



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

November 8, 2010

Mr. Robert Shea  
Sound Mattress and Felt Company  
7424 Bridgeport Way, Suite 206  
Lakewood, Washington 98499-8134

**Re: Further Action at the following Site:**

- **Site Name:** Former Sound Mattress & Felt Co./Brown & Haley Warehouse
- **Site Address:** 1940 East 11<sup>th</sup> Street, Tacoma
- **Facility/Site No.:** 1232087
- **VCP Project No.:** SW0857

Dear Mr. Shea:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the former Sound Mattress & Felt Company/Brown & Haley Warehouse facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

**Issue Presented and Opinion**

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Is further remedial action necessary to clean up contamination at the Site?

**YES. Ecology has determined that further remedial action is necessary to clean up contamination at the Site.**

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

**Description of the Site**

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This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following release:

- Chlorinated hydrocarbons and breakdown products into the Soil, Ground Water, Surface Water, and Air.

Enclosure A includes a detailed description and diagram of the Site, as currently known to Ecology.



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Please note a parcel of real property can be affected by multiple sites. At this time, we have no information that the parcel(s) associated with this Site are affected by other sites.

### **Basis for the Opinion**

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This opinion is based on the information contained in the following documents:

1. Environmental Associates, Inc., Preliminary Subsurface Exploration, Revchem Plastics, Inc., 1132 Thorne Road, Tacoma, Washington, June 10, 2004.
2. Environmental Associates, Inc., Groundwater Plume Delineation, Revchem Plastics, Inc., 1132 Thorne Road, Tacoma, Washington, July 23, 2004.
3. Environmental Associates, Inc., Offsite Groundwater Plume Delineation, Former Automotive Tire Service Facility, 1132 Thorne Road, Tacoma, Washington, February 11, 2005.
4. Environmental Management Services, LLC, Groundwater Sampling Report, 1940 East 11th, Tacoma, Washington, July 20, 2005.
5. LSI Adapt, Supplemental Characterization, Groundwater Monitoring Well Installation and July 2005 Groundwater Quality Monitoring Report, Former Automotive Tire Service Facility, 1132 Thorne Road, Tacoma, WA 98421, November 10, 2005.
6. Pacific Crest Environmental, LLC, Focused Site Investigation Report, Shaub-Ellison Company, 1132 Thorne Road, Tacoma, Washington, June 13, 2006.
7. Pacific Crest Environmental, LLC, Remedial Investigation Report, Former Sound Mattress and Felt Property, 1940 East 11<sup>th</sup> Street, Tacoma, Washington, December 9, 2009.
8. Pacific Crest Environmental, LLC, Data Gap Investigation Report, Former Sound Mattress and Felt Property, 1940 East 11<sup>th</sup> Street, Tacoma, Washington, August 4, 2010.

Those documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

This opinion is void if any of the information contained in those documents is materially false or misleading.

### Analysis of the Cleanup

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Ecology has concluded that **further remedial action** is necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

#### 1. Characterization of the Site.

Ecology has determined your characterization of the Site **is sufficient** to establish cleanup standards and select a cleanup action. The Site is described above and in **Enclosure A**.

Environmental Associates, Inc. (EAI) conducted sampling and testing of the former Automotive Tire Service Facility, located on the Shaub-Ellison property at 1132 Thorne Road, from March through May of 2004. The findings of that subsurface investigation included the discovery of tetrachloroethylene (PCE) in the ground water in the vicinity of the southwest corner of the warehouse. In addition to chlorinated hydrocarbons, petroleum hydrocarbons were detected in soil samples. The source is unknown, but diesel appears to have penetrated the fill soil that existed around the former hydraulic floor hoist. The extent of diesel-impacted ground water appears to be limited and contained within the boundaries of the Shaub-Ellison property. However, the extent of the chlorinated hydrocarbon plume had not been determined in the initial characterization of the property.

In July 2004, additional Strataprobe borings supported by a mobile laboratory further delineated the on-Site extent of the ground-water plume. Additionally, four permanent ground-water monitoring wells were installed on the Shaub-Ellison property. The results of this additional work suggested that the solvent plume likely extended off the property in a northerly direction onto the northwest Robert Shea property. A number of additional monitoring wells were installed in 2005.

On January 27, 2005, a builder's level and a depth-to-water meter were employed to survey the elevation of the shallow water table. The water-table survey suggested that shallow ground water flows toward the north-northwest under a 0.4% gradient, which is consistent with the previous survey of monitoring wells MW-1 through MW-4 in July 2004. Following the survey, each well was sampled for volatile organic compounds (VOCs) and analyzed using Environmental Protection Agency (EPA) Method 8260B. Four of the eight monitoring wells (MW-1, MW-2, MW-6, and MW-8) contained PCE at concentrations above Ecology's Method A 5 micrograms per liter (ug/l) cleanup level. Two of these wells (MW-1 and MW-2) are on the Shaub-Ellison property. The other two are located on the Robert Shea property. Monitoring well MW-6 also contained concentrations of trichloroethylene (TCE) and vinyl chloride at concentrations above the Ecology cleanup levels.

This investigation suggested that, based on the distribution of contaminants, along with the ground-water flow direction to the north, the original source area for the solvent release may have been further southwest on the Shaub-Ellison property, and may not have been solely related to a part-washer that existed in the southwest corner of the former service bay area. The full down-gradient limits of the solvent plume likely extended under the warehouse building on the Robert Shea property.

On July 7, 2005, LSI Adapt (Adapt) sampled four of the eight ground-water monitoring wells using a peristaltic pump and low-flow methods. Environmental Management Services, LLC (EMS), environmental consultant for the adjacent Robert Shea property, sampled the four monitoring wells on that property. The two consulting firms shared results. Based on the ground-water elevation measurements, ground-water migration direction appeared to be to the north at a gradient that ranged from 0.004 to 0.008 feet(ft)/ft.

Soil and ground-water analytical data and reported ground-water flow direction data collected to date did not indicate an apparent residual source for chlorinated hydrocarbons on the Shaub-Ellison property. The presence of daughter products (TCE, trans- and cis-Dichloroethylene [-DCE] and vinyl chloride) in ground water appeared to indicate that some natural attenuation was occurring at the Site. However, following the Adapt study, evidence suggested a likely source of chlorinated hydrocarbons present on the Robert Shea property and not the Shaub-Ellison property.

Pacific Crest Environmental (Pacific Crest) conducted a focused Site investigation in April to May 2006. The focused investigation included the completion of a utility conduit survey and a soil gas survey at the Site. The results of the utility survey indicated that public utilities located adjacent to the Site in the Thorne Road right-of-way include natural gas, municipal storm sewer, and municipal sanitary sewer. The natural gas line serving the Site parallels the Sound Mattress building 20 ft to the east. The natural gas line enters the building near the building mid-point (Figure 2). The non-conductible utility locate revealed a 4-inch polyvinyl chloride (PVC) sanitary sewer line situated approximately between 25 and 43 ft east of and running semi-parallel to the Sound Mattress building (Figure 2). To determine the subsurface position of the sewer line, a cable carrying a transmitting device and camera was pushed through the line for approximately 225 ft, the maximum serviceable distance of the instrumentation. Three laterals to the sanitary sewer line extending from the Sound Mattress building were identified by the locate.

As a result of the utility investigation, a soil-gas survey was performed at the Site. The analytical data for the soil-gas survey indicated that soil vapor plumes of PCE, TCE, and DCE are present in the Site subsurface. The highest concentrations of VOCs were detected adjacent to the south side of the sanitary sewer line and approximately midway between the second and third side sewer laterals identified at the Site.

During the period that Sound Mattress apparently conducted aluminum etching, plating, and painting activities, PCE and TCE were commonly used to remove organic contaminants. The historical research and utility survey results indicate that the underground sanitary sewer line laterals appear to be connected to that portion of the Sound Mattress building that was formerly used in the plating and etching activities. Further, the PVC material used to construct the underground sanitary sewer line is highly susceptible to degradation by chlorinated solvents. The distribution of VOCs detected by the soil vapor survey indicates that the VOCs observed at the Site are likely the result of an historical release of PCE. The pathway for PCE entering the subsurface would appear to be the sanitary sewer line that is connected to the Sound Mattress building approximately midway between laterals LAT2 and LAT3. The distribution of PCE observed in the ground water is consistent with the probable point of release. Historically, the highest concentrations of PCE in ground water have been detected in monitoring wells MW-7 and MW-8, which are located adjacent to the south side of the sanitary sewer line. In addition to PCE, concentrations of TCE, DCE, and vinyl chloride have also been detected in ground water at the Site above applicable MTCA Method A or B ground-water cleanup levels. The low to non-detect concentrations of VOCs in soil samples collected from the Site are also consistent with a point release from the sanitary sewer line. The high permeability of the backfilled sanitary sewer line has provided a pathway for the movement of soil vapors, resulting in the elongated shape of the PCE and TCE soil vapor plumes, the axes of which are nearly superimposed above the sewer line. The evidence is consistent with a release of PCE from the Sound Mattress building operations during the 1960s.

In October 2006, Pacific Crest advanced one soil boring and converted it to monitoring well MW-10. Pacific Crest collected soil samples and later collected ground-water samples from this well and from monitoring wells MW-1 through MW-8. In November 2008, Pacific Crest constructed monitoring well MW-11 and again sampled the soil and ground water from the available wells. Three more monitoring wells (MW-12 through MW-14) were constructed in 2009. Soil and ground water were sampled from these wells and analyzed for VOCs. In April 2009, Pacific Crest conducted a 72-hour tidal study by monitoring ground-water elevations in select Site monitoring wells using data-logging pressure transducers.

In June 2009, the Port of Tacoma conducted an indoor air survey by collecting indoor air and ambient air samples at three locations in the Site building over a 24-hour period using Summa Canisters. These samples were sent to an independent laboratory that ran samples for VOCs as per US Environmental Protection Agency Method TO-15 SIM. Although the outside ambient air samples did not exceed any of the Ecology cleanup levels or screening levels for air, the two locations inside the building had samples that exceeded the MTCA Method B and C PCE and TCE air cleanup levels.

In August 2009, Pacific Crest conducted another passive soil-vapor survey by installing and retrieving Gore-Sorber modules at 33 locations beneath the building. All of the Site investigations indicated that the lateral extent of contamination had not been determined.

In May and June 2010, a two-stage investigation was conducted to attempt to close the data gaps. Further investigation of the ground water to the north of the former Sound Mattress and Felt property was necessary to determine if contamination was entering the Sitcum Waterway and Commencement Bay. Borings were drilled to depths of 26 to 36 ft below ground surface (bgs) at locations shown in Figure 2. Boring MW-15 was converted to monitoring well MW-15 and is located adjacent to the waterway. Total well depth was set at 30 ft bgs. From June 15 to June 17, 2010, Pacific Crest monitored the depth to ground water in the newly installed monitoring well MW-15 using a data-logging pressure transducer. The study was conducted to determine timing and magnitude of the influence of tidal surface-water fluctuations in the vicinity of the Sitcum Waterway. Tidal fluctuations ranged from 6.44 ft bgs to 15.82 ft bgs in a 25-hour period and lags minimum and maximum tidal stage in the Sitcum Waterway by 12 minutes.

The results of the data gap investigation indicated that shallow ground water at the Site is encountered at approximately 10 ft bgs, and is located in a shallow unconfined aquifer that extends to approximately 30 ft bgs. This aquifer directly overlies a competent silt layer reported to be up to 11 ft thick at the Port of Tacoma. The laboratory analysis of a ground-water sample from well MW-15 detected vinyl chloride at 280 ug/l, which exceeds the federal Water Quality Criteria surface-water cleanup level of 2.4 ug/l. Cis-1,2-DCE was detected at 1,400 ug/l, which is less than the federal Water Quality Criteria cleanup level for the surface water for trans-1,2-DCE (10,000 ug/l). The data-gap investigation indicates that vinyl chloride and DCE is building up at the down-gradient edge of the Site where it is entering the waterway. Whereas, PCE, TCE, DCE, and vinyl chloride concentrations that exceed surface-water cleanup levels are present beneath the former Sound Mattress building. Figures 4 and 5 show the VOC concentrations in ground water. It would appear that the lateral and vertical extent of the chlorinated hydrocarbon plume has been characterized at the former Sound Mattress and Felt Site. Figures 3, 4, and 7 depict the former Sound Mattress and Felt Site.

## 2. Establishment of cleanup standards.

Ecology has determined the cleanup levels and points of compliance you established for the Site do not meet the substantive requirements of MTCA.

Pacific Crest has determined that the COCs are PCE and the daughter products generated by reductive dechlorination. The daughter products are TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. Pacific Crest has established cleanup standards for this Site through the remedial investigation (RI). Cleanup standards include cleanup levels and points of

compliance where those cleanup levels are to be met. The cleanup levels for PCE, TCE, cis-1,2-DCE, and vinyl chloride were calculated in accordance with Method C of MTCA for the surface water exposure pathway that is protective of human exposure scenarios for ingestion of seafood. The cleanup levels for PCE, TCE, and vinyl chloride were adjusted downward to ensure that the total excess cancer risk does not exceed  $1.0 \times 10^{-5}$ . No adjustment was necessary for the non-carcinogen cleanup level of cis-1,2-DCE. The Pacific Crest RI Cleanup Levels for ground water are summarized below:

Ground-Water Cleanup Levels

COC	Method A (ug/l)	RI Method C (ug/l)	RI Cleanup Level (ug/l)	Excess Cancer Risk	RI Regulatory Basis
PCE	5	9.7	7.76	$8.00 \times 10^{-6}$	MTCA Method C – adjusted downward
TCE	5	165.5	16.55	$1.00 \times 10^{-6}$	MTCA Method C – Adjusted downward
Vinyl Chloride	0.2	90	9	$1.00 \times 10^{-6}$	MTCA Method C – adjusted downward
<b>Total Risk</b>				$1 \times 10^{-5}$	
Cis-1,2-DCE	-----	13,000	13,000		MTCA Method C

The Pacific Crest Cleanup Levels for COCs detected in upland soil at the Site, including PCE, TCE, cis-1,2-DCE, and vinyl chloride, were calculated in accordance with MTCA Method B for the dermal exposure route and for Method C for leaching to ground water - surface -water exposure pathway that is protective of human exposure scenarios for ingestion of seafood. The lower of the values (dermal exposure vs. surface water) was selected as the Pacific Crest RI Cleanup Level. The RI Cleanup Levels are summarized below:

Upland Soil Cleanup Levels

COC	Method A (mg/kg)	Dermal Exposure (mg/kg)	Protection of Surface Water (mg/kg)	RI Cleanup Level (mg/kg)	RI Regulatory Basis
PCE	0.5	1.85	0.334	0.334	MTCA Method C – adjusted

					downward
TCE	0.03	11	0.296	0.296	MTCA Method C – Adjusted downward
Vinyl Chloride	-----	0.667	0.057	0.057	MTCA Method C – adjusted downward
Cis-1,2-DCE	-----	800	65	65	MTCA Method C

The Pacific Crest Cleanup Levels for the COCs in air at the Site were calculated based on an exposure scenario for workers in an industrial setting. The Method C air cleanup levels were calculated assuming a workday of 10 hours/day and an exposure frequency of 250 days per year (i.e., a typical 5-day work schedule). When multiple hazardous substances are present, cleanup levels for individual hazardous substances are adjusted downward to ensure that the total excess cancer risk does not exceed  $1.0 \times 10^{-5}$  and the total non-carcinogenic risk does not exceed a hazard quotient of 1.0. The cleanup levels for PCE, TCE, and vinyl chloride were adjusted downward to ensure that the total excess cancer risk does not exceed  $1.0 \times 10^{-5}$ . No adjustment was necessary for the cleanup level of cis-1,2-DCE. The Pacific Crest RI Cleanup Levels for air are summarized below:

Indoor Air Cleanup Levels

COC	Method B (ug/m <sup>3</sup> )	RI Method C (ug/m <sup>3</sup> )	RI Cleanup Level (ug/m <sup>3</sup> )	Excess Cancer Risk	RI Regulatory Basis
PCE	0.42	14.61	6.57	$4.50 \times 10^{-6}$	MTCA Method C – adjusted downward
TCE	0.1	3.45	1.55	$4.50 \times 10^{-6}$	MTCA Method C – Adjusted downward
Vinyl Chloride	0.28	9.9	0.99	$1.00 \times 10^{-6}$	MTCA Method C – adjusted downward
<b>Total Risk</b>				<b><math>1 \times 10^{-5}</math></b>	



Cis-1,2-DCE	16	122.72	122.72	MTCA Method C
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*Although these cleanup levels would appear to be appropriate for this Site, MTCA provides for first evaluating whether Applicable or Relevant and Appropriate Requirements (ARARs) are available for the particular pathway of concern and whether these ARARs are sufficiently protective. In the case of ground-water and the surface-water pathway, ARARs are available and are appropriate for the pathway of concern. The MTCA cleanup levels are summarized in the following table:*

<i>Ground-Water Cleanup Levels</i>						
COC	RI Method C (ug/l)	RI Cleanup Level (ug/l)	ARAR Cleanup Level (ug/l)	ARAR Cleanup Level for Site (ug/l)	Excess Cancer Risk	RI Regulatory Basis
PCE	9.7	7.76	3.3	3.3	1.00 x 10 <sup>-6</sup>	National Recommended Water Quality Criteria (2009)
TCE	165.5	16.55	30	30	1.00 x 10 <sup>-6</sup>	National Recommended Water Quality Criteria (2009)
Vinyl Chloride	90	9	2.4	2.4	1.00 x 10 <sup>-6</sup>	National Recommended Water Quality Criteria (2009)
<b>Total Risk</b>					<b>3 x 10<sup>-6</sup></b>	
Trans-1,2-DCE or Cis-1,2-DCE	-----	-----	10,000			National Recommended Water Quality Criteria (2009)

*Although the indoor air cleanup levels that have been established are appropriate for this Site, PCE and TCE concentrations exceed indoor air Method B and Method C cleanup levels as presented in the Ecology Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action. Although cleanup levels established for protection of surface water may be appropriate for that pathway, it is not necessarily protective of indoor air. Therefore, additional characterization of soil vapor will need to be conducted at this Site. It will be necessary to incorporate the Johnson/Ettinger Model to evaluate soil-vapor intrusion. Indoor air samples collected by the Port of Tacoma discovered PCE and TCE concentrations that exceeded guidance document Table B-1 Method B and Method C indoor air cleanup levels in one location and a PCE concentration that exceeded the Method B and Method C cleanup levels at a second location.*

Pacific Crest established the point of compliance for ground water as the standard point of compliance defined as all ground water from the uppermost level of the saturated zone extending vertically to the lowest depth that is affected by any of the COCs. A conditional point of compliance has not been established for this Site. Pacific Crest has stated that for the purposes of the RI, the standard point of compliance will be used for evaluation of compliance with the cleanup standards. However, a conditional point of compliance may be proposed for ground water at some time in the future. The point of compliance for soil based on the protection of ground water is defined as all soil throughout the Site. The point of compliance for soil cleanup levels based on direct contact is soil between ground surface and 15 ft bgs. Air cleanup standards apply to ambient air and to air within any building or other structure large enough for a person to fit. The point of compliance for air is defined as ambient air throughout the Site.

3. **Selection of cleanup action.**

Ecology has determined the cleanup action you selected for the Site does not meet the substantive requirements of MTCA.

No feasibility study has been conducted for this Site to determine alternatives for cleanup.

4. **Cleanup.**

Ecology has determined the cleanup you performed does not meet any cleanup standards at the Site.

*No cleanup has yet been performed at this Site. Further action is necessary to achieve or maintain compliance with cleanup standards, including development of the following:*

- *Environmental covenants for institutional controls for maintaining industrial Method C cleanup levels for indoor air at this Site. The Commencement Bay*

*ground water is considered non-potable and does not require an environmental covenant.*

- *Operation and maintenance plans for any engineered controls.*
- *Confirmational monitoring plans.*

*All sampling data shall be submitted to Ecology according to the requirements of WAC 173-340-840(5), in printed form and in electronic form capable of being transferred into the Department's data management system. Electronic data submittal requirements are provided at <http://www.ecy.wa.gov/eim/>.*

### **Limitations of the Opinion**

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**1. Opinion does not settle liability with the state.**

Liabe persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion does not:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

**2. Opinion does not constitute a determination of substantial equivalence.**

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. See RCW 70.105D.080 and WAC 173-340-545.

**3. State is immune from liability.**

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. See RCW 70.105D.030(1)(i).

### **Contact Information**

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Thank you for choosing to clean up the Site under the Voluntary Cleanup Program (VCP). After you have addressed our concerns, you may request another review of your cleanup. Please do not hesitate to request additional services as your cleanup progresses. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our web site: [www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm](http://www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm). If you have any questions about this opinion, please contact me by phone at (360) 407-6267 or e-mail at [CHCL461@ecy.wa.gov](mailto:CHCL461@ecy.wa.gov).

Sincerely,



Charles S. Cline  
SWRO Toxics Cleanup Program

CSC/ksc:Sound Mattress Site FA 112010

Enclosures (1): A – Description and Diagrams of the Site

By certified mail: (7009 2820 0001 7161 0497)

cc: Mr. Scott Hooton, Port of Tacoma  
Mr. Carl Forsberg, Forsberg & Umlauf, P.S.  
Ms. Lauren G. Carroll, L.G., L.H.G., Pacific Crest Environmental, LLC  
Ms. Sharon Bell, Tacoma-Pierce County Health Dept.  
Mr. Scott Rose, Ecology w/o enclosures  
Ms. Dolores Mitchell, Ecology w/o enclosures

**Enclosure A**

**Description and Diagrams of the Site**

## Site Description

Portions of the former Sound Mattress & Felt Company property, located at 1940 East 11<sup>th</sup> Street, Tacoma, Washington, and the Shaub-Ellison property, located at 1132 Thorne Road, Tacoma, Washington, are the subject of various investigations and are collectively referred to as the Site. The Site is located within a portion of the Sound Mattress & Felt Property and marginally extends onto the adjacent Shaub-Ellison property to the southeast, and extends to the northwest under East 11<sup>th</sup> Street and the Port of Tacoma property beyond (Figure 2). Figure 1 and aerial photograph 1 show the general vicinity of the properties. Both properties are located in the Commencement Bay industrial area of the City of Tacoma, Pierce County, approximately 500 feet from the marine waters of Sitcum Waterway. The Shaub-Ellison property has Pierce County Tax #6965000502 and is approximately 0.79 acre. Both the former Sound Mattress & Felt Property and the Shaub-Ellison property are currently owned by the Port of Tacoma, which purchased the properties in October 2006 and August 2007, respectively. The Shaub-Ellison property was purchased from Mr. Robert Shea, Sr. in 1970. The Shaub-Ellison company operated a retail tire service center on the property from 1974 to 1998. It is presently occupied by Revchem Plastics Company. The adjacent former Sound Mattress & Felt Company Property is labeled Tax parcel #2275200661 and is approximately 5.77 acres. The Sound Mattress and Felt Company manufactured steel spring mattresses in the early 1960s. The manufacturing operations included painting, aluminum etching, buffing, plating, and acid storage. The Sound Mattress property was purchased by Robert Shea, Sr. in 1964. It was recently occupied by Brown & Haley Company until it was vacated in 2010. Following purchase in 1964, Robert Shea, Sr. installed a polyvinyl chloride (PVC) underground sanitary sewer line in the alley east of the Sound Mattress building, located between the Sound Mattress property and the Shaub-Ellison property. It is the understanding of Robert Shea, Jr. that the sanitary sewer line installed by his father exits the building at the cleanout (CO) and ends in an open termination point somewhere on the northeast side of the building, without connection to the municipal sewer line on Thorne Road (Figure 2).

Physiographically, the Site is situated on a delta, known as the "tide flats", formed by the Puyallup River, and Wapato and Hylebos Creeks where they discharge into Commencement Bay. Sediments have been deposited, modified by the river and creeks and by tidal action. Dredge and fill activities conducted since the 1920s have significantly changed the estuarine nature of the shoreline and the tide flats. The historic meandering streams and rivers were dredged to form waterways; and the intertidal areas between the waterways were filled with dredge material to create useable land. The newly created land has since been used for commercial and industrial operations including shipbuilding, chemical manufacturing, ore smelting, oil refining, food preservation, and transportation facilities. Materials that may underlie the Site at some depth may include imported fill materials and recent alluvium of silt, sand, and gravel. The various investigations have described the fill as consisting of sand and gravel to a depth of 3 feet below ground surface (ft bgs), overlying fine sand with occasional minor silt and shell fragments to approximately 13.5 to 15 ft bgs, at which depth a silt to clayey silt layer is encountered. The silt to clayey silt layer is likely tide flat mud and has been interpreted to represent the base of the shallow water-bearing zone. Figure 7 shows a cross-sectional view of the Site lithology. The Site is situated on a generally level area, approximately 15 ft above mean sea level. Depth to ground water during the various Site studies averaged approximately 6 to 11.5 ft bgs. Saturated conditions extend to the top of the clayey silt at approximately 30 ft bgs that is interpreted to represent the base of the shallow water-bearing zone. The depth to ground water at the Site ranged from a high of 4.52 ft below the top of the casing in well MW-9 to a low of 15.82 ft below the top of casing in well MW-15. The ground-water flow direction was generally to the north-northwest and may vary depending on tidal fluctuations. Figure 6 shows the direction of ground-water flow.

## Site Diagrams

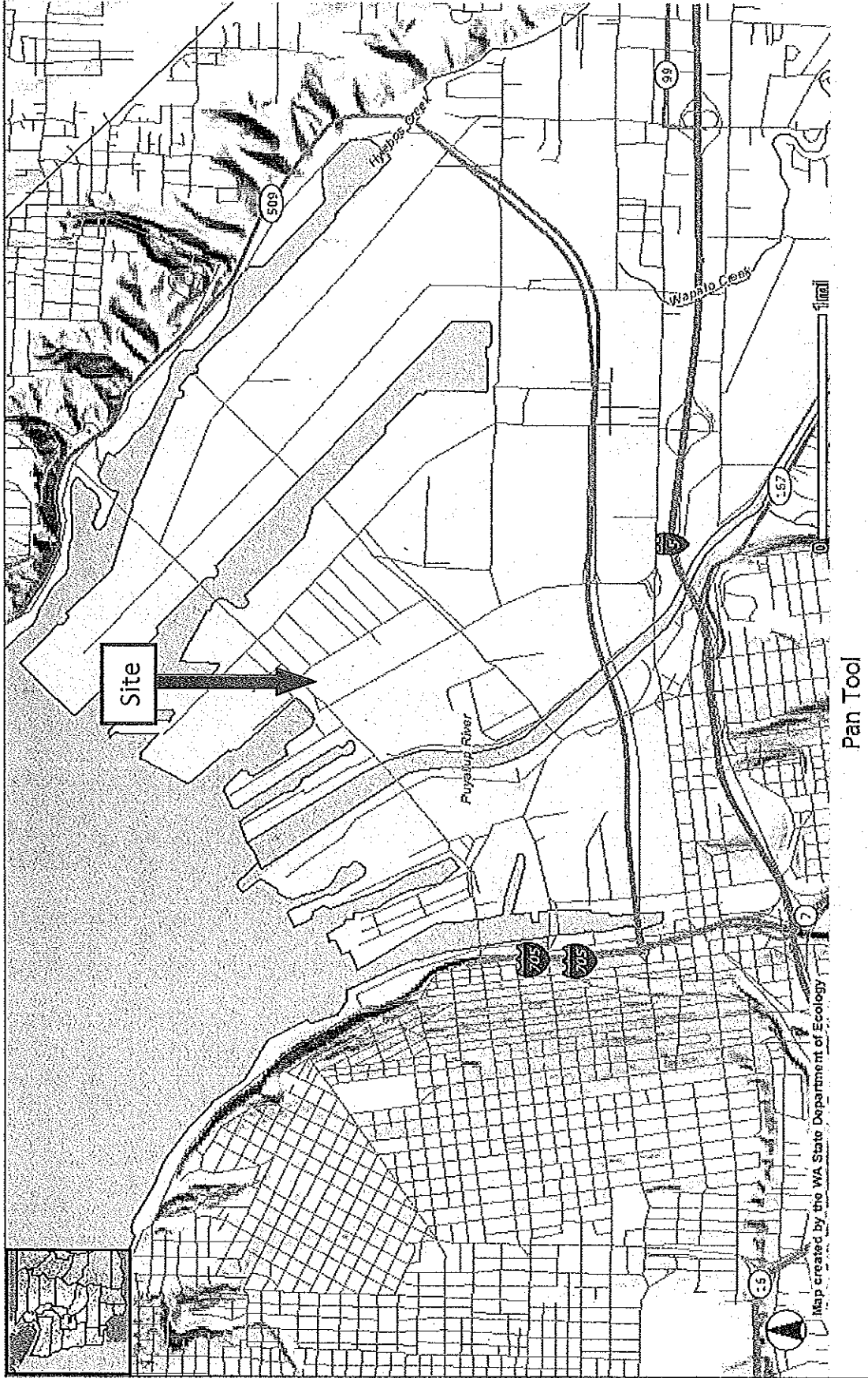
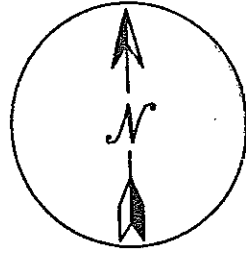


Figure 1 – Sound Mattress & Felt Company Property  
1940 East 11<sup>th</sup> Street, Tacoma





Sitcum Waterway

Port of Tacoma

East Sitcum Way

East 11th Street

Thorne Road

Ross Way

Manufacturing/Painting  
Packing/Shipping

Painting & Drying  
Plating  
Buffing

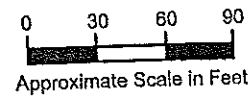
Warehouse

RevChem  
Plastics

Gas Line  
Trucking

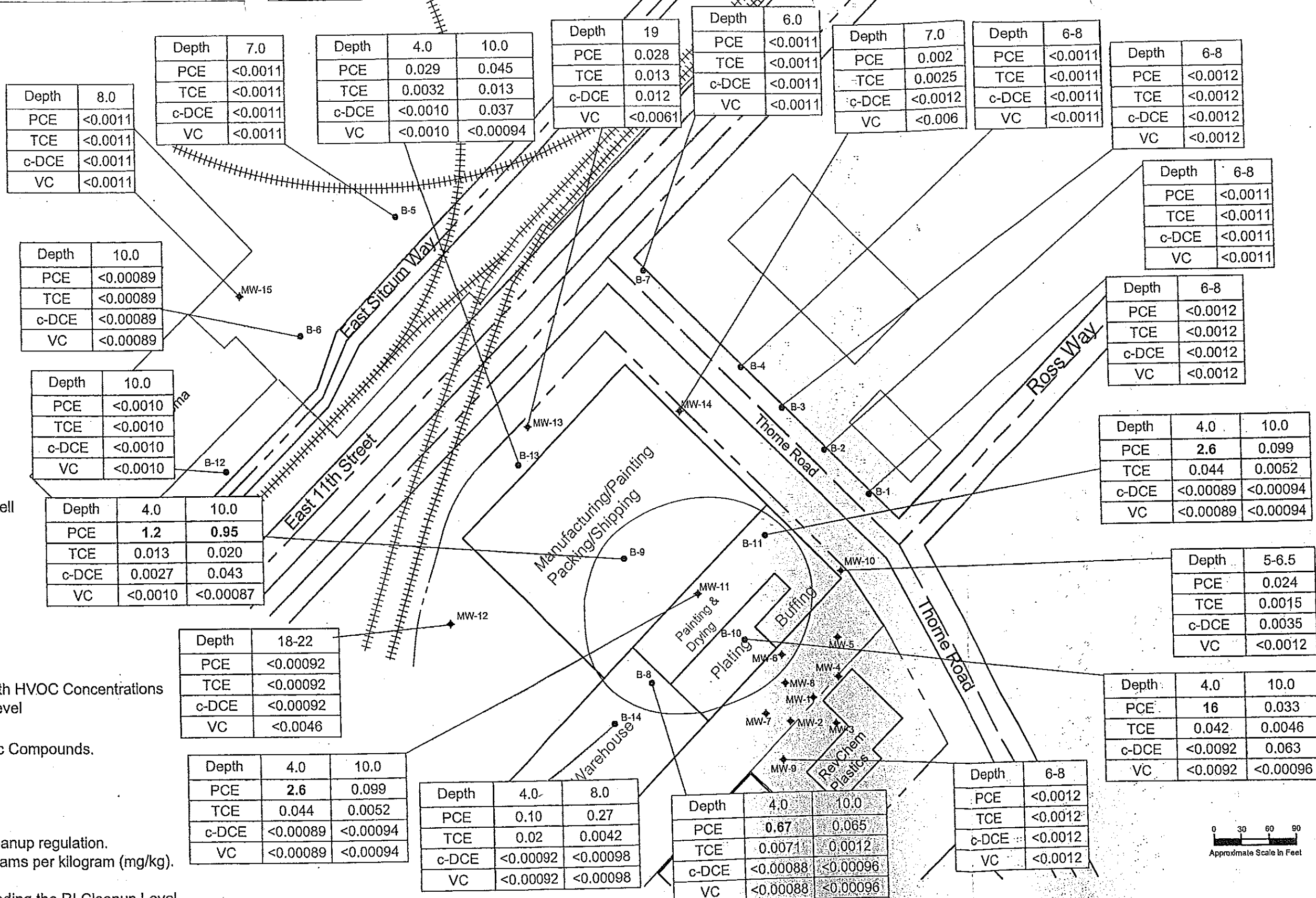
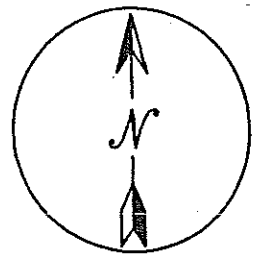
**Legend**

- ◆ MW-9 Groundwater Monitoring Well
- B-4 Soil Boring
- A—A' Cross-section location
- Road
- Building Exterior
- - - Property Boundary
- - - Pre-1965 Operations
- ++++ Railroad Tracks
- ss- Sanitary Sewer
- G- Gas Line



PACIFIC CREST ENVIRONMENTAL  
WWW.PCENV.COM 425-888-4990

**Figure 2**  
**Site Plan with Cross Section Location**  
Former Sound Mattress and Felt Company Property  
1940 East 11th Street Tacoma, Washington



### Legend

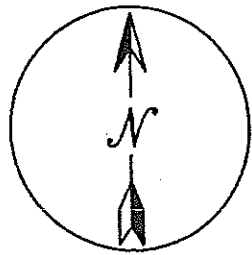
- ◆ MW-9 Groundwater Monitoring Well
- B-4 Soil Boring
- Road
- Building Exterior
- - - Property Boundary
- - - Pre-1965 Operations
- ++++ Railroad Tracks
- Estimated Extent of Soil with HVOC Concentrations Exceeding a RI Cleanup Level

**NOTES:**  
 HVOC = Halogenated Volatile Organic Compounds.  
 PCE = Tetrachloroethene.  
 TCE = Trichloroethene.  
 c-DCE = cis-1,2-dichloroethene.  
 VC = Vinyl Chloride.  
 MTCA = Model Toxics Control Act cleanup regulation.  
 Groundwater concentrations in milligrams per kilogram (mg/kg).  
 Depths in feet below ground surface.  
**BOLD** indicates concentrations exceeding the RI Cleanup Level.  
 < indicates concentrations less than the laboratory practical quantitation limit listed.  
 RI Cleanup Levels:  
 PCE = 0.334 mg/kg  
 TCE = 0.296 mg/kg  
 c-DCE = 65 mg/kg  
 VC = 0.057 mg/kg

Soil samples collected on 9/21/2005 (MW-9), 10/20/2006 (MW-10), 11/29/2007 (B-1 to B-4), 11/19/2008 (MW-11), 3/4 to 6/2009 (MW-12 to MW-14), 5/25 & 26/2010 (B-5 to B-11), 6/15 to 17/2010 (B-12 to B-14, & MW-15).



**Figure 3**  
**HVOC Concentrations in Soil**  
 Former Sound Mattress and Felt Company Property  
 1940 East 11th Street Tacoma, Washington



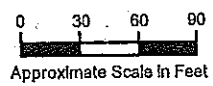
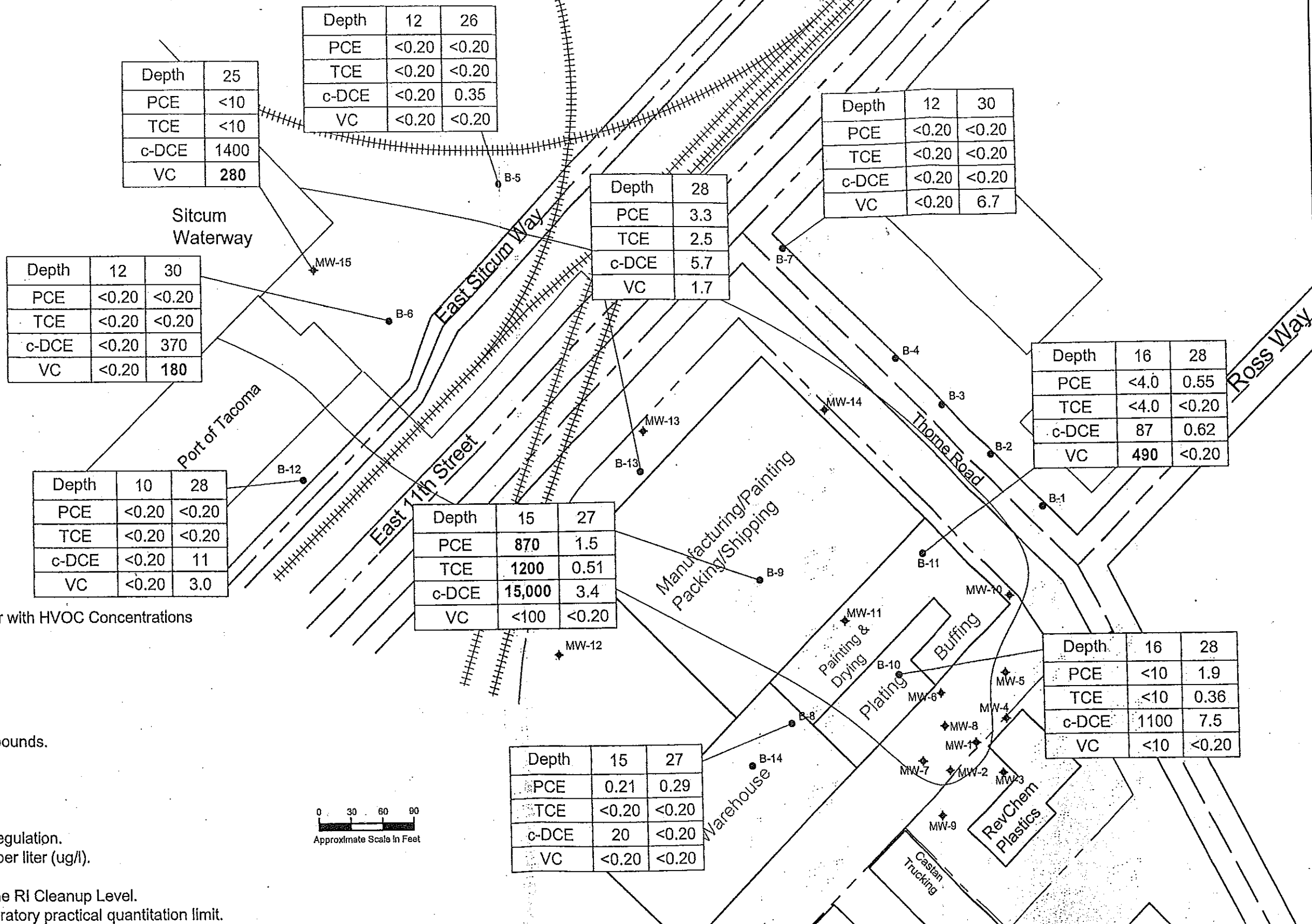
## Legend

- ◆ MW-9 Groundwater Monitoring Well
- B-4 Soil Boring
- Road
- Building Exterior
- - - Property Boundary
- Pre-1965 Operations
- ++++ Railroad Tracks
- Estimated Extent of Groundwater with HVOC Concentrations Exceeding RI Cleanup Levels

**NOTES:**  
 HVOC = Halogenated Volatile Organic Compounds.  
 PCE = Tetrachloroethene.  
 TCE = Trichloroethene.  
 c-DCE = cis-1,2-dichloroethene.  
 VC = Vinyl Chloride.  
 MTCA = Model Toxics Control Act cleanup regulation.  
 Groundwater concentrations in micrograms per liter (ug/l).  
 Depths in feet below ground surface.  
**BOLD** indicates concentrations exceeding the RI Cleanup Level.  
 < indicates concentrations less than the laboratory practical quantitation limit.  
 RI Cleanup Levels:  
 PCE = 7.76 ug/l  
 TCE = 16.55 ug/l  
 c-DCE = 13,000 ug/l  
 VC = 9 ug/l

Reconnaissance groundwater samples were collected on May 25 & 26 (B-5 to B-11), and June 15 & 16, 2010 (B-12 and B-13).

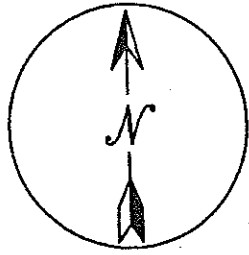
A groundwater sample was collected from MW-15 on June 17, 2010.



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**Figure 4**  
**HVOC Concentrations in Groundwater**  
 May and June, 2010

Former Sound Mattress and Felt Company Property  
 1940 East 11th Street Tacoma, Washington

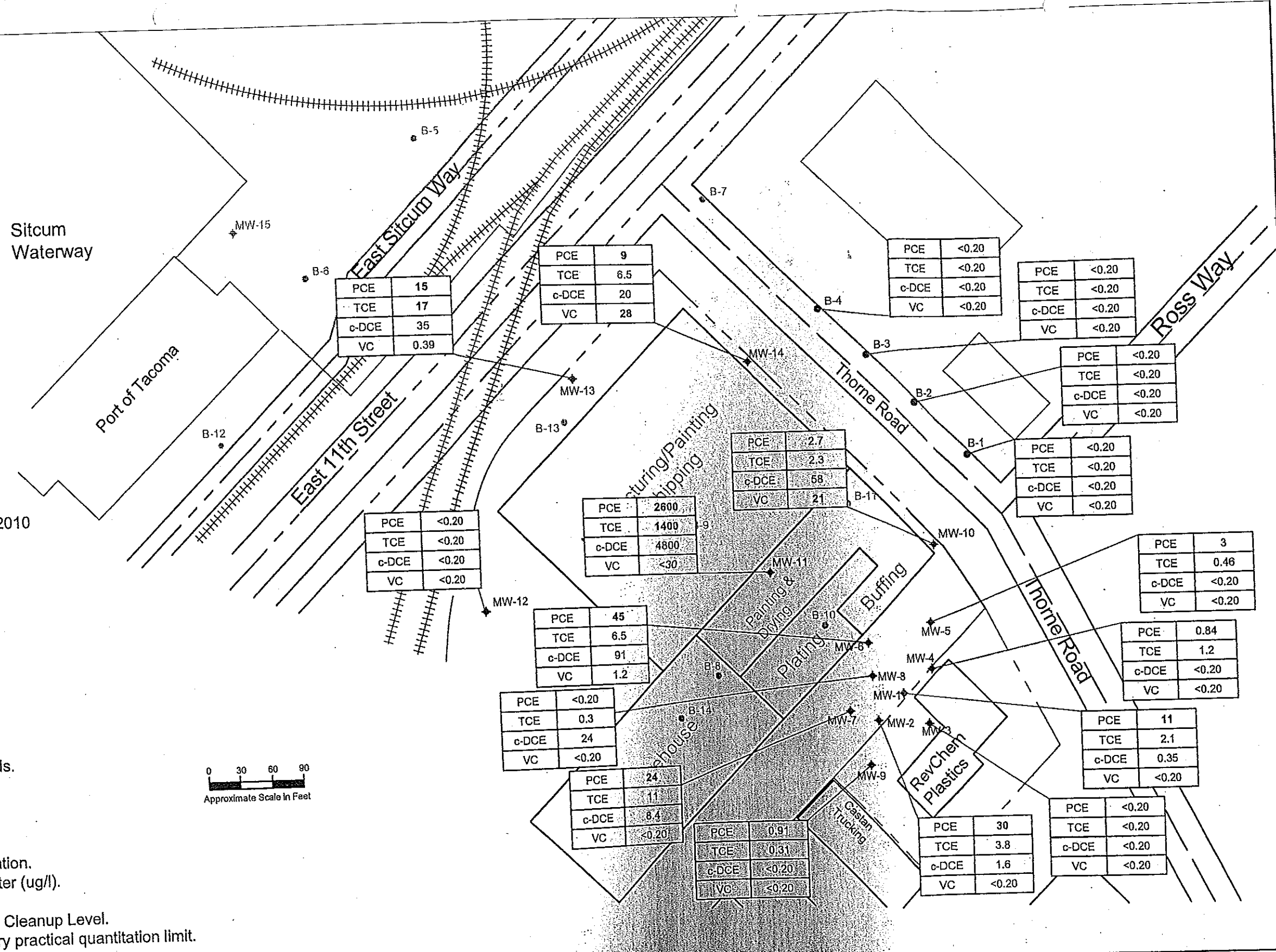
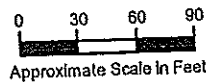


## Legend

- ◆ MW-9 Groundwater Monitoring Well
- B-4 Soil Boring
- ◆ MW-15 Groundwater Monitoring Well installed in June, 2010
- B-4 Soil Boring advanced in May or June, 2010
- Road
- Building Exterior
- - - Property Boundary
- Pre-1965 Operations
- ++++ Railroad Tracks

**NOTES:**  
 HVOC = Halogenated Volatile Organic Compounds.  
 PCE = Tetrachloroethene.  
 TCE = Trichloroethene.  
 c-DCE = cis-1,2-dichloroethene.  
 VC = Vinyl Chloride.  
 MTCA = Model Toxics Control Act cleanup regulation.  
 Groundwater concentrations in micrograms per liter (ug/l).  
 Depths in feet below ground surface.  
**BOLD** indicates concentrations exceeding the RI Cleanup Level.  
 < indicates concentrations less than the laboratory practical quantitation limit.  
 RI Cleanup Levels:  
 PCE = 7.76 ug/l  
 TCE = 16.55 ug/l  
 c-DCE = 13,000 ug/l  
 VC = 9 ug/l

Reconnaissance groundwater samples collected on November 29, 2007 (B-1 to B-4).  
 Groundwater samples were collected from monitoring wells on March 10, 2009 (MW-12 to MW-14),  
 and November 20, 21 & 24, 2008 (MW-1 to MW-11).



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**Figure 5**  
**HVOC Concentrations in Groundwater**  
**Prior to 2010**

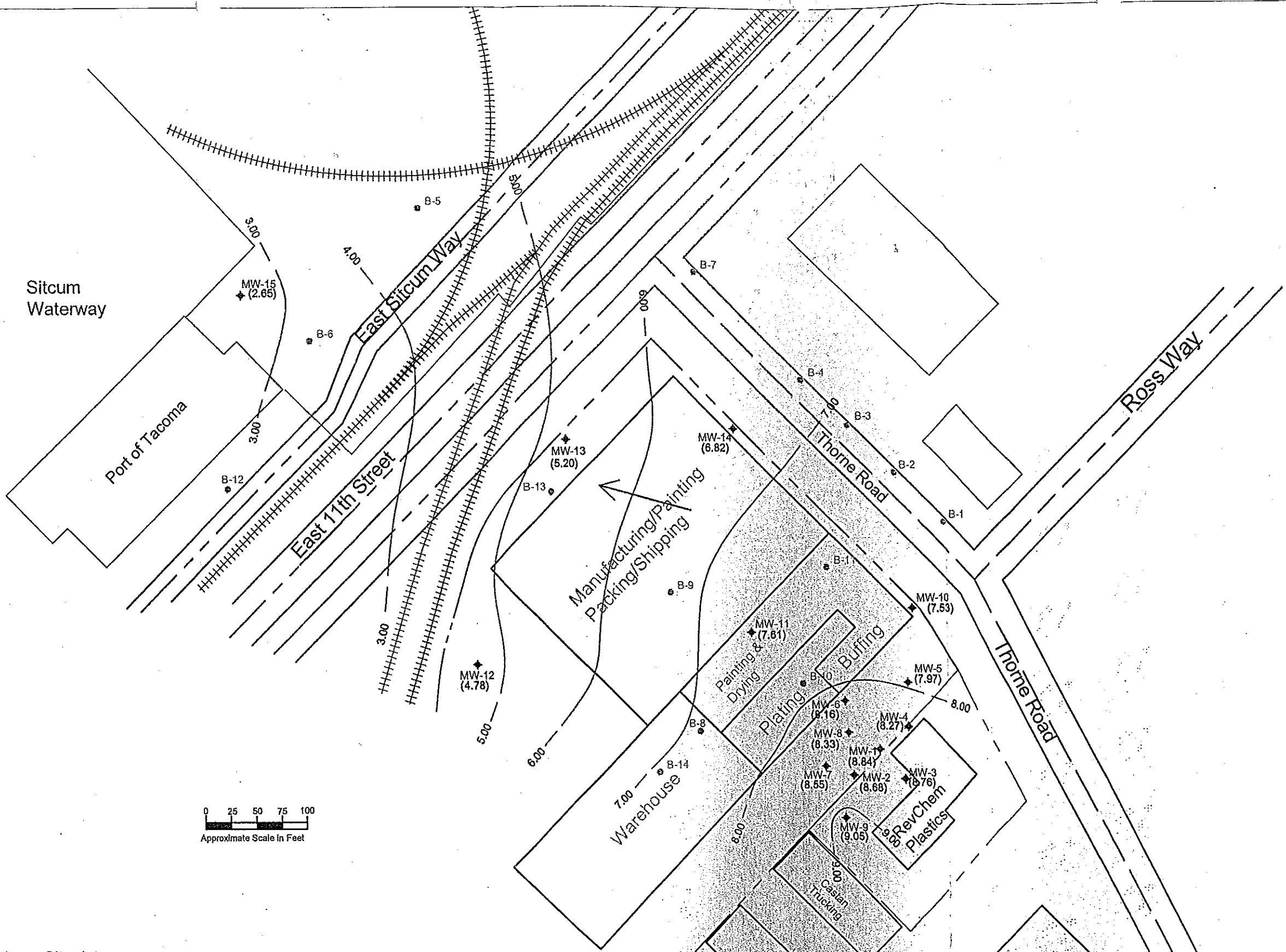
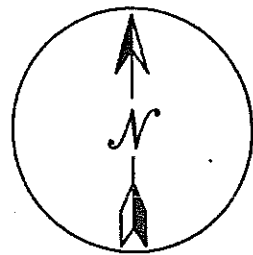
Former Sound Mattress and Felt Company Property  
 1940 East 11th Street Tacoma, Washington

Drawn By: MB

Checked By: WC

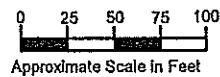
Date: 06/03/10

Project Number: 110-001



## Legend

- ◆ MW-9 Groundwater Monitoring Well
- B-4 Soil Boring
- (4.78) Potentiometric Elevation in Well
- 6.00 Potentiometric Contour Elevation
- ~ Potentiometric Contour
- Direction of Groundwater Flow
- Road
- ▭ Building Exterior
- - - Property Boundary
- Pre-1965 Operations
- ++++ Railroad Tracks



### NOTES:

Potentiometric Elevations are in feet above arbitrary Site datum.  
 Groundwater elevations were measured on June 17, 2010.  
 The Potentiometric elevation for MW-15 was calculated using a  
 25-hour mean depth to water for data collected using a  
 data-logging pressure transducer on June 16 & 17, 2010.



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**Figure 6**  
**Groundwater Potentiometric Surface**  
**(June 17, 2010)**

Former Sound Mattress and Felt Company Property  
 1940 East 11th Street Tacoma, Washington

Drawn By: MB

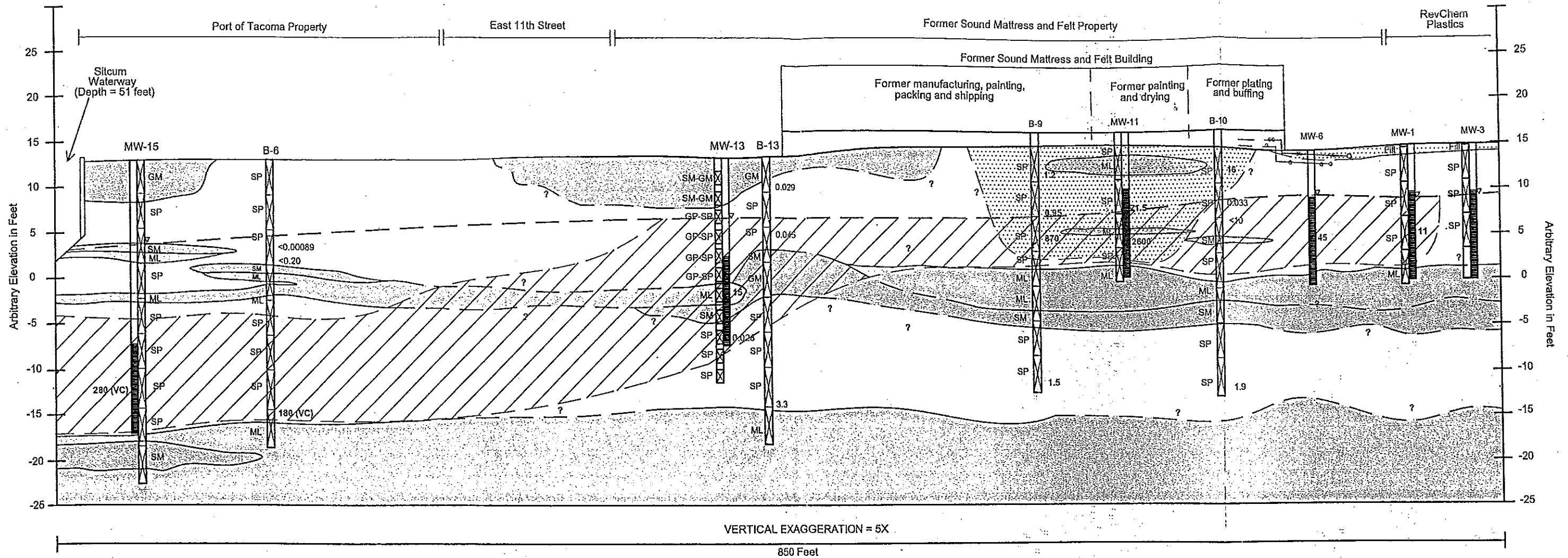
Checked By: WC

Date: 06/03/10

Project Number: 110-001

A  
(NORTHWEST)

A'  
(SOUTHEAST)



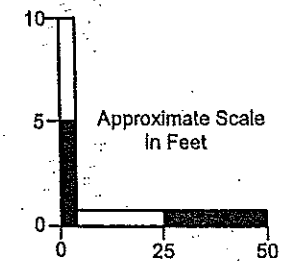
LEGEND

- Blank Well Casing
- Soil Sample Interval
- Potentiometric Elevation In Well
- Screened Interval
- FILL
- SP, GP-SP = Sand, Gravel and Sand
- SM, GM, SM-GM = Sand, Gravel or Sand and Gravel containing Silt
- ML = Silt
- Contact Between Sediment Types (Dashed Where Inferred)
- Groundwater Potentiometric Surface (June 17, 2010)
- Sanitary Sewer
- Gas Line

- 45 Concentration of PCE in Groundwater in  $\mu\text{g/l}$  (Bold indicates concentration exceeds RI Cleanup Level of 7.76  $\mu\text{g/l}$ )
- 180 (VC) Concentration of VC in Groundwater in  $\mu\text{g/l}$  (Bold indicates concentration exceeds RI Cleanup Level of 9.0  $\mu\text{g/l}$ )
- 1.5 Concentration of PCE in Soil in  $\text{mg/kg}$  ( Bold indicates concentration exceeds RI Cleanup Level of 0.334  $\text{mg/kg}$ )
- Estimated Extent of Groundwater with Concentrations of Site COCs Greater Than the RI Cleanup Level
- Estimated Extent of Soil with Concentrations of Site COCs Greater Than the RI Cleanup Level

Notes:

Concentrations of VC are displayed if they exceed the VC Cleanup Level of 9  $\mu\text{g/l}$  and all other HVOC concentrations are below the respective RI Cleanup Levels.  
 PCE = tetrachloroethylene.  
 VC = vinyl chloride.  
 $\mu\text{g/l}$  = micrograms per liter.  
 $\text{mg/kg}$  = milligrams per kilogram.  
 < indicates concentration is less than the laboratory practical quantitation limit displayed.



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**Figure 7**  
**Cross Section A - A'**  
 Former Sound Mattress and Felt Company  
 Property  
 1940 East 11th Street Tacoma, Washington