	12-21-93	12-21-93	12-21-93	12-21-93	01-03-94
date of extract	12-21-93	12-21-93	12-21-93	12-21-93	01-04-94
date of analysis	12-21-93	12-21-93	12-21-93	12-21-93	01-04-94

N.D. = Non-detect

All five soil samples contained detectable concentrations of diesel contaminants. Highest concentrations were found at the north end of the excavation. Between 11 feet BGS and 16 feet BGS, TPH diesel concentrations attenuated from 120 PPM to 75 PPM.

3.2 Groundwater

At present, there is no known impact to groundwater. No samples for chemical analysis have ever been collected either from the existing de-watering or monitoring wells. The depth to groundwater under the former underground tank is unknown.



ZONE 7 WATER AGENCY

▲5 OK

PROJECT LAYOUT & SOIL SAMPLING LOCATIONS

PROJECT # 35458 601 EAST VALLECITOS ROAD
LIVERMORE, CALIF. 94550

NOTE ; FINAL EXCAVATION DIMENTIONS 13' W / 17' L /15' D

▲ PROPOSED BORINGS

FIGURE 5

ZONE 7DRW

4.0 PROPOSED SITE INVESTIGATION

In this Section, proposed action to further investigate known contamination at the former underground diesel tank site is presented.

4.1 Soil

Residual soil contamination is present at the bottom and possibly on the sides of the former underground tank excavation. Further site investigation is proposed to fully define the extent and magnitude of contamination.

Objectives

- Define the lateral and vertical extent of soil contamination
- Acquire data to design an effective and efficient remediation project

Scope

- Complete soils borings and associated soil sampling
- Analyze soil samples in a DHS certified testing laboratory
- Abandon borings

Approach

It is intended to complete at least five soils borings in and around the former underground diesel tank excavation. Figure 5 illustrates the proposed boring locations.

Due to the presence of the spill containment slab constructed for the new above ground fuel tank, it will be necessary to drill proposed boring No. 2 on a slant. Proposed borings No. 1, 3, 4 and 5 will be vertical. → Not needed

Boring No. 1 is intended to penetrate through the north end of the former tank excavation where soil concentrations of 120 PPM and 75 PPM were previously measured. First sampling will occur upon reaching undisturbed soil at 16 feet BGS. The boring will be continuously sampled from that point downward until: 1) soil contamination is apparently absent; 2) auger refusal or 3) reaching first groundwater.

Soil samples will be field screened with a PhotoVac MP 1000, photoionization meter. In the event apparent soil contamination ends before auger refusal or encountering first groundwater, a soil sample will be thereafter be collected every five feet.

Boring (1) will be eventually advanced until encountering groundwater, auger refusal or completing 20 feet of apparently clean hole below the last observed contamination. A final soil sample will be collected from the hole bottom.

want downgradient borings for this

not needed

Boring 2 is intended to investigate the west side of the former tank installation. Due to the presence of the above ground tank spill slab, it will be necessary to angle boring 2 through the top of the former excavation. Boring 2 will be drilled so as to penetrate the former excavation sidewall at 11 feet BGS. The first sample will be collected in undisturbed soil at this point. The boring will be continuously sampled from that point onward until the absence of apparent contamination is observed. Boring 2 will be advanced until completing 5 feet of apparently clean hole below the last observed contamination. A final soil sample will be collected from the hole bottom.

Borings 3, 4 and 5 will be sited 5 feet laterally from the east, south and north sides of the former tank excavation. Borings 3, 4 and 5 will be drilled entirely through native soil, consequently it is proposed to collect soil samples at 5 foot intervals. If obvious soil contamination is encountered in any boring, the boring will be continuously sampled until the absence of apparent contamination is observed. Borings 3, 4 and 5 will be advanced to a depth of 20 feet BGS if no apparent contamination is encountered. If soil contamination is observed, the boring will be advanced at least 5 feet beyond the absence of apparent contamination. Boring 5 to be advanced (continuous core) to 50' to verify DTW. GW grab sample to be collected if encountered.

In the event serious contamination is encountered in any of the borings sited laterally from the former excavation, additional boring(s) will be sited further from the former tank location. It is the intent of this investigative effort to completely define the lateral and vertical extent of soil contamination.

Soil samples will be selected for submittal to the testing laboratory based on results of field screening. At a minimum, two soil samples from each boring will be submitted for analysis.

It is intended to complete all borings utilizing a powered, continuous flight, hollow stem auger drill rig. Undisturbed soil samples will be collected using a split spoon sampler fitted with new brass inserts. Drilling and soil sampling specifications will comply with State Water Board and Tri-Regional Board Staff Recommendations For Preliminary Evaluation and Investigation of Underground Tank Sites. Drilling and sampling specifications are presented in the appendix section: SOIL BORINGS AND SAMPLING.

All soil samples will be sealed, labeled, chilled and entered on a chain of custody form as specified in the appendix section: SOIL BORINGS AND SAMPLING. Soil samples will be hand carried to a DHS certified laboratory for analytical testing. Each sample will be discreetly analyzed for TPH-diesel and BTXE by EPA method 8260, GC/MS. Soil w/ obvious contamination should be analyzed for PNAs

All borings will be permitted in accordance with prevailing Alameda County and/or Alameda County Flood Control District regulations. Soil cuttings will be containerized, labeled and stored on-site pending receipt of laboratory analysis and arrangements for proper disposal. Each boring will be abandoned at the conclusion of soil sampling by filling with hydrated bentonite hole plug.

4.2 Groundwater

There is no evidence of impact to groundwater from the former diesel tank. In this Section, proposed measures to assess the possible impact to groundwater from known soil contamination are presented.

Objectives

- Assess the potential for impact to groundwater from existing soil contamination

Scope

- Determine the proximity to first groundwater under the former underground tank location
- Determine the proximity and concentration of soil contamination to groundwater
- Collect a groundwater sample from existing de-watering well 1+00

Approach

In the previous Section (4.1) specifications for at least one deep soil boring (No. 5~~1~~) were presented. Boring 5~~1~~ will be advanced until first groundwater is encountered, auger refusal, or 3~~0~~0 feet of clean hole under the contaminated zone is completed. In the case of the latter two situations, it will be concluded that there has been no impact to groundwater due to the diesel release. If groundwater is encountered, a potential for contamination may exist.

The boring logs for geotechnical borings 4 & 5 (Section 2.2) indicate permeable soils to approximately 20 feet BGS. Below 20 feet BGS, dense claystone was reported. This unit may have acted as a barrier to vertical contaminant migration, however there was apparently no problem drilling or sampling in this material. At 41 feet BGS a silty sandstone material was encountered. The thickness of this unit is unknown.

Although no groundwater was encountered at 41 feet BGS at geotechnical boring location No. 5 in 1972, since then percolation from the sludge drying beds may have resulted in a groundwater rise under the former underground tank location. The potential for impact to groundwater will depend on the vertical migration of contamination and the current depth to first groundwater.

It is proposed to collect a groundwater sample from existing de-watering well 1+00. The location of de-watering well 1+00 is indicated on Figure 2. Not necessary - too far away.

De-watering well 1+00 is the closest groundwater sampling point to the former underground tank location. Well 1+00 is screened from 25 feet to 45 feet BGS. A float actuated pump within well 1+00 maintains the top of the saturated zone within the well screen length.

Groundwater sample collection will be performed by lowering a new, disposable, plastic bailer into the well. The groundwater sample will be transferred to a laboratory supplied sample vial containing a suitable preservative. The sample will be labeled, entered on a chain of custody, chilled and hand carried to the testing laboratory. Analysis for TPH-diesel & BTXE will be by EPA method 8260. Minimum detection limits will be within Tri-Regional Board guidelines.

5.0 REPORT OF FINDINGS

Within 60 days of completing site investigation field work, a written report of findings will be submitted to the Alameda County Health Care Agency and the San Francisco Bay Regional Water Quality Control Board. The report shall include:

- Executive summary
- List of acknowledgements
- Table of contents
- Site status
- Site history
- Location map
- Description of site characteristics
- Boring logs
- Analytical data (including original laboratory report forms)
- Geologic cross sections
- Remedial proposals
- Recommendations

6.0 HEALTH & SAFETY PLAN

During the site investigation it is proposed to implement measures to protect workers, the public and the environment from injury or contamination. Health & Safety measures are described in the following Sections.

6.1 Health & Safety Procedures

Objectives

- Protect workers from injury
- Prevent workers, employees or the public from contacting hazardous materials
- Prevent contaminants from entering the environment

Site Safety Officer

A designated site safety officer shall be on-duty during all work activity. The site safety officer shall have completed Hazardous Waste Supervisor, 8 hour training and Hazardous Waste Worker, 40 hour training as defined by OSHA regulation 1910.120.

The site safety officer shall keep a copy of the health & safety plan at the site. The site safety officer shall ensure that all persons at the work site have read and understood the site safety plan. A bound log book available for inspection by regulatory personnel shall be maintained at the site by the safety officer.

The site safety officer shall have a battery powered cellular phone on site at all times. As a backup, the safety officer shall have access to a land line phone in the treatment plant. In the event of emergency, assistance is summoned by dialing 911. The closest responder is:

- Livermore Fire Department

The nearest location for medical assistance is:

- Valley Memorial Hospital
  1111 East Stanley Blvd.
  Livermore (510) 447-7000

Hazard Assessment - Physical

The principal hazard associated with the proposed work involves operation of a mobile, hollow stem rotary, drill rig. No excavation or earth moving work is proposed.

Potential hazards include drilling into underground utilities, coming into contact with rotating equipment, falling objects and heavy lifting.

Health & Safety Measures - Physical

The possibility of accidental damage through contact with underground utilities will be minimized by diligently locating all known sub-surface structures before drilling. A low drill torque setting will be used through the upper 5 feet of soil to reduce the threat of utility damage.

The area immediately around the drill rig will be physically cordoned by a combination of barriers and caution tape. The site safety officer shall be responsible for establishing the exclusion zone and for prohibiting entry to unauthorized persons.

All personnel working inside the exclusion zone will be equipped with sturdy, steel toed, footwear; eye protection; protective outer clothing; hearing protection; hard hat; suitable respiratory protection and gloves. Based on the work activity underway, the site safety officer will advise personnel regarding mandatory use of any piece of protective equipment.

Hazard Assessment - Chemical

The following chemical compounds are known to be on site:

- Petroleum Hydrocarbons
- Volatile Aromatics (toluene)

Personnel may come into contact with these compounds either through inhalation or dermal contact. Ingestion exposure is not possible since eating, drinking and smoking are prohibited in the exclusion area.

Health & Safety Measures - Chemical

All personnel authorized to enter the exclusion zone shall have completed 40 hour health & safety training for hazardous waste workers as defined by OSHA regulation 1910.120. All personnel shall be current with regard to annual 8 hour hazardous waste health & safety training refresher courses.

Air monitoring will be continuously conducted while work activities are underway. A wind speed and direction indicator will be placed in a clearly visible location. Air monitoring will be performed downwind from the boring location using a PhotoVac MP 1000 Photoionization detector (PID). The PID will be calibrated at the start of each work day.

The PID alarm shall be set to 300 PPM total volatiles. If the ambient air concentration exceeds that limit, work will either be stopped until the ambient concentration falls below 300 PPM or respiratory protection will be used.

Each worker within the exclusion zone shall have a properly fitted half face respirator equipped with organic filter cartridges. One spare pack of organic filter cartridges per worker shall be available on site if sub-surface work is underway.

Dermal contact with hazardous chemicals shall be prevented by the use of protective clothing. Workers shall be equipped with tyvex overalls and disposable vinyl gloves. Spare overalls and gloves shall be available on-site while sub-surface work activities are underway.

6.2 Environmental Protection

Contaminated material shall be isolated from the environment. Drill cuttings shall be immediately placed in DOT approved open top 55 gallon drums. Full drums shall be sealed, labeled (contents, generator name/address and date) and relocated to a secure, temporary on-site storage area.

All decontamination water shall be considered hazardous. Decon water shall be collected in a containment area. Decon water will be periodically transferred to properly labeled 55 gallon drums for temporary on-site storage.

Residue samples will be collected and analyzed in order to arrange for legal disposal. All resides will be transported to proper disposal within 90 days of generation.

Additional specifications describing residue management are presented in the appendix section: EQUIPMENT DECONTAMINATION AND DISPOSAL OF CONTAMINATED MATERIALS.

SOILS BORINGS AND SAMPLING

Soil borings shall be completed through the use of a mobil, continuous flight, hollow stem, auger drill rig. The drilling sub-contractor shall have a valid California C-57 license. All borings will be supervised and logged by an engineer or geologist licensed in California.

Materials encountered during the drilling shall be described and classified by the Uniform Soil Classification System (USCS). The supervising professional shall keep a written log of all sub-surface work performed.

Borings will be advanced until reaching the saturated zone or encountering apparently clean soil. Drilling through confining layers or penetrating further than necessary into clean soil will be avoided.

Undisturbed soil samples will be collected with a hammer driven, split spoon, core sampler fitted with new, brass sleeves. The blow count for each 0.5 foot of penetration shall be recorded. Soil samples designated for chemical analysis shall be tightly capped, labeled, sealed in zip lock bags and chilled.

The number and stratigraphic position of soil samples will be selected to adequately define the magnitude and distribution of contamination. Samples will be collected at marked changes in lithography, at the capillary fringe and at the hole bottom.

All borings will be abandoned as soon as possible. Abandonment will be by placement of bentonite hole plug, hydrated with clean water, or pre-mixed bentonite grout. Borings in pavement shall be capped with asphalt or concrete.

All boring locations shall be plotted on a site plan. Horizontal control accuracy shall be at least 0.10 feet.

SAMPLE QUALITY ASSURANCE/QUALITY CONTROL

Sample quality will be checked by the use of proper sampling, handling and testing methods. Examples of quality control methods are use of background samples, equipment rinse samples, and trip and field blanks. Chain of custody forms, use of a DHS certified laboratory, acceptable detection limits and proper sample preservation and holding times also provide assurance of accurate analytical data.

Background Samples

Procedures and methods used to obtain, handle, prepare, transport and analyze background samples will be identical to those used for site samples. Background samples will be used to define conditions at the site before the unauthorized release.

An equipment rinse sample will be utilized to detect residual contamination on sampling apparatus. Sampling equipment will be filled with distilled water which will then be transferred to a sample container.

Sample blanks will be used to check for cross-contamination during sample collection, transport and in the laboratory. Two types of sample blanks will be utilized; trip blanks will be used to verify handling, storage and shipment conditions, field blanks will be used to confirm site conditions.

Trip blanks will either be prepared by the analytical laboratory or the responsible professional before traveling to the work site.

One trip blank will be used for each sample set of 20 or less samples. At least 5% trip blanks will be used for sets greater than 20 samples. Trip blanks will remain with the collected samples during transportation and will be analyzed with the field samples to check for any introduced contamination. Trip blanks will not be opened by either the sample collectors or handlers.

Field blank water samples will be opened and exposed at the sampling site to detect contamination from air exposure. The sample will be poured into the sample container to simulate actual sampling conditions.

Chain of Custody Forms

A chain of custody form will be generated for all site samples. The form will accompany the samples from the time of generation to time of analysis. Originals will be retained even if illegibility or inaccuracies require preparation of a replacement. Any corrections will be initialed and dated. Copies will be retained by the supervising professional.

A sample chain of custody form is depicted in the figure on the next page. The site name, collector signature, date and time of collection will always appear. The number and condition of containers, description of samples and sample identification numbers will also be included. The name and signature of all individuals, with inclusive dates of possession, will be recorded.

State Certified Laboratories

All soil and water samples will be analyzed by a commercial laboratory certified by the California Department of Health Services for the intended analysis. Documentation of certification will be presented in all reports containing analytical results.

Detection Limits

Minimum detection limits for analytical procedures are:

COMPOUND	WATER (ppb)	SOIL (ppb)	METHOD*
Benzene	0.3	5.0	EPA 602/8020
Toluene	0.3	5.0	EPA 602/8020
Xylenes (Total)	0.3	5.0	EPA 602/8020
Total Petroleum Hydrocarbons	500.0	1,000.0	DHS mod. 8015 (GC-FID)

* Alternatively, EPA method 8260, Fuel Fingerprint by one-pass mass spectrometry may be substituted.

Sample Preservation and Holding Time

PARAMETER	MATRIX	CONTAINER	HOLDING TIME	PRESERVATION
TPH	Soil	3" stainless or brass cylinder	14 days	Frozen
	Water		40 days	4°C
BTXE	Soil	40ml glass vial teflon faced silicon septum	14 days	4°C
	Water		40 days	4°C
Organic Lead	Soil	3" SS or brass cylinder	14 days	Frozen
	Water	40ml glass vial	4 days	4°C

COAST - TO - COAST ANALYTICAL SERVICES

141 Suburban Road • San Luis Obispo, CA 93401 • (805) 543-2553 FAX (805) 543-2685
751 S. Kellogg, Suite A • Goleta, CA 93117 • (805) 964-7838 FAX (805) 967-4386
6006 Egret Ct. • Benicia, CA 94510 • (707) 747-2757 FAX (707) 747-2765
2400 Cumberland Dr. • Valparaiso, Indiana 46383 • (219) 464-2389 FAX (219) 462-2953

Chain of Custody

Page _____ of _____

• PLEASE PRINT IN PEN

Client West & Hansen	Contact Brian W. West	Phone # (707) 451-1360	FAX # ( )
Address 112 Pepperell Court	City Vacaville	State CA	Zip 95688
Project Name/Number		Project MGR Brian West	
Bill (If different than above)	Address		
Sampler (Print and sign)	Due Date	Circle for RUSH*	Copies To: Auth. Init.

* Subject to Availability

Sample Description	Date/Time Coll'd	*Matrix	# of Containers	Pres.	Filt. y/n	Analysis	Remarks	Lab ID #

Relinquished By	Date/Time	Received By	Relinquished By	Date/Time	Received By

FOR LAB USE ONLY

Shipping Method	Shipping #	Received By	Date/Time	Condition (See Remarks) Cold	Sealed	Intact

REMARKS _____

* **Matrix:**
DW - Drinking Water
WW - Wastewater
GW - Groundwater
SW - Surface Water
IM - Impinger
FI - Filter
FP - Free Product
A/G - Air/Gas
SL - Sludge/Soil/Solid
OT - Other _____

ORIGINAL

EQUIPMENT DECONTAMINATION
AND
DISPOSAL OF CONTAMINATED MATERIAL

Decontamination

All downhole tools and equipment will be decontaminated prior to use at each sample location. Most site equipment will be decontaminated using a portable steam cleaner. Equipment or materials not suitable for high temperature cleaning will be decontaminated utilizing a USEPA Region IX recommended method.

All downhole equipment or other tools, supplies and apparatus coming into contact with potentially contaminated material shall be decontaminated prior to transport off site.

Categorization and Disposal

All excavated soil, drill cuttings, generated fluids, equipment rinsate and contaminated disposable supplies will be containerized onsite until demonstrated to be nonhazardous or designated for proper treatment or disposal. Obviously contaminated material will be segregated from apparently clean material to avoid cross contamination.

Material in each container will be logged as to type and point of origin to facilitate proper categorization. Additional sampling will be performed as necessary to classify each lot.

All regulated material will be manifested and transported to proper disposal as required by law. Material verified non-hazardous will be dispensed with in an appropriate manner.