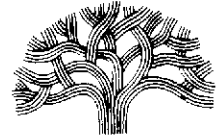




ENVIRONMENTAL HEALTH
PROTECTION
CITY OF OAKLAND



98 FEB 20 PM 2: 56

ENVIRONMENTAL SERVICES • 1333 BROADWAY, SUITE 330A • OAKLAND, CALIFORNIA 94612

Public Works Agency

(510) 238-6688
FAX (510) 238-7286
TDD (510) 238-7644

February 19, 1998

Mr. Barney Chan
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Subject: Workplan - City of Oakland Municipal Service Center (94407)

Dear Barney:

Enclosed is one copy of the workplan prepared by our consultant, DOVE Engineering Group, Inc., for investigation and remediation of soil and groundwater at the City of Oakland's Municipal Service Center at 7101 Edgewater Drive.

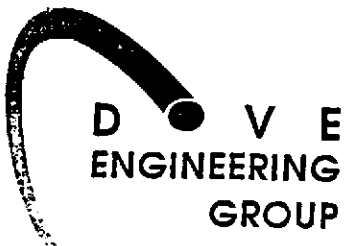
Please call me at 238-7695, if you have any questions or require additional information.

Sincerely,

A handwritten signature in cursive script that reads "Mark B. Hersh".

Mark B. Hersh
Environmental Program Specialist

cc: (w/o enclosure)
Andrew Clark-Clough
Chris Palmer, DOVE



WORKPLAN

**CITY OF OAKLAND
Municipal Service Center**

Oakland, California

Prepared for

**Mark Hersh
City of Oakland Public Works Agency
Environmental Services Division**

Prepared by

Dove Engineering Group, Inc.

1/20/98

Christopher M. Palmer Date: 1/20/98

Christopher M. Palmer
MSC Project Manager
Certified Engineering Geologist
No. 1262

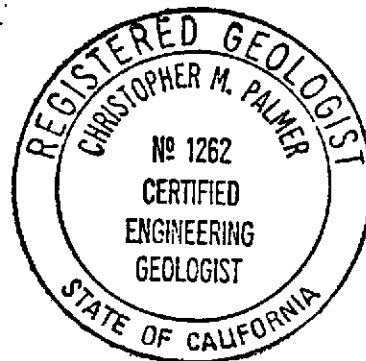


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1.0 INTRODUCTION

Dove Engineering Group, Inc. (DEGI) has prepared this workplan for the City of Oakland, Public Works Agency's Municipal Services Center (MSC) located at 7101 Edgewater Drive, Oakland, California (see Figure 1). This workplan presents seven proposed tasks addressing underground fuel storage tank (UST) and pipeline removal, human health and ecological risk assessment and the monitoring and remediation of petroleum hydrocarbons in soil and groundwater. The Alameda County Health Care Services Agency (ACHCSA) provides regulatory oversight for this site.

2.0 BACKGROUND

The suspected sources of the petroleum hydrocarbon contamination include USTs, fuel distribution pipeline system and waste oil sumps. Initially, fourteen USTs and related piping were located on-site. **Currently three UST remain in use and are scheduled to be upgraded to comply with the December 22, 1998 USTs upgrade deadline. The inactive fuel distribution pipeline located in the northwestern portion of the site, is tentatively scheduled for removal in Spring 1998.** The sumps that were historically used for waste oil collection were located in the vicinity of Building 5 (see Figure 1).

Previous site work performed since 1989 has included UST removals and site assessment for soil and groundwater contamination (see References). Currently, ten groundwater monitoring wells exist on-and off-site and forty-six exploratory soil borings have been drilled for subsurface investigation and sample collection. The data collected to date shows that capillary fringe and groundwater contamination exist primarily under approximately the western half of the site. **Separate phase product has been observed at former USTs 1, 2, 3, 4, 5 and 6, and selected soil boring locations in the vicinity of the former fuel distribution pipelines and active USTs 7, 8, 9.** Some contaminated soil and groundwater has been removed during UST removals. **Approximately 1,500 gallons of mixed groundwater and separate phase product were removed in May 1997 from the excavation at USTs 4, 5, and 6 (see Figure 1).**

The site hydrogeology consists of San Francisco Bay margin and floodplain alluvium crosscut by tidal channels with areas of artificial fill placed atop the native sediment. The fill was emplaced in several phases from 1945 through 1973 and consists primarily of gravelly clay, however fill composition appears to vary vertically and laterally across the site. Previous groundwater monitoring indicates that groundwater flow appears to be influenced by the presence of buried channels and daily tides. Groundwater generally flows westerly and northerly toward Damon Slough and San Leandro Channel. The groundwater measurement data indicates about 0.5 foot of daily tidal fluctuation and local groundwater flow direction may vary greatly.

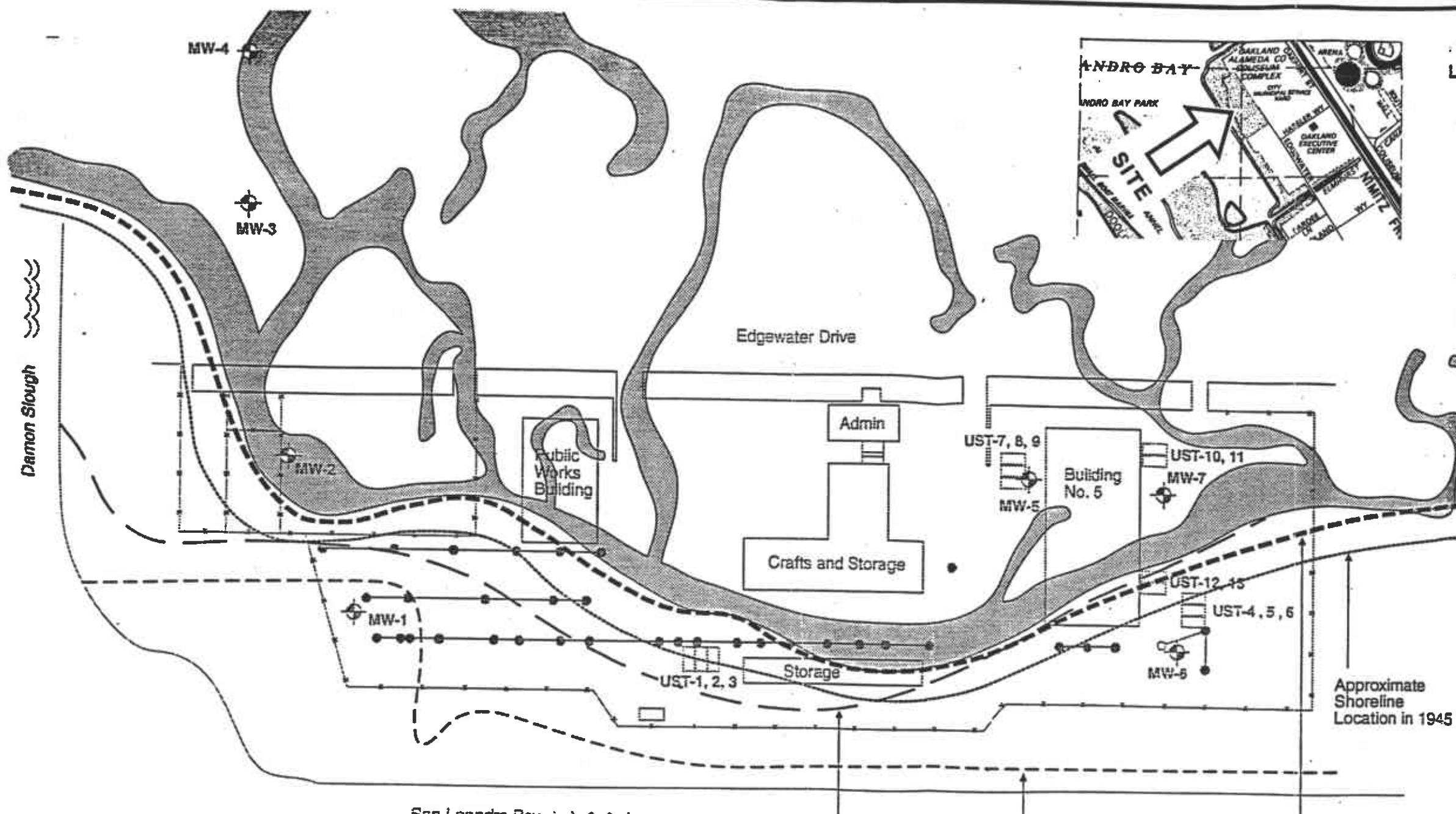
3.0 TECHNICAL APPROACH

The purpose of this workplan is to: a) review and assess the investigative information collected to date, b) present recommended tasks for completing site characterization and c) formulate a cleanup plan and a risk management plan for the site. This site poses unique problems given the proximity to the Bay fringe and the need of the City for future use of the property.

The following proposed work task items have been developed:

- (1) address overall issues of site groundwater monitoring compliance,
- (2) evaluation of the existing data to assess completeness of the site investigation,
- (3) field support for UST and pipeline removal,
- (4) possible product recovery approaches,
- (5) a risk based management strategy for site cleanup and attaining site closure (see Figures 1 and 2),
- (6) preparing and implementing remedial action needed to assist the City in achieving site closure
- (7) overall project management of ongoing activities including monitoring, operation and maintenance for cleanup implementation.

These proposed work tasks are discussed in 4.0.



- LEGEND**
- MW-1 Approximate Monitoring Well Location
 - Valve Box
 - Fueling Stations and Pipeline
 - Approximate UST Location (Sources: 3 and 4)
 - Predevelopment Shoreline
 - Dike Location
 - Tidal/Stream Channel

Damon Slough

Edgewater Drive

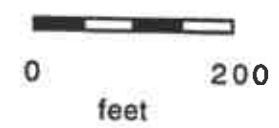
Public Works Building

Admin

Building No. 5

Crafts and Storage

Storage



Note: Base map compiled by Woodward Clyde Asso., proj. no. 92C0414A, 1995 showing predevelopment tidal/stream channels.



Site Map
 City of Oakland
 Municipal Service Center
 7101 Edgewater Avenue
 Oakland, CA

Scale: 1" = 200'
 Date: Sept., 1997

Figure 1

o Do we need additional MW's near MW 1,2,3,

4.0 PROPOSED WORK TASKS

4.1 Task 1. Monitoring Well Sampling

DEGI has reviewed the previous groundwater correspondence from the ACHCSA for modifying the current monitoring schedule for MSC as approved November 7, 1997, is presented in Table 1.

Table 1. Groundwater Well Monitoring Schedule

Well	Frequency	TPHG	TPHD	Kero	M Oil	Fuel Ox.	BTEX	Cd	Cr	Pb	Ni	Zn
		5030/ 8015	3510/ 8015	3510/ 8015	3510/ 8015	8260	8020	6010	6010	6010	6010	6010
MW-1		SA	SA	--	--		SA	--	--	--	--	--
MW-2		--	SA	--	--		SA	--	--	SA	--	--
MW-5		SA	SA	SA	SA		SA	--	--	--	--	--
MW-6		SA	SA	--	--		SA	SA	SA	SA	SA	SA
MW-7		--	--	--	--		--	--	--	--	A	--
MW-8		Q	Q	Q	Q	Q	Q	--	--	--	--	--
MW-9		Q	Q	Q	Q	Q	Q	--	--	--	--	--
MW-10		Q	Q	Q	Q	Q	Q	--	--	--	--	--
Blank		Q		--	--		Q	--	--	--	--	--

-- not analyzed R - currently recommended analysis Q - Quarterly A - Annual in Feb. SA - Semi annual in February and August.

TPHG - Gasoline

Kero - Kerosene

TPHD - Diesel

M Oil - Motor Oil

Fuel Ox. - Fuel oxygenates including Methyl-tert-butyl-ether (MTBE) verified by Method 8260 unless MTBE is ND by Method 8020

BTEX - Benzene, Toluene, Ethylbenzene, Xylenes

Cd - Cadmium

Cr - Chromium

Pb - Lead

Ni - Nickel

Zn - Zinc

* TPHD, Kerosene, Motor Oil use EPA Method 3630M for silica gel cleanup.

All metals analyses are to be filtered in the laboratory.

MW-8 installed as Uribe B-35. MW-9 installed as Uribe B-39. MW-10 installed as Uribe B-44.

All monitoring wells including those not on the sampling schedule, will be sounded for total depth, depth to groundwater, presence of separate phase product and purged using the attached sampling protocol. Purge water will be stored on-site at the location designated by the City. Groundwater samples will be shipped to Chromalab, Inc. a State certified laboratory under chain-of-custody. In addition to the analytes shown in Table 1, samples from MW-1, MW-2, MW-6, MW-7 and MW-8 will be analyzed for total dissolved solids (TDS). The sample from well MW-4 will be analyzed only for chloride. In addition, selected wells will be analyzed for oxidation reduction potential by Method SM 2580B, sulfate and nitrate by EPA Method 300, and ferrous/ferric iron by EPA Method 6010 to support estimates of subsurface biologic hydrocarbon fuel degradation activity.

Logic?
- Stranched on log?

4.1.1 Reporting

A report will be prepared presenting the results from each sampling event. The report will include the field methods, data compilation, groundwater elevation contour maps, concentration maps and a brief narrative of the observed conditions during sampling.

4.1.2 Site Well Elevation Survey

An elevation survey referenced to the City of Oakland datum will be performed.

4.2 Task 2. Existing Data Evaluation

Previous site work has included removal of USTs and limited cleanup of contaminated soil and groundwater, installation of ten groundwater monitoring wells and site subsurface investigation by exploratory borings and reconnaissance groundwater sampling. The results of that work have been compiled in individual and summary consultant reports (see References).

DEGI and the project team members have performed a preliminary review of the investigation and monitoring data collected to date. These data need to be compiled, analyzed and presented in a summary format to show distribution of contaminants in soil and groundwater, historic groundwater flow trends, and the relationships of site geology, hydrogeology to artificial fill. Limited tidal measurement studies have been performed at the site. However, these measurements were collected over several days at two different times and may only partially address the extent of tidal influence. An understanding of the extent and influence of tidal effects are recommended to provide a basis for the current and future risk-based site management.

The following proposed compilation and analysis will provide a basis for judgements regarding the completeness of the site investigation, for identifying additional information needed for further assessment, and will provide information for developing site cleanup objectives (see Task 5 below):

- Compile groundwater flow maps using historic and recently collected data.
- Compile soil and groundwater contamination distribution maps.
- Prepare geologic cross sections of the site.
- Perform a tidal study using four wells, over a 100 hour duration to assess tidal influence over the site.
- Identify possible preferred contaminant pathways including tidal effects subsurface drains and subsurface media.
- Assess completeness of the site chemistry data.
- Review the recent biologic activity data analyses for evaluating effects of biodegradation on contaminants.
- Characterize the geochemical implications of tidal influence and identify "fresh water" dilution boundary.

814-
5900
Venza

Risk analysis data needs will be addressed specifically to allow additional data to be gathered as a part of the ongoing investigation and monitoring tasks (piggy-back tasks where possible). A summary report of the data review will be prepared. This report will include a site-wide assessment of site characterization completeness and identify needs for additional sampling and data collection. Thereafter, periodic groundwater monitoring reports will be provided to the City as warranted.

4.3 Task 3. Source Removal and Field Support

The anticipated projects include removal of the abandoned fuel distribution pipeline and upgrade USTs 7, 8 and 9. The field support is anticipated to include observations of the field removal activities, soil and groundwater sampling, additional analytical laboratory services, preparing letter reports of sampling and site observations.

4.3.1 Global Safety Plan Approach

A project site safety plan will be prepared for general site safety and modified as needed for individual or special tasks and/or as conditions arise to address safety during the performance of the proposed services. DEGI maintains a comprehensive Health and Safety Program which includes general policies and procedures for environmental projects. This program is supervised by a Certified Industrial Hygienist (CIH) with extensive experience with remedial action projects. Under the Health and Safety Program, DEGI develops Site Specific Health and Safety Plans (HASPs) detailing procedures necessary to protect site workers and the public.

Recommendations and requirements from following State and Federal regulatory guidelines are routinely incorporated into our HASPs:

CCR* Title 22
Identification and Listing of Hazardous Waste Div. 4, 5, Chapter 11

CCR Title 8, Sect. 5192
Hazardous Waste Operations

29 CFR* Part 1910.120
Hazardous Waste Operations and Emergency Response, Occupational Safety and Health Administration (OSHA), Occupational, Safety and Health Standards

29 CFR Part 1926
OSHA Safety and Health Regulations for Construction

40 CFR Part 261
Resource Conservation and Recovery Act (RCRA) Identification and Listing of Hazardous Waste

* CCR: California Code of Regulations, CFR: Code of Federal Regulations

4.3.2 Health and Safety Plan

Task specific HASPs will be generated by reference to the appropriate sections of the master document.

Task 1: Historical review of the site and remediation scope.

Task 2: Hazard analyses (chemical and physical).

Task 3: Remediation project task/activity hazard analyses.

Task 3: Completion of site specific HASP in accordance with the following General Outline:

- * Introduction
- * Site Hazard Evaluation
- * Site Control Measures
- * Health and Safety Training
- * Use of Safety Equipment
- * Use of Personal Protective Equipment / Action Levels
- * Internal and External Communications
- * Environmental and Personnel Air Monitoring Program
- * Automated Real Time Monitoring
- * Areas of Restricted Access
- * Standard Safety Operating Procedures
- * Emergency and Contingency Planning

4.3.3 Pipeline Removal

The abandoned fuel distribution pipeline is located in the western portion of the site (see Figure 1). The pipeline is tentatively scheduled to be removed following the rainy season (Spring 1998). An estimated 2,400 lineal feet of pipeline together with the dispensers will be removed. Soil surrounding the pipeline will be removed on a limited basis as conditions warrant. For planning purposes, it is anticipated that approximately 2-feet of soil, laterally and vertically around the pipeline will be removed. The City is preparing a bid specification for the pipeline removal. DEGI anticipates the support for this work may include soil and groundwater sampling, field observation of work and/or other tasks as assigned by the City.

4.3.4 UST Upgrade *work w/ City of Oakland*

USTs 7, 8, and 9 are located near the northeast corner of Building 5, and are currently used by the City. These tanks will be upgraded to comply with December 22, 1998 UST upgrade deadline. DEGI anticipates their support for this work may include, soil and groundwater sampling, field observation of work and tasks as assigned by the City.

4.4 Task 4 Preliminary Technical Approach for Separate Phase Hydrocarbon Removal

Separate phase hydrocarbon product has been observed in excavations during UST removal of USTs 1, 2, 3 and 4, 5, 6, and in reconnaissance soil borehole groundwater sampling. Temporary product recovery extraction wells were installed in the gravel backfill of the UST excavations for possible extraction of separate phase product at these former UST locations. *for UST area 1,283 only are these wells near (4,546)*

4.4.1 Assessment of Separate Phase Hydrocarbon from Investigation and Monitoring.

All groundwater monitoring wells and the temporary separate phase recovery wells will be sounded during the next scheduled groundwater monitoring event. Separate phase thickness will be measured, if present. These data will be compared with the observed occurrence of sheen or suspected occurrence of separate phase hydrocarbons. All the data will be compiled to draft working maps of the distribution of hydrocarbons.

Need additional SGP & MW

4.4.2 Approach for Evaluating Separate Phase Cleanup Hydrocarbon Technologies.

Based upon review of new and existing data, a preliminary screening of cleanup approach and technologies will be performed. This will include a review of active and passive approaches to separate phase recovery of the site given the site groundwater flow conditions, influence of artificial fills, and site proximity to the Bay.

4.5. Task 5. Develop Site Cleanup Objectives *meet & confer w/ RWCCB*

The purpose of this task is to develop cleanup objectives for the site using risk assessment methods. This risk evaluation will include:

- Identifying screening media concentrations (SMCs),
- Developing preliminary target concentrations (PTCs) for protection zones, based on the SMCs and potential chemical migration,
- Comparing representative site soil and groundwater concentrations in four identified protection zones (Figure 2) with the corresponding PTCs.

ecologic protection

The SMCs will be applicable published criteria for evaluating potential exposures, e.g., ASTM Risk Based Screening Levels, ambient water quality criteria, etc. The PTCs will represent media concentrations in the protection zones developed to be protective of human health and the environment. The chemicals of potential concern (COPCs), are the chemicals for which SMCs will be compiled and PTCs developed. The COPCs will only include chemicals released at the site and will not include chemicals present at background concentrations. The COPCs are expected to be limited to hydrocarbon compounds associated with fuel (gasoline and diesel) related compounds (BTEX) and lubricating and waste oil.

The SMCs and PTCs will be based on current and anticipated future land use, and will address potentially complete exposure pathways identified in a conceptual site model (described below). SMC selection and PTC development will be consistent with the American Society for Testing and Materials' (ASTM) 1995 *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Site*, and the Urban Land Redevelopment Program (ULRP) being developed by the City of Oakland. Separate stepwise processes will be used to address protection of human health and the environment. The first steps (Level 1) in each will use simple, conservative generalizations. Site soil or groundwater concentrations exceeding one or more of the pertinent PTCs may warrant further action. If representative soil or groundwater concentrations at the site exceed the PTCs, additional steps (Level 2, 3, etc.) may be taken to refine the analysis. The refinements will incorporate additional site-specific considerations, and/or more sophisticated analyses to be less conservative but still protective of human health and the environment.

address ecology

Jeri

Additionally, cleanup and closure requirements for other petroleum sites around the San Francisco Bay will be reviewed to identify decisions made at relevant sites, and to provide a frame of reference for the PTCs developed.

4.5.1 Conceptual Site Model

The PTCs will address exposure pathways that may be complete for the COPCs at the site. An exposure pathway consists of four components:

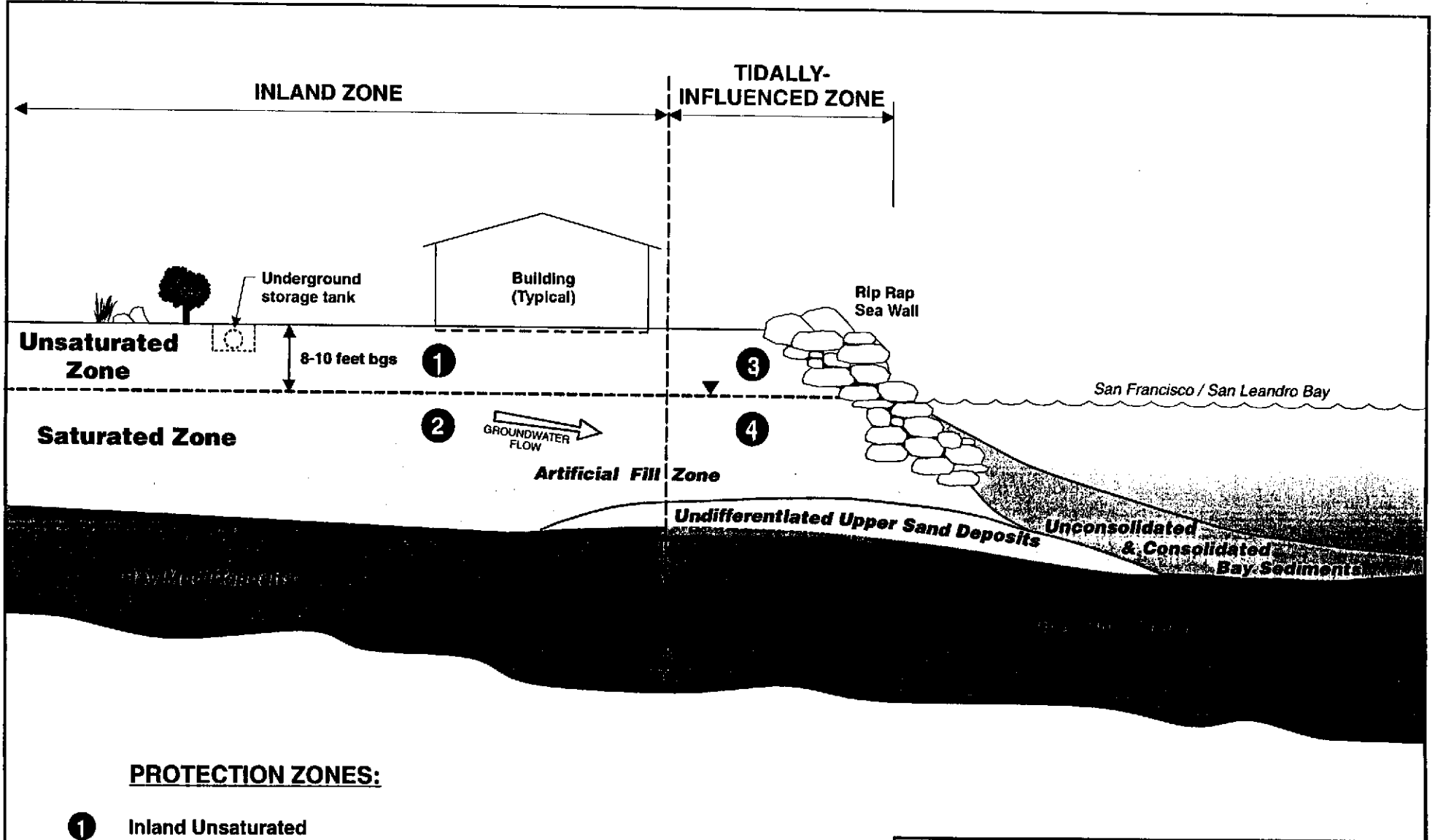
1. A chemical source and release mechanism,
2. A retention or transport medium,
3. A receptor and uptake route (inhalation, ingestion, etc.), and
4. An exposure medium at a point of potential contact.

Exposure pathways may also include one or more inter-media transfers and additional transport mechanisms. Exposure pathways are considered to be complete, and exposure may occur, only if all four components are present. The preliminary

conceptual site model presented in Table 2 is based on a preliminary review of the available site characterization information. The conceptual site model identifies four different protection zones for which PTCs will be developed to address COPCs with potentially complete exposure pathways. The four protection zones are:

- Zone 1: The vadose zone (soil) upgradient of tidally-influenced groundwater
- Zone 2: The saturated zone (soil and groundwater) upgradient of tidally-influenced groundwater
- Zone 3: The vadose zone (soil) overlying tidally-influenced groundwater
- Zone 4: Tidally-influenced saturated zone (soil and groundwater)

The conceptual site model presented in Table 2 and Figure 2 is based on the current and projected future site use as a commercial or industrial property. Evaluation of potential health and environmental impacts will address each zone separately.



PROTECTION ZONES:

- ① Inland Unsaturated
- ② Inland Saturated
- ③ Tidally-Influenced Unsaturated
- ④ Tidally-Influenced Saturated

Note:
Preferred groundwater pathways such as historical stream channels and storm drains are not illustrated.

CITY OF OAKLAND, MUNICIPAL SERVICE CENTER

**Conceptual Schematic
Protection Zones**



Project No. P030497J

Figure 2

Table 2

Protection Zone # 1	Zone Description: Vadose zone (soil) overlying groundwater that is upgradient of the tidally-influenced groundwater zone		Basis for Level 1 Protection Zone Preliminary Target Concentrations (PTCs)
	Potential Exposure Pathways		
	Potential Migration Mechanisms, Exposure Media, and Uptake Routes	Potential Receptors	
Potential Human Health Effects	Excavation and direct exposure to soil by ingestion, or dermal contact * Migration of vapors to indoor and outdoor air *	Site workers indoors and outdoors * Residents indoors and outdoors **	Screening values from ASTM (1) and/or ULRP
Potential Ecological Effects	Potential migration from Zone 1 to groundwater in Zone 2 and subsequent transport to San Leandro Bay and/or Damon Slough *	Terrestrial ecological receptors in Zone 1 ** Biota of San Leandro Bay and Damon Slough *	ASTM (1) leaching and groundwater transport models combined with: AWQC (3), SWRCB Basin Plan Water Quality Objectives, and other SF Bay site cleanup criteria
Protection Zone # 2	Zone Description: Saturated zone (soil and groundwater) that is upgradient of the tidally-influenced groundwater zone		Basis for Level 1 Protection Zone Preliminary Target Concentrations (PTCs)
	Potential Exposure Pathways		
	Potential Migration Mechanisms, Exposure Media, and Uptake Routes	Potential Receptors	
Potential Human Health Effects	Excavation and direct exposure to soil by ingestion, or dermal contact * Migration of vapors to indoor and outdoor air * Direct dermal contact with groundwater ** Ingestion of groundwater **	Site workers indoors and outdoors * Residents indoors and outdoors **	Same as Zone 1
Potential Ecological Effects	Potential groundwater movement to San Leandro Bay and/or Damon Slough*	Terrestrial ecological receptors in Zone 2 ** Biota of San Leandro Bay and Damon Slough *	Potential migration to Zone 4, and to San Leandro Bay and/or Damon Slough
Protection Zone # 3	Zone Description: Unsaturated Zone (Soil) Overlying Tidally-Influenced Groundwater		Basis for Level 1 Protection Zone Preliminary Target Concentrations (PTCs)
	Potential Exposure Pathways		
	Potential Migration Mechanisms, Exposure Media, and Uptake Routes	Potential Receptors	
Potential Human Health Effects	Direct exposure to soil by ingestion, or dermal contact * Migration of vapors to indoor and outdoor air *	Site workers indoors and outdoors * Residents indoors and outdoors **	Same as Zone 1
Potential Ecological Effects	Potential migration from Zone 3 to Zone 4 groundwater and transport to San Leandro Bay and/or Damon Slough**	Terrestrial ecological receptors in Zone 3 ** Biota of San Leandro Bay and/or Damon Slough *	Same as Zone 1
Protection Zone # 4	Zone Description: Tidally-Influenced Saturated Zone (Soil and Groundwater)		Basis for Level 1 Protection Zone Preliminary Target Concentrations (PTCs)
	Potential Exposure Pathways		
	Potential Migration Mechanisms, Exposure Media, and Uptake Routes	Potential Receptors	
Potential Human Health Effects	Excavation and direct exposure to soil by ingestion, or dermal contact * Migration of vapors to indoor and outdoor air * Direct dermal contact with groundwater ** Ingestion of groundwater **	Site workers indoors and outdoors * Residents indoors and outdoors**	Same as Zone 1
Potential Ecological Effects	Potential groundwater movement to San Leandro Bay and/or Damon Slough*	Terrestrial ecological receptors in Zone 4 ** Biota of San Leandro Bay and/or Damon Slough *	ASTM (1) groundwater transport models combined with: AWQC (3), SWRCB Basin Plan Water Quality Objectives, and other SF Bay site cleanup criteria

site specific geo tox tests SF Airport Tier 1

* Preliminary analysis indicates this to be part of potentially complete exposure pathway
 ** Preliminary analysis indicates this exposure pathway is not complete
 (1) ASTM = Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites
 ULRP = City of Oakland, Urban Land Redevelopment Program Screening Values
 AWQC = Federal Ambient Water Quality Criteria

pls provide these #s

4.5.2 Potential Human Health Impacts

The Level 1 analysis will use existing SMCs obtained from:

- The 1995 ASTM *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*
- The Urban Land Redevelopment Program (ULRP) being developed by the City of Oakland

The Tier 1 Risk Based Screening Levels from the ASTM and ULRP are soil and groundwater concentrations that address potential exposure via specific pathways, and will be used directly as the Level 1 PTCs. The screening concentrations from the ULRP include regional, but not site-specific assumptions about geology, hydrogeology, and land use in the area near the bay shore in Oakland.

Soil and groundwater COPC concentrations that are lower than the pertinent PTCs will be considered to not represent a threat to human health. If some COPC concentrations exceed PTCs, a Level 2 analysis may be performed using refined PTCs.

*with this part
a "brownfield"* The Level 1 analysis will also include a review of cleanup and closure requirements for other "Brownfields" petroleum sites around the San Francisco Bay to identify pertinent decisions made at those sites and to provide a frame of reference for the PTCs developed.) ?

The Level 2 analysis will use health risk-based PTCs that have been refined based on less conservative site-specific assumptions and factors affecting the environmental fate and transport of COPCs. The refining assumptions will be based on, and consistent with, USEPA, Cal/EPA, and ASTM risk assessment guidance. The Level 2 analysis will also consider alternate SMCs if pertinent.

Soil and groundwater COPC concentrations lower than the pertinent Level 2 PTCs and/or pertinent guidance will be considered to not represent a threat to human health. If some COPC concentrations exceed the corresponding refined PTCs, additional steps may be taken in a Level 3 analysis to further refine the PTCs.

4.5.3 Potential Ecological Impacts

The Level 1 analysis of potential ecological impacts will:

- Identify existing SMCs
- Develop PTCs for each protection zone, and
- Compare representative protection zone concentrations with the PTCs.

The SMCs will consist of published state and federal water quality criteria such as:

- Federal Ambient Water Quality Criteria (AWQC), and
- Water Quality Objectives identified in the Basin Plan developed by the California Water Resources Control Board.

In Level 1, ecological PTCs for soil and groundwater in each protection zone will be developed using the water quality criteria and dilution and/or attenuation factors based on simple, conservative environmental fate and transport models presented in ASTM's 1995 *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites*. The preliminary conceptual site model indicated that exposure of terrestrial organisms is not expected to occur because the site is paved. The paving precludes direct exposure to COPCs and transfer of COPCs from the subsurface to stormwater runoff. **The SMCs will therefore be limited to criteria addressing aquatic organisms.**

I don't
agree
yet

Representative soil and groundwater COPC concentrations in the protection zones will be compared with the corresponding PTCs. Concentrations lower than those PTCs will be considered to not represent a threat to the environment. If some COPC concentrations exceed PTCs, additional steps may be taken to refine the PTCs or develop an approach for a Level 2 analysis.

another
option
to remediate ←
PTC!

The Level 1 ecological analysis will also include a review of cleanup and closure requirements for other "Brownfields" petroleum sites around the San Francisco Bay to identify relevant decisions and to provide a frame of reference for the PTCs developed and analysis performed.

4.6 Task 6. Prepare Remedial Action Cleanup Plan

Results of the previously discussed tasks will be used to design a remedial action plan for site cleanup. A cleanup workplan will be prepared for submittal to and approval by the regulatory agency.

4.6.1 Remedial Action Plan Design and Implementation

The cleanup plan will review the contaminant distribution and feasibility of appropriate technologies to achieve the cleanup goals. This is anticipated to include active and passive approaches for separate phase product recovery, removal of contaminated soil and groundwater, an estimate of indigenous biodegradation activity for residual contaminants and on-site risk-based management. Estimates of material volumes for treatment or removal and verification monitoring will be included. Technologies and approaches will be selected based on effectiveness and cost of cleanup to achieve the cleanup goals.

A schedule of implementation will be prepared for review by the regulatory agency. The schedule will include an estimate of duration of operation and maintenance of the selected remediation systems. Recommended schedules of maintenance and the corresponding costs will be attached to the cleanup plan. After the remedial cleanup plan is implemented, the overall cleanup effectiveness will be evaluated at regular intervals to monitor progress toward the site cleanup goals. Site monitoring will be performed according to a schedule approved by the regulatory agency.

4.7 Task 7.0 Project Management and Ongoing Verification Monitoring, Operation and Maintenance Activities

DEGI will provide project management and technical oversight for the project. This will include the work tasks outlined in this work plan and additional "on-call" tasks the City may periodically assign to DEGI outside the work plan scope. These "on-call" tasks may include meetings, sampling and/or laboratory performance audits and coordination of other work. DEGI will coordinate the other team members to perform this work and prepare written documents and attend meetings as needed.

DEGI will coordinate the site monitoring and ongoing operation and maintenance of remedial systems with the City. System effectiveness monitoring will be coordinated with the City.

DEGI will schedule meetings as needed for discussion or execution of the work tasks as agreed with the City. As scopes of work for specific tasks are identified, DEGI will prepare budgets and schedules for the City at their request.

5.0 WORKPLAN SCHEDULE

ESTIMATED SCHEDULE FOR WORK TASKS

no dates ?

Table 3 is a schedule of proposed tasks in the workplan. This schedule presents estimates of the duration of each task based on currently available information and anticipated task assignments.

Table 3

Work Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1	Well Sampling	Lab Analysis	Lab Analysis	Report Prep	Submit Draft	City Comment	Final Report	
2	Data Review	Data Review	Report Prep	Report Prep	Submit Draft	City Comment	Submit Report	
3.1	Safety Plan Prep	Submit Draft	City Comment	Final Plan				
3.2	Remove pipeline	Remove pipeline	Lab Analysis	Lab Analysis	Report Prep	Submit Draft	City Comment	Final Report
3.3	UST upgrade	Lab Analysis	Lab Analysis	Report Prep	Submit Draft	City Comment	Final Report	
4	Data Review	Prepare Rec.	Submit for review					
5	To Be Scheduled	<i>need to meet</i>						
6	To Be Scheduled							
7	To Be Scheduled							

It is anticipated that laboratory analysis will be on a normal turnaround time (up to 10 working days).

REFERENCES

Woodward-Clyde Consultants, March 1988, "Geotechnical Engineering Study, Equipment Building, Consolidated Service Center, Oakland, California," prepared for the City of Oakland.

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