

**EXPLANATION OF SIGNIFICANT DIFFERENCES TO THE
AMENDED RECORD OF DECISION FOR THE**

**COMMENCEMENT BAY – SOUTH TACOMA CHANNEL
SUPERFUND SITE, OPERABLE UNIT 1**

WELL 12A

TACOMA, WASHINGTON

PREPARED BY:

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
SEATTLE, WA**

JUNE, 2012

Issued by:

Date:

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U.S. Environmental Protection Agency

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June, 2012

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1.0 INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

There are three distinct operable units within the 2.5 square mile Commencement Bay - South Tacoma Channel Superfund Site in Tacoma, Washington. The Well 12A Site has been designated as Operable Unit 1 (OU1). The two other distinct operable units are the Tacoma Municipal Landfill (OU-2) and South Tacoma Field (OU-3). The United States Environmental Protection Agency (EPA) is the lead agency and the Washington State Department of Ecology (Ecology) is the support agency.

OU1 includes volatile organic compound (VOC) contaminated groundwater in the area surrounding the City of Tacoma Water Supply Well 12A and the former Time Oil Company property, which is the apparent source of contamination. OU1 consists primarily of industrial/commercial land, with a small amount of residential land, in southwestern Tacoma, Washington. OU1 is approximately 4 miles southwest of the southernmost tip of Commencement Bay near the junction of Interstate 5 and State Highway 16 (see **Figures 1 and 2**). The exact area of OU1 is not well defined but is generally considered to be about one square mile.

The original OU1 Record of Decision (ROD) was signed on March 18, 1983 and included the installation of an air stripping system to treat contaminated groundwater at Well 12A. A ROD Amendment was signed in 1985 to address soil and groundwater contamination in and near the source area, the Time Oil property. Remedial actions conducted as part of the 1985 Amendment (Amendment #1) included excavation of contaminated soils along the Burlington Northern Railroad right-of-way and installation of the groundwater extraction treatment system (GETS) near the source area at the Time Oil Building in 1988, which is still in operation. In addition, approximately 5,000 cubic yards of filter cake were excavated and a soil vapor extraction system (SVE) was built in 1993 near the historical drum storage and disposal operation on the west side of the Time Oil Building and operated for approximately four years. A second ROD Amendment (Amendment #2) was signed on October 29, 2009 to enhance the remedial action for soil and groundwater at OU1 by shallow excavation, thermal remediation and enhanced anaerobic bioremediation of source material to address risks from exposure to residual contamination in soils and groundwater, reduce or eliminate these sources of groundwater

contamination, reduce the contaminant mass flux and prevent further migration of contaminant mass and degradation of groundwater quality.

During remedial design, EPA determined that additional information was needed to more fully characterize the residual sources of contamination and to appropriately design and implement the remedy selected in ROD Amendment #2. This additional site characterization confirmed that more residual source material remained beneath the Time Oil Building than was previously known. To address the recently identified additional source material, the Time Oil Building needs to be removed. Building removal and remediation of the additional source material is estimated to add an additional \$1 million to the remedy but is not expected to impact the remedy schedule. Total capital construction costs for the remedy are now estimated to be \$13.5 million. EPA has consulted with Ecology and they concur that these changes need to be made and that they will significantly but not fundamentally alter the remedy scope and cost as documented in ROD Amendment #2. Therefore, EPA has prepared and is publishing this Explanation of Significant Differences (ESD) to modify the Amended Remedy and inform the public in accordance with CERCLA §117 and NCP §300.435(c)(2)(i).

The amended remedy selected in Amendment #2 and modified by this ESD is considered a final remedy for soils and an interim remedy for groundwater that will be protective, achieve the Remedial Action Objectives (RAOs), and assist in achieving the long-term objective for OU1 of restoring the aquifer to its beneficial use as a drinking water source for the City of Tacoma. A final groundwater remedy will be selected after these actions have been completed and monitored for a reasonable timeframe. If the interim remedy does not fully achieve the long-term objective in a reasonable timeframe, additional remedial actions will be evaluated and documented in a future decision document.

This ESD, and all documents that form the basis for this decision, will become part of the Administrative Record file for the Well 12A Operable Unit ROD Amendment #2 consistent with Section 300.825(a)(2) of the NCP. The Administrative Record contains the information on which selection of this remedial action is based and is available for review at the following locations:

Citizens for a Healthy Bay
917 Pacific Avenue, Suite 100
Tacoma, Washington 98402
(253) 383-2429

EPA Region 10 Superfund Records Center
1200 Sixth Ave, Suite 900, ECL-076 (7th Floor)
Seattle, WA 98101
(206) 553-4494

2.0 SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

2.1 Site History

In 1981, chlorinated organic solvents were detected in groundwater at Well 12A, a municipal water supply well owned and operated by the City of Tacoma Water Department. EPA conducted a site investigation during the summer of 1981, and concentrations of chlorinated organic solvents detected in groundwater in the well were high enough to remove the well from service. Based on the findings of the investigation, the Commencement Bay South Tacoma Channel Site was proposed for listing on the National Priorities List (NPL) on September 1, 1981. The Site was added to the NPL on September 8, 1983.

The Time Oil property was historically used for various activities including oil recycling and paint and lacquer manufacturing. Oil recycling and solvent processing began as early as 1923 and continued to 1991, with occasional interruptions due to changes in ownership and a large fire in 1976. The Time Oil Company vacated the premises in 1991, and the property has since been used for storage and small-scale manufacturing. The Site is currently used as a warehouse and storage area for a moving company and as a parking and staging area for a construction company. The Site is owned by the owners of these companies.

In addition to a number of possible leaks and spills over the years, some of the filter cake generated during oil recycling was land disposed around the Time Oil Building and additional filter cake was used as fill material in 1982 for constructing the Burlington Northern Railroad spur to the north of the Time Oil Property. Subsequent investigations have identified this filter cake as a primary source of 1,1,2,2-tetrachloroethane (PCA), tetrachloroethylene (PCE), trichloroethylene (TCE), and other organic solvents discovered in the groundwater at Well 12A.

2.2 Contamination

Soil samples at or near the Time Oil property contain the highest concentrations of contaminants. Soil contamination is greatest near the surface on the east side of the Time Oil Building where the contamination extends downward to the water table, which suggests a continuing source to groundwater. A 40,000 gallon underground storage tank and associated highly contaminated soil beneath the tank was removed from this area in 2011.

The primary VOC contaminants of concern in groundwater are PCE, trichloroethylene (TCE), 1,2-dichloroethene (cis and trans) (DCE), and vinyl chloride (VC). TCE is the most widespread VOC, with a plume extending east and southwest of the Time Oil property, towards Well 12A and the highest concentrations reported south of the Time Oil property (**Figure 3**).

Despite previous remedial efforts, a number of sources of dissolved phase contamination still remain on or near the Time Oil property. Both light and dense non-aqueous phase liquids (LNAPL and DNAPL) have been identified beneath the property and an additional area of filter cake has been identified to the east of the Time Oil Building.

2.3 Conceptual Site Model

The results of investigations were used to establish the conceptual site model (which includes the nature and extent of contamination, the location of contamination, and the transport of contaminants). According to the conceptual site model, four zones or areas need to be addressed.

1. Filter Cake and Shallow Impacted Soil. This zone needs to be addressed because it is at the surface and it appears to be contributing to subsurface contamination.
2. Deep Vadose Zone Soil and High Concentration Groundwater Beneath and East of Time Oil Building. The vadose zone, also called the unsaturated zone, extends from the surface to the water table (saturated zone). Since technologies applied in the deep vadose zone would likely be applicable to the upper saturated zone, the two media are combined into this one treatment zone. The extension of vadose zone contamination into the water table suggests that it is a continuing source of contamination. If left untreated, these high concentrations of contamination would continue to impact groundwater and prevent achievement of RAOs and restoration of groundwater.
3. High Concentration Groundwater West and South of Time Oil Building (TCE and cis-1,2-DCE greater than 300 µg/L). This area is predominantly defined by groundwater

with TCE and cis-1,2-DCE at concentrations above 300 µg/L. The 300 µg/L concentration was chosen to define this zone because, beyond this concentration, negligible additional contaminant mass is gained. Also, where contamination drops below 300 µg/L, the aquifer begins to transition from anaerobic conditions (without oxygen) to aerobic conditions (with oxygen). Also included in this zone are the area east of the Time Oil Building with elevated concentrations of 1,1,2,2-PCA and the area southwest of the Time Oil Building for which limited data are available.

4. Low Concentration Groundwater (TCE and cis-1,2-DCE less than 300 µg/L) This treatment zone includes groundwater with concentrations of TCE/cis-1,2-DCE less than 300 µg/L. Groundwater data from wells in this zone indicate that the degradation of chlorinated volatile organic compounds is probably occurring naturally under current conditions.

2.4 Selected Remedies and Response Actions to Date

The remedy selected in the 1983 ROD was intended to address groundwater contamination at Well 12A and was the most cost-effective of the systems evaluated. The 1983 remedy involved the installation and operation of an air stripping system that treats water pumped from Well 12A using five packed towers operating in parallel at a total flow rate of 3,500 gallons per minute (gpm). Treated water is discharged to Commencement Bay or to the city's water system depending on measured quality and the city's needs. This remedy was meant as an interim measure until the source area could be identified and the contamination mitigated.

Following a remedial investigation and feasibility study, the 1985 Amendment #1 detailed additional measures needed to address soil and groundwater contamination within the identified source areas. Contaminated filter cake, and soils in and around the Time Oil Building were identified as a source of contamination. In addition, Amendment #1 identified the Burlington Northern Railroad right-of-way adjacent to the Time Oil facility as an additional source of contamination to Well 12A. In June 1986, Burlington Northern excavated approximately 1,200 cubic yards of contaminated soils along the rail spur.

In accordance with Amendment #1, a Groundwater Extraction and Treatment System (GETS) was installed on the Time Oil property in November 1988 to pump and treat contaminated groundwater near the source. In 1995, four additional extraction wells were added to the system.

In 1993, a soil vapor extraction (SVE) system was installed and began operation in the area where drum storage and disposal operations had previously occurred to the west of the Time Oil Building. During construction of the SVE system, approximately 5,000 cubic yards of waste sludge (filter cake) from the oil recycling operations were excavated. Operation of the SVE system was discontinued in 1997 after soil contamination was reduced to concentrations that would not impact groundwater quality along the west side of the Time Oil Building.

In 2004-2005, the EPA installed additional monitoring wells and collected soil samples and groundwater samples. Oily product was identified in some soil samples primarily collected from areas to the east of the Time Oil Building. Groundwater contaminant concentrations and distribution had generally decreased compared to previous sampling events, with elevated concentrations of VOCs still found near the Time Oil property. In September 2008, the third Five-Year Review was completed for Well 12A. The review concluded that the GETS is no longer effectively reducing contaminant concentrations and is not adequately controlling the migration of contamination. Since the report concluded that the remedy was not protective, additional cleanup actions were needed. EPA conducted a Focused Feasibility Study (FFS) analyzing potential remedial alternatives to address ongoing contamination. The FFS was completed in April 2009.

2.4.1 Description of the Amended Remedy Selected in ROD Amendment #2

The amended remedy selected in Amendment #2 addresses releases and sources of volatile organic compounds (VOCs) identified in soil and groundwater at OU1. The amended remedy continues the groundwater extraction and treatment and wellhead treatment at Well 12A selected in the 1983 ROD and 1985 Amendment #1, updates the RAOs and cleanup goals for OU1 and adds the following remedy components:

- Excavation and off-site disposal of filter cake and contaminated soils in a Resource Conservation and Recovery Act (RCRA) landfill;
- In situ thermal remediation (ITR) of soil and groundwater;
- In situ enhanced anaerobic bioremediation (EAB) of groundwater;
- Institutional controls (ICs) to avoid or limit exposure to site contamination and guide the use of the aquifer;

- Continued operation and maintenance of the groundwater extraction system selected in the ROD Amendment #1 to prevent migration of contaminants while mass is reduced (via excavation, ITR and EAB), with a contingency for discontinuation of the groundwater extraction and treatment system and reliance on monitored natural attenuation (MNA) for further remediation once the active measures have achieved interim objectives;
- Monitoring of the plume; and
- Continued operation and maintenance of the five air stripping units and monitoring groundwater for VOCs at Well 12A.

Contaminated soils and source materials have been excavated to a depth of approximately 6 feet (see section 2.4.2). Confirmation sampling has been conducted within the excavated areas to evaluate any contamination left in place. Any contamination left in place following excavation is expected to be addressed by the ITR treatment. The deep vadose zone and upper saturated zone near the former Time Oil Building will also be treated with ITR. The high concentration groundwater plume will be treated using EAB through reductive dechlorination under anaerobic conditions. EAB will not only accelerate biodegradation of contaminants within the high-concentration treatment area, but will also likely accelerate natural attenuation of contaminants by producing by-products that can induce contaminant-degrading enzymes within the low-concentration aerobic contaminant plume.

The amended remedy includes institutional controls to limit access to and future development, improvement, and use of affected properties to protect human health. ICs would include activity and use restrictions enacted through proprietary (e.g., easements, covenants) and/or governmental (e.g., zoning requirements) controls to prevent uses of the property that would pose an unacceptable risk to receptors (i.e., for residential use). Informational device ICs (e.g., warning signs, advisories, additional public education) would also be employed to limit access to contaminated soils and groundwater. Tacoma-Pierce County Board of Health Resolution No. 2002-3411, Land Use Regulations, and applicable sections of Washington Administrative Code Titles 173 and 246 are current guidelines that would be considered, or possibly amended, for the location and installation of supply wells.

The amended remedy also includes groundwater monitoring. Attainment of the Remedial Action Objectives (RAOs) will be measured through the monitoring of contaminant levels in groundwater, and evaluating contaminant mass discharge from the source area. A 30-year monitoring and evaluation program will be implemented to monitor remedial performance.

The estimated cost for implementing the amended remedy selected in Amendment #2 was \$16,210,000 which included \$12,527,000 in capital costs and \$3,683,000 in operation and maintenance costs.

The amended remedy selected in Amendment #2 is considered a final remedy for soils and an interim remedy for groundwater that will be protective and assist in achieving the long-term objective for OUI of restoring the aquifer to its beneficial use as a drinking water source for the City of Tacoma. The amended remedy is also expected to enhance site conditions such that MNA will become more effective. After the excavation, disposal, ITR and EAB achieve their interim objectives, EPA and Ecology will evaluate whether further operation of the GETS is necessary to achieve the long-term objectives or if MNA can be relied upon to do so in a reasonable timeframe instead. If, at some point, that is the case, EPA will issue an explanation of significant differences to implement the MNA contingency and discontinue GETS operation. Wellhead treatment and institutional controls will be maintained as long as necessary to prevent exposure. If the interim remedy does not fully achieve the long-term objective in a reasonable timeframe, additional remedial actions will be evaluated, followed by remedy selection and implementation if practicable and necessary.

2.4.2 Amended Remedy Implementation

Excavation and off-site disposal of filter cake and contaminated soils found adjacent to the former Time Oil Building has been completed. Due to differences in the type and concentration of contamination found in the soil, the excavation area was divided into a northern and southern area. The soil in the southern half of the excavation area met the RCRA Land Disposal Restrictions (LDRs) found in 40 CFR 268.49, and 960 tons of contaminated soil from this area was shipped off site to a RCRA landfill. The soil in the northern portion of the area contained high levels of VOCs and therefore was treated using in-situ chemical oxidation (ISCO) to reduce

the levels of VOCs and therefore meet RCRA LDRs. The chemical that was used to treat the soil was persulfate. After treatment, 982 tons of contaminated soil from the northern area was shipped off site to a RCRA landfill. In addition, a underground storage tank (UST) containing oily water and pea gravel was excavated from the area. A total of 6,775 gallons of oily water was removed from the UST and transported to a RCRA-permitted facility for treatment and disposal. Approximately 40 cubic yards of pea gravel contaminated with lead and VOCs was also removed from the UST and transported to a RCRA landfill. Approximately 60 tons of heavily contaminated soil that was excavated from the area beneath the UST was treated with persulfate prior to disposal at a RCRA landfill. Because the ground surface of the excavated area is used for heavy traffic such as trucks, the excavated area was first backfilled with clean recycled concrete. The recycled concrete was compacted and 3 inches of asphalt cover was placed over the clean concrete fill. All other elements of the Amended Remedy remain to be completed.

3.0 BASIS FOR THIS DOCUMENT AND SCOPE OF THE CHANGE

During Remedial Design EPA determined that additional information was needed to more fully characterize the residual sources of contamination and to design and implement the Amended Remedy, and performed some additional site characterization.

ROD Amendment #2 identified ITR as the selected remedy for the highly impacted portions of the deep vadose zone and upper saturated zone near the former Time Oil Building. The ITR treatment zone presented in the FFS (**Figure 4**) was based on modeling of historical soil data collected between 1985 and 2004. The ITR treatment zone was later revised based on the results of the 2010 Remedial Design Investigation (RDI), and the revised treatment zone and rationale were presented in the Draft Basis of Design Report (CDM 2010b). With the addition of the 2010 RDI soil data, the modeled soil plume had shifted to the west such that the majority of the treatment area (approximately 76 percent) was located within the footprint of the former Time Oil Building (**Figure 5**). As a result of the shift in ITR treatment zone location, EPA determined that additional follow-on work was necessary to complete delineation of the ITR treatment zone and reduce uncertainty in the extent of contaminants beneath and in the vicinity of the former

Time Oil building. As described below, the ITR treatment zone has been further refined based on results from additional soil borings advanced as part of an additional RDI conducted in 2011.

The stratigraphic units beneath the Well 12A site are shown in **Figure 6**. Based on the results of the 2011 RDI, the majority of the soil contaminant mass is located in two distinct zones (**Figure 7**). The Qpf fine-grained layer in Zone B contains approximately 50 percent of the soil VOC mass $>5,000 \mu\text{g}/\text{kg}$. The vadose zone and saturated zone beneath and in the vicinity of the former Time Oil Building, Zones C and D, account for an additional 44 percent of the soil VOC mass $>5,000 \mu\text{g}/\text{kg}$. Investigations performed to date suggest that together these two zones contain approximately 94 percent of the total VOC mass $>5,000 \mu\text{g}/\text{kg}$. As such, these two zones will be the primary focus areas for the EAB and ITR components of the remedy. While the silt unit contains approximately 50 percent of the contaminant mass, it is believed to be responsible for a significantly lower percentage of the contaminant mass discharge from the site because the contaminant mass contained within the low permeability silt unit likely has limited exposure to groundwater flow. This theory is further supported by the GETS operational data which indicate that the majority (60 to 80 percent) of the total contaminant mass discharge to the GETS comes from extraction wells EW-4 and EW-5 (in the vicinity of the former Time Oil Building) as compared with EW-1 through EW-3 which are located near the silt unit. EW-1 and EW-3 are also much further from the Time Oil sources, and that together with the cleaning that has occurred over many years of pumping, are some reasons for the significant difference in mass removed by these two sets of wells.

The $5,000 \mu\text{g}/\text{kg}$ soil plume beneath and in the vicinity of the former Time Oil Building was selected as the target ITR treatment zone in the Draft Basis of Design Report (CDM 2010b). Several soil borings installed as part of the 2011 RDI, served to better bound the soil plume to the east and south and to confirm its presence beneath the building, resulting in a significant reduction in uncertainty associated with the delineation.

Figure 8 shows the proposed ITR treatment zone as revised based on the additional data collected during the 2011 RDI. The proposed ITR treatment zone encompasses the vadose zone $5,000 \mu\text{g}/\text{kg}$ VOC isopleths. The proposed treatment zone was extended to the south and

southwest to include highly impacted areas of the upper saturated zone beneath the southwestern portion of the former Time Oil Building.

The proposed ITR treatment zone is approximately 12,000 square feet in size and extends from the ground surface (approximate elevation 254 ft msl) to a depth of 55 ft bgs (elevation 199 ft msl). This zone contains an estimated 44 percent of the VOC mass in soil and for the reasons noted above, it is also believed to be responsible for the majority of the contaminant mass discharge from the site. As can be seen from Figure 8, approximately 74 percent of the treatment area is within the footprint of the former Time Oil Building, with 30 percent beneath the older southern portion of the former Time Oil Building. Based on site-specific drilling experience, due to the depth of the proposed ITR treatment zone, and the limited access within this portion of the building, the older southern portion of the former Time Oil Building will have to be demolished in order to cost effectively advance the ITR borings within the building footprint.

The recently collected data has confirmed that more residual source material remains beneath the old Time Oil Building than was previously known. To address the additional source material, the Time Oil Building must be removed. The older portion of the Building has very low ceilings and the conventional equipment for the ITR could not be used resulting in significantly increased costs. Building removal and remediation of the additional source material has been determined to be more cost effective and is estimated to cost \$1,000,000. It is not expected to impact the schedule for completing the Amended Remedy.

The residual source area near and beneath the Time Oil Building contains highly contaminated soils and groundwater which are considered to be “principal threat wastes” (PTW) because the chemicals of concern are found at concentrations that pose a significant risk and are highly mobile to groundwater. Removal of the Time Oil Building will allow access to remediate the PTW and accelerate groundwater restoration.

EPA has consulted with Ecology and they concur that these changes should be made and that the changes will significantly, but not fundamentally alter the remedy scope and cost as documented in the 2009 Amendment #2. Therefore, EPA has prepared and is publishing this

ESD to modify the Amended Remedy and inform the public in accordance with CERCLA §117 and NCP §300.435(c)(2)(i).

3.1 Sources of Information

The following information in the Administrative Record supports the need for the significant differences described herein.

- CDM. 2009. Final Focused Feasibility Study, Well 12A Superfund Site, Tacoma, Washington, April 2, 2009.
- CDM. 2010. Draft Basis of Design Report, Well 12A Superfund Site, Tacoma, Washington, October 8, 2010.
- CDM. 2011. Addendum to the Draft Basis of Design Report Memorandum, Well 12A Superfund Site, Tacoma, Washington, February 1, 2011.
- Kemron, 2012, Draft Closure Report, Remedial Action Completion Report, Well 12A Shallow Excavation Remedial Action, Tacoma, Washington, March 2012

4.0 DESCRIPTION OF SIGNIFICANT DIFFERENCES

4.1 As described in Sections 2.4.2 and 3.0, the Amended Remedy did not identify the need to demolish the old Time Oil Building in order to access and clean up source material beneath the building via ITR. New data confirms that demolition of the building will be necessary to address source material. Demolition of the building constitutes a significant difference from Amendment #2 for the following reasons:

- a. An estimated 74% of the contaminant mass is beneath the building and removal of this mass will significantly aid in achieving RAOs.
- b. Costs associated with demolition of the former Time Oil Building are estimated at \$1,000,000 constituting a significant increase in the cost of the selected remedy.

4.2 Remedial Action Objectives, Cleanup Levels, Points of Compliance and ARARs

No changes have been made to the RAOs, cleanup levels and points of compliance in this ESD; they all remain as selected and documented in Amendment #2. The Time Oil Building may contain asbestos and therefore standards for demolition of buildings containing asbestos found

at 40 CFR §61.145 may be relevant and appropriate. Asbestos Control Standards related to demolition which are administered by the Puget Sound Clean Air Agency will be considered during demolition activities. All other ARARs identified in Amendment #2 remain the same.

4.3 Changes in Expected Outcomes

Demolition of the Time Oil Building will grant more complete access necessary to remove source material by ITR. This will aid in achieving RAOs within the expected timeframe

5.0 STATE/SUPPORT AGENCY ACCEPTANCE

Ecology has reviewed this ESD and supports the changes to the amended remedy documented herein.

6.0 STATUTORY DETERMINATIONS

The amended remedy for the Site, as modified by this ESD, continues to satisfy the requirements of §121 of CERCLA to:

- Protect human health and the environment, through a combination of treatment, engineering controls, and/or institutional controls;
- Comply with ARARs;
- Be cost-effective;
- Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable (i.e., explain why the Selected Remedy represents the best option); and,
- Satisfy the preference for treatment as a principal element.

7.0 PUBLIC PARTICIPATION COMPLIANCE

The public participation requirements for an ESD are set out in NCP §300.435(c)(2)(ii) as follows: (A) Make the ESD and supporting information available to the public in the administrative record established under § 300.815 and the information repository; and (B) Publish a notice that briefly summarizes the ESD, including the reasons for such differences, in a

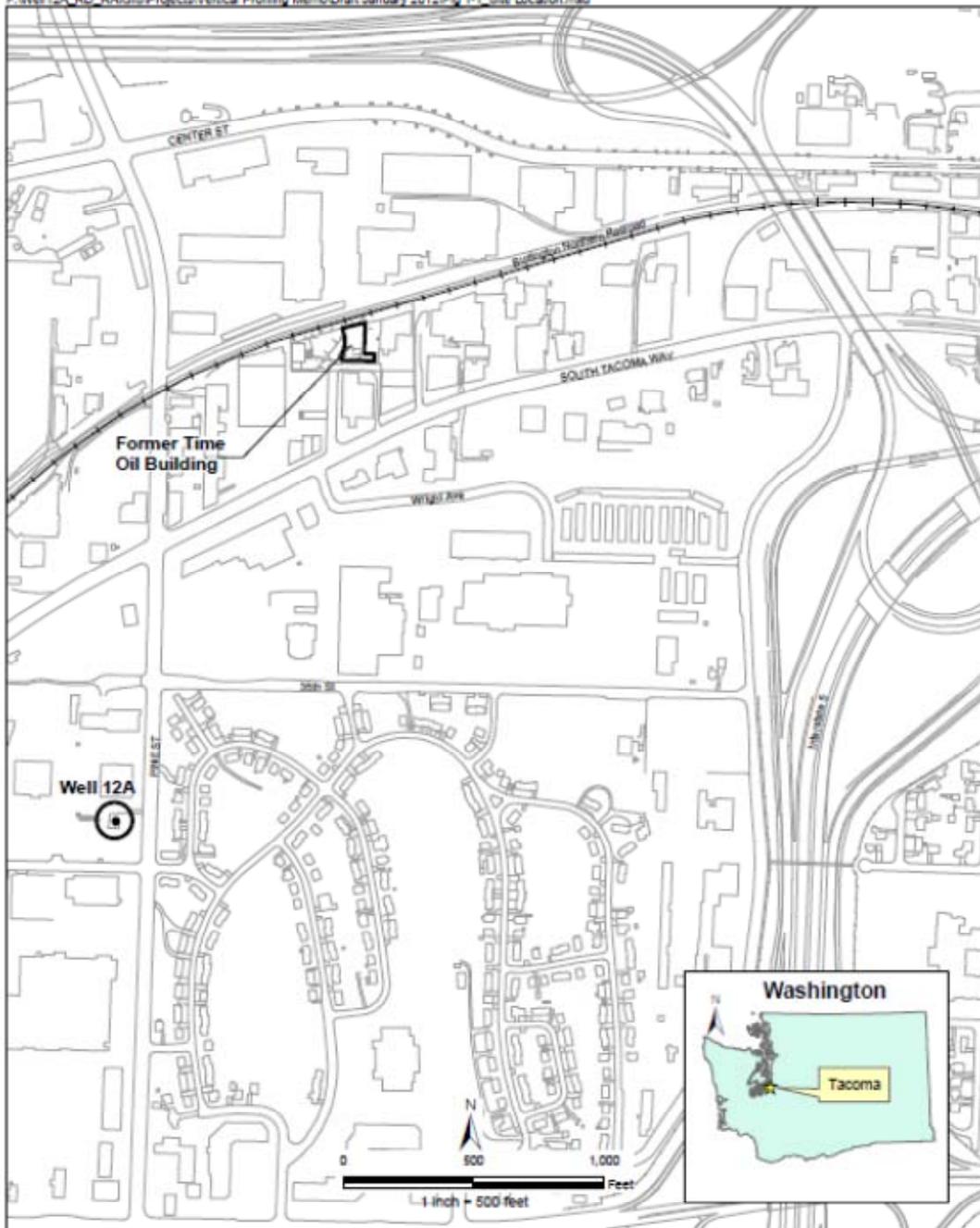
major local newspaper of general circulation. These public participation requirements for an ESD have been met as follows:

The ESD and supporting information has been added to the administrative record established under § 300.815 and made available in the following information repositories:

Citizens for a Healthy Bay
917 Pacific Avenue, Suite 100
Tacoma, Washington 98402
(253) 383-2429

EPA Region 10 Superfund Records Center
1200 Sixth Avenue, Suite 900, ECL-076 (7th Floor)
Seattle, WA 98101
(206) 553-4494

A notice that briefly summarizes the ESD, including the reasons for such differences, will be published in the Tacoma News Tribune.



**CDM
Smith**

Well 12A Superfund Site
Tacoma, Washington

Figure 1-1
Well 12A Site Location Map

Figure 1



CDM

Well 12A Site
Tacoma, WA

Figure 3-1
Site Features

Figure 2

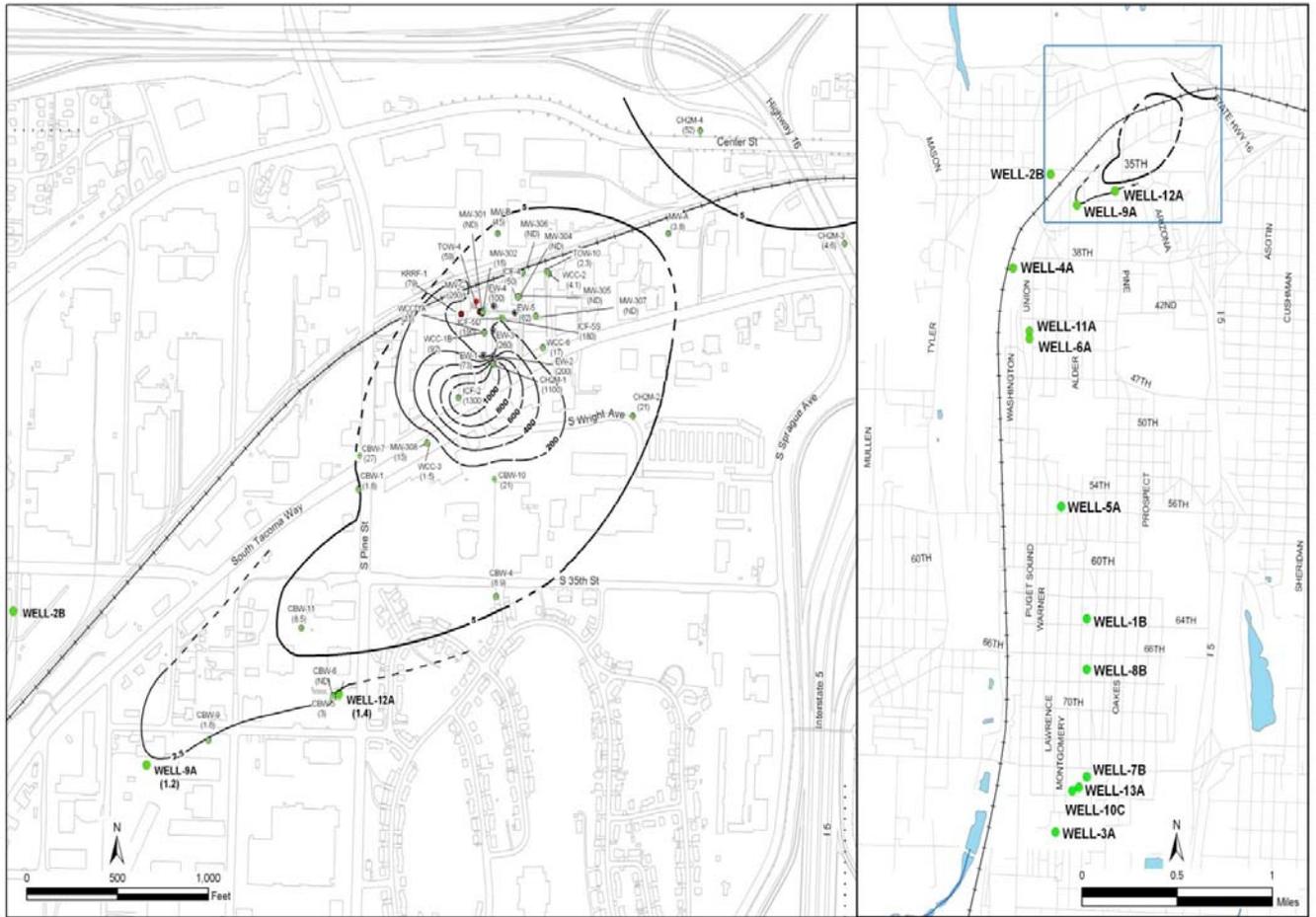
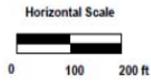


Figure 3
Time Oil/Well 12A
TCE Plume Extent



Plan view of PCA in soil

Water table

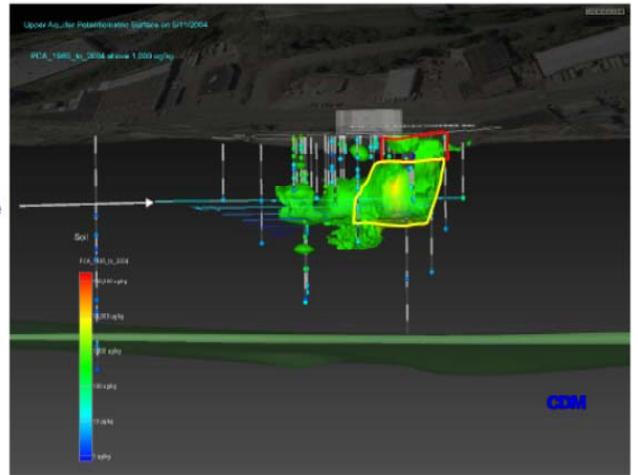


Vertical Scale for Section: Each dark gray (and light gray) interval on well bores represent 10 ft

This figure was prepared using static images exported from an EVS three-dimensional model.

-  - Shallow soil/filter cake treatment zone
-  - Deep vadose and upper saturated zone soil on east side of Time Oil Building
Since the extent into the saturated zone is being delineated by soil concentrations, it is included as a soil treatment zone.

View northwest at PCA in soil



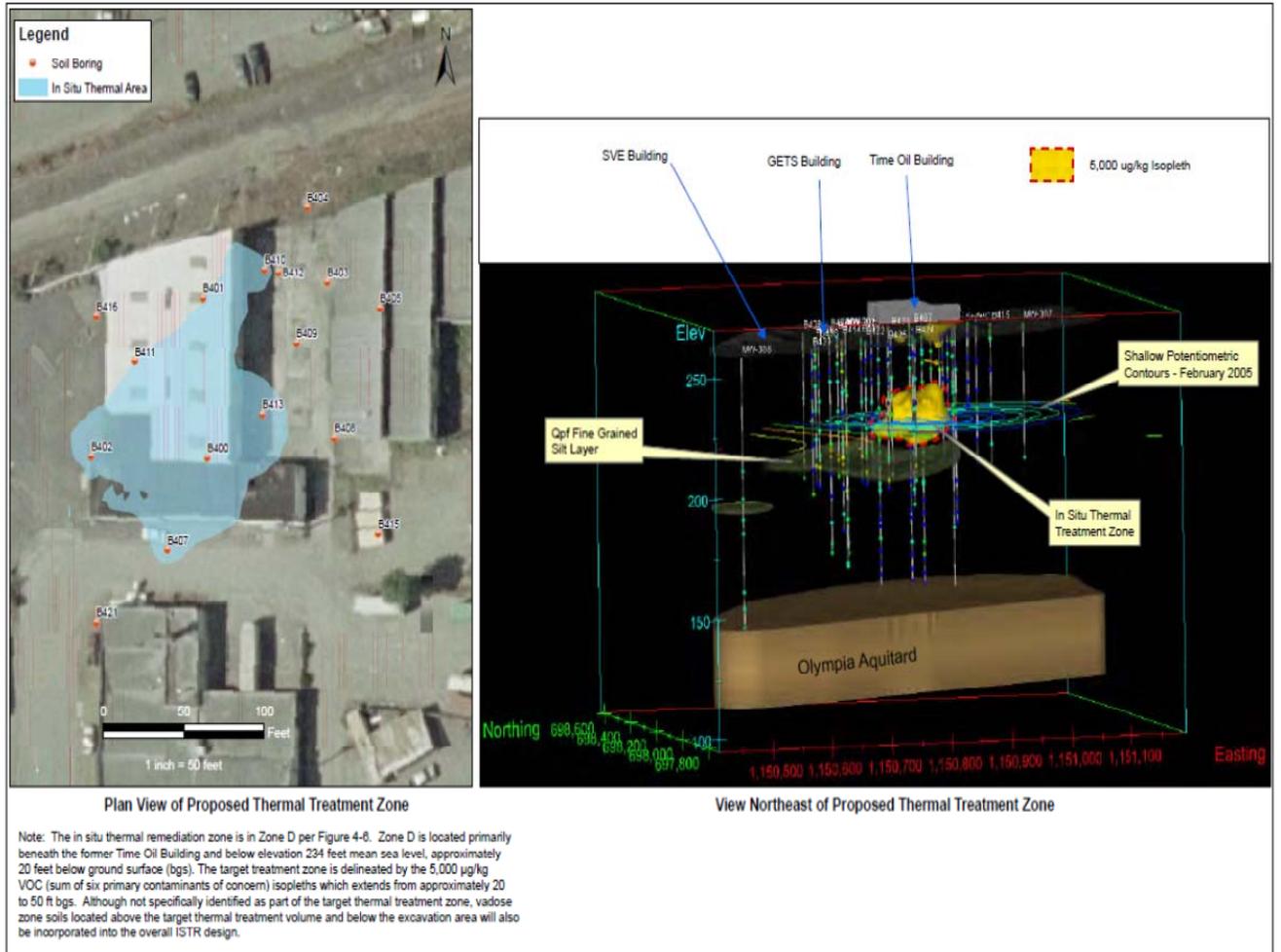
Plume shown is PCA > 1000 ug/kg in soil above and below the water table
Light green unit is semi-confining layer



Well 12A Superfund Site
Tacoma, Washington

Figure 3-1
Proposed Treatment Zones in Soil

Figure 4

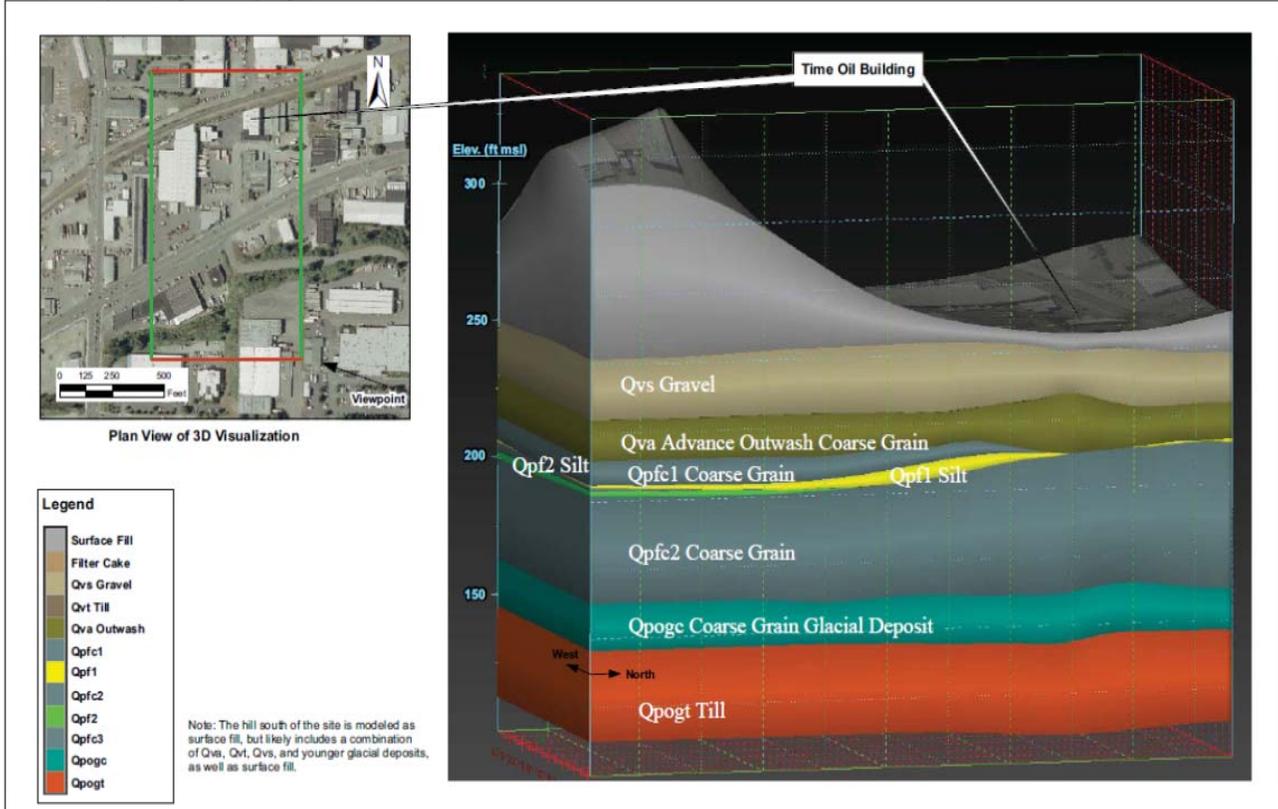


CDM

Well 12A Site
Tacoma, WA

Figure 5-2
Proposed Thermal Treatment Zone

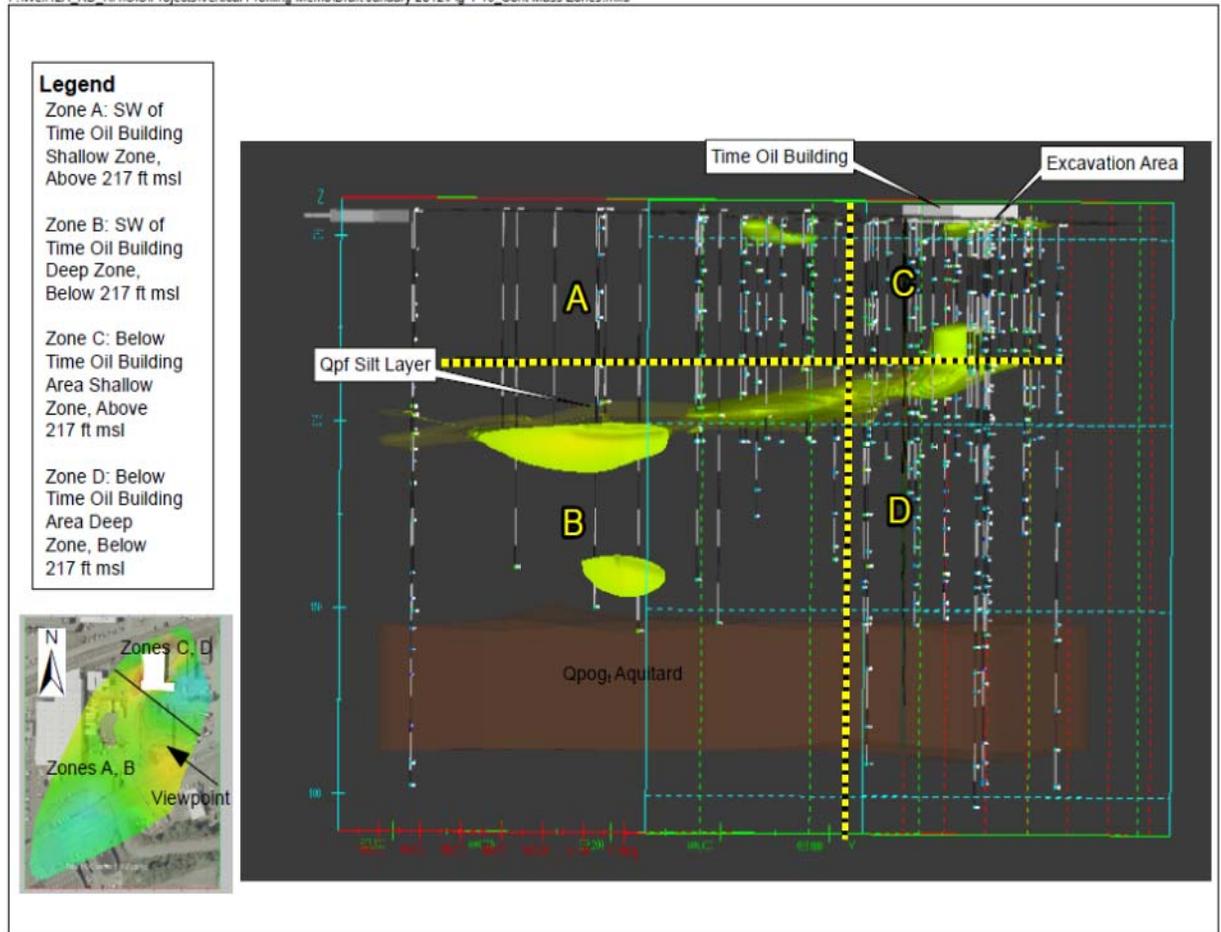
Figure 5



Well 12A Superfund Site
Tacoma, Washington

Figure 4-8
3D Visualization of
Stratigraphic Units

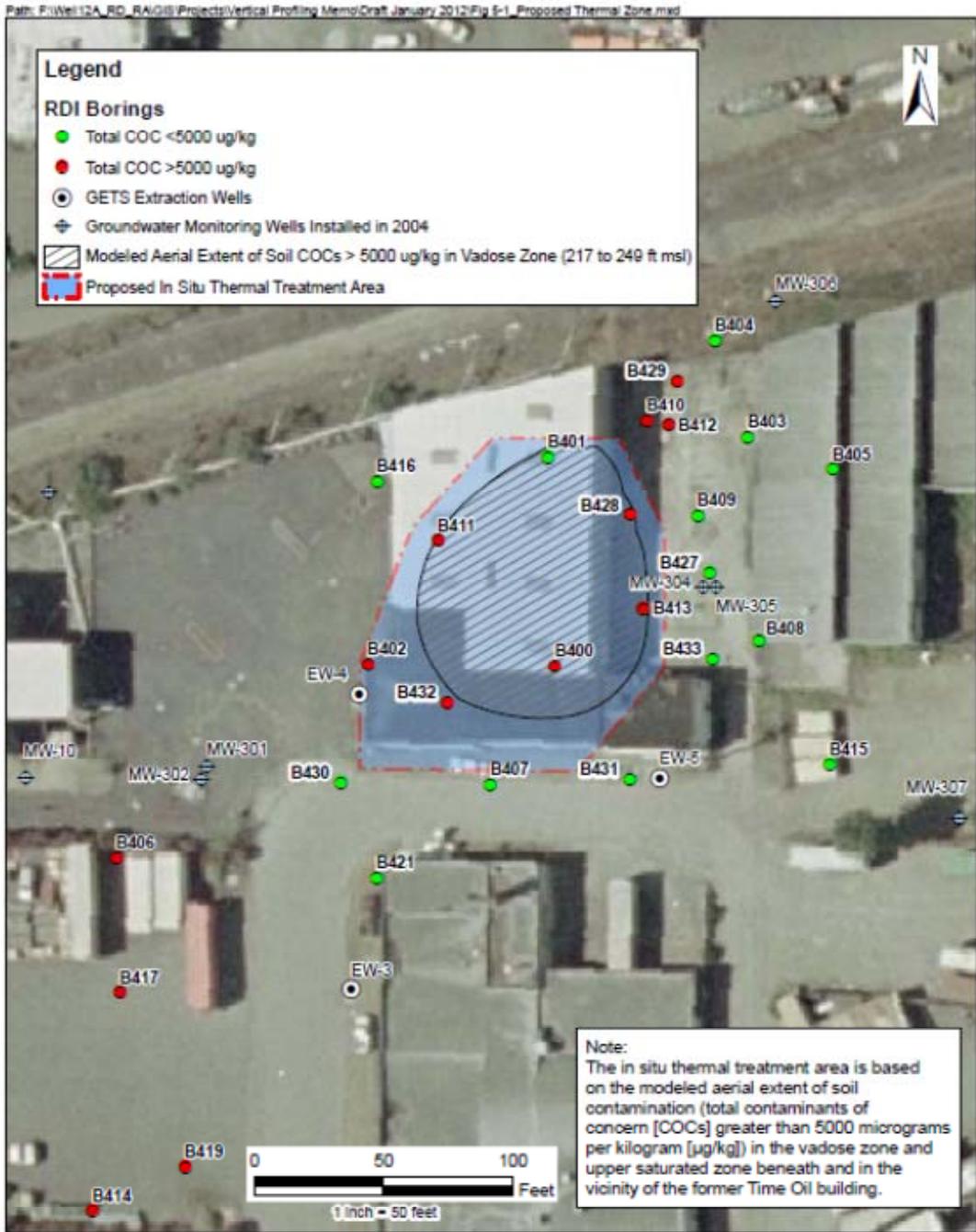
Figure 6



Well 12A Superfund Site
Tacoma, Washington

Figure 4-16
Contaminant Mass Zones
5000 ug/kg Isopleths, Total of 6 VOC COCs

Figure 7



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Well 12A Superfund Site
Tacoma, Washington

Figure 5-1
Proposed Thermal Treatment
Zone in Plan View

Figure 8