# Blaine Mini Mart Site
# Blaine, Washington

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Draft

# Cleanup Action Plan

Prepared for


Washington State Department of Ecology
Toxics Cleanup Program
300 Desmond Drive
Lacey, Washington

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# List of Acronyms

| | |
|---|---|
| ARAR | Applicable or relevant and appropriate requirement |
| ARRA | American Reinvestment and Recovery Act |
| bgs | below ground surface |
| CAP | Cleanup Action Plan |
| CLARC | Cleanup Levels and Risk Calculation |
| COC | contaminant of concern |
| CUL | cleanup level |
| Ecology | Washington State Department of Ecology |
| EDC | ethylene dichloride (1,2-dichloroethane) |
| FFS | Focused Feasibility Study |
| JEM | Johnson and Ettinger model |
| mg/kg | milligrams per kilogram |
| µg/L | micrograms per liter |
| MTBE | methyl tertiary-butyl ether |
| MTCA | Model Toxics Control Act |
| MW | monitoring well |
| NAPL | non-aqueous phase liquid |
| ORC | oxygen release compound |
| PVC | polyvinyl chloride |
| RCW | Revised Code of Washington |
| SAIC | Science Applications International Corporation |
| SB | soil boring |
| SCR | Site Characterization Report |
| SEPA | State Environmental Policy Act |
| TEE | terrestrial ecological evaluation |
| TPH | total petroleum hydrocarbons |
| UST | underground storage tank |
| VOC | volatile organic compound |
| WAC | Washington Administrative Code |

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# 1.0 Introduction

The purpose of this draft Cleanup Action Plan (CAP) is to identify the cleanup actions selected by the Washington State Department of Ecology (Ecology) for the remediation of contaminated soil and groundwater at the Blaine Mini Mart property, located at 2530 Peace Portal Drive in Blaine, Washington. This CAP has been developed in accordance with the Model Toxics Control Act (MTCA), under the Revised Code of Washington (RCW) 70.105D, and Chapter 173-340 of the Washington Administrative Code (WAC). Components of the CAP follow the listing in MTCA [WAC 173-340-380(1)].

The Toxics Cleanup Program of Ecology is managing the Site Characterization Report (SCR), Focused Feasibility Study (FFS) Report, and CAP. Funding from the American Reinvestment and Recovery Act (ARRA) became available in early 2010 for additional site characterization efforts and cleanup at the Blaine Mini Mart site.

In accordance with MTCA [WAC 173-340-360(2)], the selected cleanup actions must comply with the following requirements: be protective of human health and the environment, comply with cleanup standards, comply with applicable state and federal laws, provide for compliance monitoring, use permanent solutions to the maximum extent practicable, provide for a reasonable restoration time frame, and consider public concerns.

The cleanup action approved by Ecology and discussed in this CAP includes:

- Removal of station dispenser islands and other structures
- Removal of on-property petroleum hydrocarbon contaminated soil
- Offsite treatment and disposal/reuse of soil
- In-situ groundwater treatment with oxygen release compound (ORC)
- Confirmational monitoring of groundwater
- Use of institutional controls to manage contact during natural attenuation

Ecology has selected the cleanup action based upon site-specific data provided in the SCR and FFS Report (SAIC 2010a,b). To review or obtain copies of the above documents, contact Sally Perkins (Public Disclosure Coordinator) at Ecology's Northwest Regional Office in Bellevue, Washington, at (425) 649-7190.

# 2.0 Background

The following information has been compiled from previous investigation reports produced for the site and includes discussion on former property uses and operations conducted on the property.

## 2.1 Site Description

The Blaine Mini Mart is an active gas station located at 2530 Peace Portal Drive within the city limits of Blaine, Washington (Figure 1). The property is a one-half acre triangular lot bounded by Peace Portal Drive on the southwest and Bell Road to the west. Vacant land is present between the property and Interstate 5 to the north, and an abandoned former Rocky Mountain Trading Post building is located on the southeast. The property is located within a mixed commercial/residential area and was previously identified as 1828 Peace Portal Drive. The property is entirely covered with asphalt, concrete, or structures and the surface slopes gently to the southwest, toward Peace Portal Drive. Dakota Creek is located approximately 1,000 feet south of the property and discharges to Drayton Harbor of Puget Sound, roughly 1,500 feet southwest of the site (Environmental Associates 2005). Shallow groundwater at the site generally flows in a south to southwest direction (SAIC 2010a).

## 2.2 Site History

The Blaine Mini Mart property was initially developed for residential purposes and included one house and two additional buildings, one of which housed the Blaine Mail and Package center (BEK 1997). In 1955, a 1,161-square foot convenience store, currently the Blaine Mini Mart, and a 1,120-square foot dual-bay storage space replaced the original buildings. Four underground storage tanks (USTs) were removed in 1980 from a tank basin in front of the current Mini Mart, where the fuel dispenser canopy is now located (Environmental Associates 2005).

In 2005, during a transition from Texaco to Shell branded gasoline, a new fuel island canopy and four dispenser islands were constructed in the footprint of the previously existing dispenser canopy (Environmental Associates 2005). Ecology UST records indicate four USTs, ranging in size from 10,000 to 29,999 gallons and containing unleaded and leaded gasoline, were permanently closed in June 2007 (Ecology 2010). Currently, three 10,000-gallon USTs, located in a tank pit on the east-central side of the property, store gasoline (regular and premium) and diesel fuel (Northwest Tank 2010). Tank-tightness tests performed in January 2010 certified no leaks or concerns regarding three 10,000-gallon USTs (Northwest Tank 2010). Reportedly, a former waste oil tank located on the east side of the Mini Mart was abandoned in-place and filled with sand and clay relatively recently.

## 2.3 Investigation History

Available documents do not include information about any initial release conditions, sources of contamination, or the initial time frame of possible petroleum-related releases. The driving factor for performing the initial environmental investigations at the Blaine Mini Mart site is not known. Three site investigations were performed at the site prior to the 2010 site characterization. Locations of wells and borings are depicted in Figure 2. These investigation reports include:

- *BEK Purnell Engineering, 1997.* In October 1997, two groundwater monitoring wells (MW-1 and MW-2) were installed on the northwest and southeast sides of the fuel dispenser islands. Groundwater samples were collected from these wells, along with previously installed tank pit observation wells OW-1, OW-2, and OW-3.
- *Environmental Associates, Inc., 2005.* In November 2005, seven soil borings (B1 through B7) were installed. At this time, groundwater samples were collection from the existing monitoring wells MW-1 and MW-2, and from geoprobe boring B-1.
- *Whatcom Environmental, 2008.* In May 2008, a third round of groundwater samples was collected from MW-1 and MW-2.

A detailed summary of the previous investigation events and analytical results was presented in the SCR. The following sections of this CAP summarize the process and findings in the SCR and FFS Report (SAIC 2010 a,b).

# 3.0 Site Characterization and Exposure Assessment

In March 2010, Science Applications International Corporation (SAIC) completed 20 soil borings (SB-8 through SB-28), with three of the soil borings completed as monitoring wells (MW-3 through MW-5), in order to more fully characterize the site (see Figure 2). Soil samples for analyses were collected in all borings. Groundwater samples were collected from monitoring wells during one event, and water levels were measured on two occasions. Results of these field investigations and the site exposure assessment are contained in the SCR and FFS Report, and these results with other previous results are summarized in the remainder of this section. Cleanup levels that are used to define contamination are discussed in Section 4 of this CAP.

## 3.1 Site Characterization

### 3.1.1 Geology and Hydrogeology

Site soils consist of the following lithologic units, listed stratigraphically from top to bottom:

- Fine to medium sand, with local cobble (fill material)
- Silt and clay with minor sand
- Silty sand

The sand fill material is generally a few feet thick, but is up to about 9 feet thick in the vicinity of the dispenser islands; cobbles are also present in fill on the southern portion of the property. The silt and clay unit consists of stiff interstratified material, forming part of the regional Everson glaciomarine drift. The top of the silty sand unit ranges from 15 to 20 feet below ground surface (bgs).

Groundwater level measurements, collected at MW-1 through MW-5 in March 2010, ranged from 2.2 to 3.9 feet below the top of the PVC well casing. Groundwater was again measured in June 2010 and ranged from 1.1 to 3.9 feet below casing. Groundwater flow direction across the site, during spring and summer months, appears to be in a southwest to south direction, toward Peace Portal Drive. The hydraulic gradient is steeper (0.041 ft/ft) during June 2010 than during March 2010 (0.028 ft/ft). Based on the fine-grained lithology and the slow recharge into wells, the site aquifer is expected to yield very small quantities of water and have a slow groundwater transport rate.

### 3.1.2 Nature and Extent of Soil Contamination

Two general areas of petroleum hydrocarbon contamination have been identified on the property (Figure 2). The largest area of soil contamination is referred to as the western plume and extends to a depth of approximately 20 feet bgs. This plume is located under and around the dispenser islands and extends to the southeast. Contamination in several borings along the southwestern property boundary indicates that soil is also contaminated beyond the property boundary under Peace Portal Drive. Contamination in the western plume may have originated from a number of sources, including a historical dispenser island located on the northwestern side of the current dispensers and possibly also from gasoline product piping.

A secondary and smaller area of soil contamination is referred to as the eastern plume. This plume is located on the southern side of the storage garage. Petroleum hydrocarbon contamination extends to depths of approximately 1 to 4 feet bgs. Contamination encountered in the eastern plume may have originated from a former waste oil tank and possible petroleum surface spills.

### 3.1.3 Nature and Extent of Groundwater Contamination

Results from the March 2010 sampling event indicate that petroleum hydrocarbon contamination is located in the western plume, within and downgradient from the dispenser island area (Figure 3). Monitoring wells MW-3 and MW-4, located along the downgradient property boundary, also showed petroleum contamination, indicating that the groundwater plume extends off-property into the right-of-way of Peace Portal Drive. Non-aqueous phase liquid (NAPL) was not identified in any wells on the site.

## 3.2 Exposure Assessment

An exposure assessment evaluates the potential for hazardous substances to reach and affect receptors via an exposure pathway. It includes defining the contaminants of concern (COC) for a site, the route or pathway by which humans and/or ecological organisms may be exposed, and the resulting exposure risk. This evaluation takes into account the unknown future land uses at the Blaine property. Unrestricted land use is being considered, which includes possible future residences.

### 3.2.1 Contaminants of Concern

COCs in soil and/or groundwater at the Blaine Mini Mart site include the following:

- Total petroleum hydrocarbons – gasoline-range organics (TPH-gasoline)
- TPH-diesel
- TPH-heavy oil
- Benzene
- Toluene
- Ethylbenzene
- Xylenes
- Methyl tertiary-butyl ether (MTBE)
- 1,2-Dichloroethane (EDC)
- Naphthalenes

### 3.2.2 Exposure Pathways

There is potential for humans and ecological receptors to be exposed to contaminants at the Blaine Mini Mart site through exposure to contaminated subsurface soil, groundwater, and vapor or affected indoor air. The exposure pathways and potential receptors are described in the FFS

and are summarized below. The ecological evaluation and the residential vapor intrusion pathway are discussed in Section 4 of this CAP.

***Subsurface Soil.*** Potential soil exposure pathways are summarized below and include: ingestion, dermal contact, soil to dust emissions (outdoor air), soil to vapor (indoor air), and groundwater leaching.

Currently the entire area of soil impacted by COCs at the site is covered by pavement or buildings. Therefore, the current potential for ingestion or contact has been significantly limited. However, soil contamination is present just below pavement (less than 6 inches deep) and as deep as 20 feet bgs. Potential dermal contact or inhalation exposures and soil to dust emissions (outdoor air) are possible during future site redevelopment or during utility work, as well as during future residential activities such as digging or gardening. In addition, soil contamination may also volatilize into outdoor or indoor air (including into residences), and if contamination remains in place, it may continue to leach into groundwater.

***Groundwater.*** Potential groundwater exposure pathways are detailed below and include: drinking water ingestion, dermal contact, inhalation, and groundwater to vapor (indoor air). Groundwater discharge to surface water is not considered to be a potential exposure pathway based on site-specific physical constraints (distance to the nearest surface water, lithology of the soil, and nature of the petroleum plume); therefore, this route was eliminated as a potential exposure pathway during the FFS.

Currently there are no drinking wells within the vicinity of the site, and installation of wells in the fine-grained shallow aquifer is very unlikely. However, future residential development could potentially include the installation of water wells on the property. Because petroleum hydrocarbon plumes typically do not extend a significant distance, due to natural attenuation processes, it is assumed that the plume does not extend south of Peace Portal Drive. Potential exposures could also occur during further site redevelopment construction or underground utility work. Groundwater at the site is relatively shallow, with a water table depth ranging from approximately 1.5 to 4.6 feet bgs. Therefore, contaminated groundwater may also be incidentally encountered by future residents while digging.

In addition, there is a potential risk due to vapors emanating from contaminated groundwater and intruding into indoor air, posing a risk for building occupants on or near the property. This vapor intrusion risk is described in detail in the FFS (SAIC 2010) and is summarized below in Section 4.3.

# 4.0 Cleanup Standards

Cleanup standards in MTCA are defined for each hazardous substance present in each environmental medium and for each pathway through which humans and the environment can become exposed to these substances. Each cleanup standard addresses the cleanup levels (CULs) for the hazardous substances, the appropriate point of compliances where these levels must be met, and other applicable regulatory requirements [WAC 173-340-700(3-4)]. Under MTCA, a point of compliance is established specific to each medium and exposure pathway, and it marks the regulatory location (such as depth) where CULs shall be attained. Media-specific CULs are discussed below in Sections 4.4 and 4.5.

## 4.1 MTCA Method A Cleanup

In this CAP, MTCA Method A is the primary CUL utilized; however, this is supplemented by two additional means of determining CULs. The soil CULs need to meet not only human health standards (Method A), but also levels protective of the terrestrial ecological pathway. In Section 4.2, a terrestrial ecological evaluation (TEE) is summarized from the FFS, and the appropriate soil CULs are applied. In addition, the vapor-intrusion pathway is addressed in Section 4.3, and this yields groundwater CULs protective of the vapor pathway that are more stringent than Method A.

According to MTCA [WAC 173-340-700(5)(a), -700(8), and -704(1)], Method A is appropriate to establish CULs for a site where hazardous substances are relatively few, the site is undergoing a routine cleanup action, and numerical standards are available for the indicator hazardous substances in the media being cleaned up (discussed in following two sections). At the Blaine site, the number of hazardous substances is relatively few, being limited to petroleum-related constituents.

### 4.1.1 Routine Cleanup Action

In order to determine if the selected cleanup action fulfills the requirements of a "routine cleanup action" as defined in MTCA (WAC 173-340-200), the following criteria must be met:

- Cleanup standards for each hazardous substance addressed by the cleanup are obvious and undisputed, and allow for an adequate margin of safety for protection of human health and the environment.
- The cleanup action involves an obvious and limited choice among cleanup alternatives and uses an alternative that is reliable, has proven capable of accomplishing cleanup standards, and with which Ecology has experience.
- The cleanup action does not require preparation of an environmental impact statement, and the site qualifies for an exclusion from conducting a simplified or site-specific TEE, or if the simplified evaluation can be ended, or if TEE cleanup levels are utilized.

The cleanup standards for site COCs and the selected cleanup action for the site (see Section 5) meet the requirements of these three criteria. Accordingly, the remedial cleanup action at the Blaine site fulfills the requirements of a routine cleanup action under MTCA.

### 4.1.2 Numerical Standards

MTCA provides media-specific numerical CULs for all COCs at the site (WAC 173-340-900 and Ecology's CLARC database), thus fulfilling the requirement of WAC 173-340-704(1)(b). Therefore, Method A CULs can be utilized for all soil and groundwater COCs at the Blaine site. The resultant list of CULs for COCs in soil and groundwater at the Blaine site are included in Sections 4.4 and 4.5. In summary, Method A is appropriate as the primary method to establish CULs for the Blaine site because hazardous substances are relatively few (limited to petroleum constituents), the site is undergoing a routine cleanup action, and/or numerical cleanup standards are available for the indicator hazardous substances in the media being remediated. Method A CULs are supplemented by CULs for soil based on the TEE and by site-specific groundwater CULs that are protective of indoor air concentrations, as discussed in the following two sections.

## 4.2 Terrestrial Ecological Evaluation

MTCA requires that a TEE be completed following the release of hazardous substances to soil in order to determine the potential impacts to terrestrial organisms at a site [WAC 173-340-7490], unless certain exclusion criteria are met. As discussed in the FFS Report, a simplified TEE was determined appropriate for the Blaine site, as specified under MTCA 173-340-7492. Therefore, concentration values from MTCA Table 749-2 were utilized for determining CULs. The only priority contaminant of ecological concern that applies to this site, because it is more stringent than MTCA Method A soil CULs, is diesel-range organics (pertains to both TPH-diesel and TPH-heavy oil) (see Section 4.4).

## 4.3 Groundwater to Indoor Air Modeling

A groundwater to indoor air model was performed as part of the FFS, in accordance with the new draft guidance document from Ecology (Ecology 2009). The guidance provides means to determine groundwater CULs (but not soil CULs) protective of vapor intrusion. The evaluation of indoor air quality applies whenever volatile hazardous substances (such as gasoline constituents) are present in the subsurface at the site. These conditions apply to the Blaine Mini Mart site.

Groundwater analytical data were used to determine if volatile organic compound (VOC) concentrations pose a potentially unacceptable threat to indoor air quality, via vapor intrusion, for current and future site buildings. Because VOCs are present in onsite groundwater at concentrations exceeding the Ecology guidance screening levels, an estimate of the maximum indoor air concentration via vapor intrusion was calculated using the standard Johnson and Ettinger Model (JEM). Detailed results of the JEM vapor modeling were included in the FFS Report.

The resultant calculated site-specific groundwater concentrations were compared to the MTCA Method A groundwater CULs. The lower of these paired values for each COC was selected as the final site-specific groundwater CUL in order to provide the most conservative risk protection. The COCs for which vapor intrusion CULs were lower than Method A CULs are benzene, xylenes, and EDC (see Section 4.5).

## 4.4 Soil Cleanup Levels

Soil CULs must be protective of unrestricted land use, including residential, based on the reasonable maximum exposure expected to occur under current and future conditions [WAC 173-340-740(1)]. The MTCA Method A CULs for soil presented in Table 740-1 (Soil Cleanup Levels for Unrestricted Land Use) are applicable to this site. However, as described above, in order to comply with the requirements to be protective of ecological receptors, the more stringent soil CULs for TPH-diesel and TPH-heavy oil derived from the TEE process will be used at this site. For all other contaminants at the site, the CULs protective of unrestricted land use (MTCA Method A) are the most stringent. Soil CULs selected for the site COCs are tabulated below, with reference listed for their origin.

| ***Hazardous Substance in Soil*** | ***Site-Specific Soil CUL (mg/kg)*** | ***Reference*** |
|---|---|---|
| Benzene | 0.03 | Method A |
| Toluene | 7 | Method A |
| Ethylbenzene | 6 | Method A |
| Xylenes | 9 | Method A |
| MTBE | 0.1 | Method A |
| Naphthalenes | 5 | Method A |
| TPH-gasoline | 30 | Method A |
| TPH-diesel | 460 | TEE |
| TPH-heavy oil | 460 | TEE |

Under MTCA, the standard point of compliance will be established throughout the site, based on protection of groundwater [WAC 173-340-740(6)(b)]. This will be obtained on the property by source removal and other actions that will also impact the downgradient site, as described in Section 5.

## 4.5 Groundwater Cleanup Levels

MTCA specifies that groundwater CULs will be based on the highest beneficial use (drinking water ingestion) and reasonable maximum exposure expected to occur [WAC 173-340-720]. Therefore, MTCA Method A CULs are applicable for this site. However, in order to reduce the vapor intrusion risk and ensure future protectiveness of human health a combination of MTCA Method A CULs and site-specific vapor intrusion levels will be utilized. The process of the vapor intrusion modeling and detailed results were presented in the FFS (SAIC 2010). Groundwater CULs selected for the site COCs are tabulated below, with reference listed for their origin.

Under MTCA, the standard point of compliance will be established throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth that could potentially be affected by the site [WAC 173-340-720(8)(b)]. This will be obtained on the property by source removal and other actions that will also impact the downgradient site, as described in Section 5.

| *Hazardous Substance in Groundwater* | *Site-Specific Groundwater CUL (µg/L)* | *Reference* |
|---|---|---|
| Benzene | 2.6 | Vapor Intrusion |
| Toluene | 1,000 | Method A |
| Ethylbenzene | 700 | Method A |
| Xylenes | 900 | Vapor Intrusion |
| MTBE | 20 | Method A |
| EDC | 4 | Vapor Intrusion |
| Naphthalenes | 160 | Method A |
| TPH-gasoline | 800 | Method A |
| TPH-diesel | 500 | Method A |
| TPH-heavy oil | 500 | Method A |

## 4.6 Extent of Environmental Media Requiring Cleanup Action

This section summarizes the portion of the site that will be remediated, based on cleanup standards and practicable feasibility.

### 4.6.1 Extent of Soil Requiring Cleanup Action

As stated in Section 3.1.2, there are two areas of contamination present on the property, the western and eastern plumes. Soil contamination at the western plume is centered around the current dispenser islands and extends approximately 500 feet in length, presumably extending off-property under Peace Portal Drive. Soil contamination within this plume ranges in depth from directly beneath the asphalt paving to 20 feet bgs. The small eastern plume is located south of the garage, entirely on the property, and ranges in depth from approximately 1 to 4 feet bgs.

For purposes of the FFS and this CAP, the extent of soil requiring direct cleanup action includes contaminated soil on the Blaine property with concentrations exceeding CULs listed in Section 4.4. It is recognized that cleanup of contaminated soil under the street is not readily feasible from a technical and safety perspective. In addition, MTCA [WAC 173-340-360(2)(d)] requires that soils exceeding CULs be treated, removed, or contained at properties that have a potential to serve as a future residential area. The portion of the site on the Blaine property qualifies in this category.

### 4.6.2 Extent of Groundwater Requiring Cleanup Action

As stated in Section 3.1.3, the areal extent of groundwater contamination is largely restricted to the area of soil contamination within the western plume. Groundwater contamination also is very likely migrating off site under Peace Portal Drive. For purposes of the FFS and this CAP, the extent of groundwater requiring cleanup action includes contaminated groundwater on the Blaine property, which would also affect downgradient groundwater.

# 5.0 Cleanup Action Alternatives

The alternative development and selection in the FFS involves a three-fold process: an initial screening of alternative components or technologies, followed by compilation of alternatives with components that pass the screening process, followed by an evaluation of the alternatives to result in a preferred alternative.

## 5.1 Screening of Alternative Components

Alternative components are identified and screened for their applicability in addressing site contamination and achieving remedial objectives (meeting cleanup standards). Furthermore, the screening of these components considers the fact that remediation will be limited to on-property portions of the site, because off-property areas are not safely or logistically accessible for cleanup. The various components have been screened to narrow the list of technologies and other measures that should be considered for more detailed evaluation. MTCA provides for an initial screening step based on the ability of the component to meet the minimum MTCA requirements and also based on its feasibility. According to WAC 173-340-350(8)(b), a cleanup alternative or a component may be screened from further consideration if the component does not meet the minimum threshold and other requirements (see Section 6), or if the component is not technically feasible. Three primary factors were considered in the FFS: effectiveness, implementability, and cost.

Based on this screening process, the following alternative components/technologies were rejected in the FFS:

- No action
- Physical access controls
- Surface cap
- Subsurface vapor barrier
- Soil vapor extraction
- Deep soil excavation (large-diameter augering)
- Air sparging
- Multi-phase extraction

The following alternative components/technologies were retained in the FFS:

- Soil management plan (institutional controls)
- Groundwater monitoring
- Soil excavation (standard technologies)
- Excavation dewatering
- Biostimulation and bioaugmentation
- Chemical oxidation
- Monitored natural attenuation

- Activated carbon filtration
- Offsite thermal desorption

## 5.2 Alternatives Evaluated in the FFS

The following is a brief description of the cleanup action alternatives evaluated in the FFS. The two alternatives for remediation of soil and groundwater developed for the site are as follows:

- Alternative 1 – Soil removal, ORC application, and monitoring
- Alternative 2 – Soil removal and monitoring

### 5.2.1 Alternative 1 — Cost: $692,000

This alternative would reduce and control exposures to contaminants on the property by the following major cleanup alternative components:

- Removal of dispenser islands and other structures
- Excavation of identified on-property contaminated soil (eastern and western plume)
- Offsite thermal desorption of excavated soil
- Oxygen release compound (ORC) application
- Regrading and restoring property
- Environmental monitoring and institutional controls

These actions will remove the risks associated with soil and reduce risk associated with groundwater contamination through complete source removal of all contaminated soil on the property, and treatment of the groundwater plume by the use of ORC. Since groundwater remediation will not occur instantly, post excavation environmental monitoring will be performed to ensure the size and concentration of the groundwater plume has reduced.

Exposure of contaminants under Peace Portal Drive will be controlled by natural attenuation of soil and groundwater in conjunction with a soil management plan. These actions will eliminate contact pathways to the subsurface contaminants until road construction allows unrestricted access to the contaminant plume.

### 5.2.2 Alternative 2 — Cost: $606,000

This alternative would reduce and control exposures to contaminants on the property by the following cleanup alternative components:

- Removal of dispenser islands and other structures
- Excavation of identified on-property contaminated soil (eastern and western plume)
- Offsite thermal desorption of excavated soil
- Regrading and restoring property
- Environmental monitoring and institutional controls

These actions will remove the risk associated with soil and reduce risk associated with groundwater contamination through complete removal of all contaminated soil on the property. Following source removal, groundwater monitoring will be performed to ensure that the concentration and size of the groundwater plume has reduced.

Exposure pathways under Peace Portal Drive will be controlled by natural attenuation and a soil management plan. These actions would eliminate contact pathways to the subsurface contaminants until future road construction allows unrestricted access to the contaminant plume.

## 5.3 Selected Cleanup Action — Cleanup Alternative 1 (Section 5.2.1)

As described in Section 6, a number of evaluation criteria were utilized to determine which of the two alternatives would be selected as the preferred cleanup action. Based on this evaluation, the cleanup action selected by Ecology is Alternative 1. Further details of actions and the selection process are presented in the FFS Report. Specific components of the selected cleanup action for the impacted areas are discussed in the sections below and depicted in Figure 4.

### 5.3.1 Monitoring Well Abandonment

Monitoring wells MW-1, MW-2, MW-3, and MW-4, which lie within the proposed remedial excavation area (within the western plume), will be decommissioned prior to removal of dispenser islands and other structure removal. These wells will be decommissioned by filling the casing with bentonite pellets from the bottom of the well to the land surface. This work will be conducted or overseen by a Washington-state licensed driller or professional engineer.

### 5.3.2 Underground Utility Location

Prior to any demolition or subsurface excavation activities, site utilities will be located and identified by a private utility locating service. In addition, the state public utility location service will be notified of activities. Any utilities located near the proposed excavation areas will be disconnected, removed, and/or rerouted.

### 5.3.3 Removal of Dispenser Islands and Structures

Prior to excavation, dispenser islands, associated product piping (within the vicinity of the excavation), and overhead canopy will be removed from the facility. The western plume underlies the footprint of the dispenser islands and canopy. Removal of impacted soil would not be possible if these structures remain in place. At this time, the asphalt and/or concrete would be removed from both the eastern and western plume areas. Materials accumulated from the canopy and dispenser island demolition and from the asphalt and concrete removal, will be landfilled or recycled.

### 5.3.4 Excavation of On-Property Contaminated Soil

On-property soils exceeding the site-specific CULs will be excavated and removed offsite. Excavation of the eastern and western plume is estimated to result in the removal of approximately 2,070 cubic yards (in situ).

The area of contaminated soil will be removed using standard excavation and hauling methods. Soil will not be segregated for contaminated versus uncontaminated portions because only minimal volumes of clean overburden soils are anticipated at the site. Soils will be directly loaded into 30-ton truck and trailer units for transport and disposal. The anticipated sidewall slopes of the excavation are approximately 1:1, but will be adjusted in the field depending on the stability of the material making up the excavation walls. To remove virtually all contaminated soil on the property, a vertical or near-vertical excavation face will be needed along the southwestern property edge, next to Peace Portal Drive. Stabilization will likely be accomplished in the form of a trench box network. The trench box system would be approximately 10 feet wide, 10 feet deep (average), and 115 feet long, just inside the southwestern property boundary (Figure 4).

Performance monitoring soil samples will be collected from both the excavation walls and floor of the excavation and analyzed by an onsite mobile laboratory to confirm contamination concentrations are below the site-specific CULs. Collected samples will be analyzed for:

- TPH-gasoline (Method NWTPH-Gx)
- TPH-diesel and TPH-heavy oil (Method NWTPH-Dx with silica-gel cleanup)
- Benzene, Toluene, Ethylbenzene, Xylenes, MTBE (EPA Method 8260)
- Naphthalenes (EPA Method 8260)

The following are limits or potential limits placed on removal (via excavation) of contaminated soil:

- The excavation will not extend beyond the property boundary, specifically the southwestern property boundary along Peace Portal Drive.
- It is unlikely that contaminated soil will extend beyond (northeast of) soil boring SB-24 (located southwest of the current station building, Figure 4); however, if contaminated soil is encountered beyond the anticipated excavation boundaries a decision will be made by Ecology as to the best path forward.
- Similarly, if contaminated soil is encountered beyond the anticipated excavation boundary of the eastern contaminant zone (near the storage garage), a decision will be made by Ecology as to the best path forward.

During demolition of station features and soil removal activities, soil samples from the excavated area will be collected in accordance with guidelines set forth in Ecology guidance on remediation of petroleum contaminated soil, and on site assessments for underground storage tanks. Coordination with the City of Blaine and with Ecology will take place to obtain any other permits and approval for excavation/grading, shoring, traffic control, and pedestrian access, as necessary.

### 5.3.5 Dewatering of Excavation Pit

When excavation takes place, water depths at the site are expected to be approximately 1.5 to 4 feet bgs, and dewatering will be required. The saturated soil material at the site is fine-grained and appears to yield only small quantities of water. Thus, dewatering the excavation pit is not

expected to produce large amounts of water. Extracted water will need to be stored, settled, filtered, and then discharged to the city sanitary sewer. Permission for temporary discharge of this treated water will be requested from the City of Blaine.

### 5.3.6 Treatment of Excavated Material

All contaminated material excavated from the site will be transported by truck to a disposal facility for treatment using thermal desorption, followed by subsequent reuse of soil. The anticipated treatment location is the CEMEX facility in Everett, Washington.

### 5.3.7 Addition of Oxygen Release Compound

Following excavation and before backfilling the area along Peace Portal Drive, ORC will be applied to the open pit. The addition of ORC to contaminated groundwater accelerates the natural biodegradation process by increasing the oxygen levels in the groundwater. It is anticipated that ORC will be heavily applied to the southwestern margin of the western plume (Figure 4), in order to act as a single time-release treatment of the presumed downgradient plume under Peace Portal Drive. The ORC will be applied so that the greater amount of the compound is located at depths adjacent to the saturated smear zone, where petroleum constituent concentrations are greatest (Figure 4). ORC will also be placed above the dry-season water table, so that as groundwater fluctuates between the wet and dry seasons the ORC will become activated. Application of ORC in the eastern plume is not anticipated.

The ORC will be placed into the excavation with backfilled quarry spalls or washed rock in order to assure that surrounding permeability is high, allowing the ORC to release and distribute oxygen into the adjacent downgradient aquifer. Approximately 8,000 pounds of ORC will be applied during the excavation activities.

### 5.3.8 Regrading and Restoring Property

In areas where excavation activities are performed, backfilling and regrading will be performed. The excavations will be backfilled with material compatible with construction of a future commercial structure or residential property. Structural fill will consist of quarry spalls such as pit run shale and will be compacted to 2 to 5 percent. The site will be repaved according to its pre-existing conditions or according to plans with the property owner. A 6-inch base course of crushed rock will be used below the asphalt or concrete. Backfill type, compaction, and pavement near the street right-of-way will be performed according to City directives. All excavated areas will be restored to approximate pre-remediation surface elevations.

### 5.3.9 Environmental Compliance Monitoring

Under MTCA, compliance monitoring is required for all cleanup action (WAC 173-340-410). The three categories of compliance include protection monitoring, performance monitoring, and confirmational monitoring.

Protection monitoring will take place during remediation primarily using air monitoring in the breathing zone. Performance monitoring will take place during remediation as discussed in Section 5.3.4 to determine that soil has been removed to CULs, as feasible.

Confirmational monitoring will include a groundwater monitoring and sampling program to evaluate groundwater quality and the natural attenuation process. This program will monitor for trends in contaminant concentrations, confirm that attenuation is taking place, determine the potential for off-property migration, and determine whether cleanup standards are met. In order to accomplish confirmational monitoring, three new monitoring wells will be installed following the cleanup action. This installation is to replace those wells that will be removed during remediation. One new well would be located upgradient and two new wells would be placed on the downgradient side of the property along Peace Portal Drive. Groundwater from all site wells would then be sampled for four quarters for one year (four separate events) to determine if water quality improves or degrades over time. Groundwater samples will be tested for the following laboratory analysis:

- TPH-gasoline (NWTPH-Gx)
- TPH-diesel and TPH-heavy oil (NWTPH-Dx with silica-gel cleanup)
- Benzene, Toluene, Ethylbenzene, Xylenes, MTBE, EDC (Method 8260)
- Naphthalenes (Method 8260)

### 5.3.10 Development of Soil Management Plan

A Soil Management Plan will be completed and submitted to the City of Blaine. The Soil Management Plan will place requirements on future intrusive subsurface work conducted in areas of likely soil and groundwater contamination remaining in the City right-of-way under Peace Portal Drive. This contaminated area is depicted in Figures 2 to 4. Anticipated potential exposures would be encountered by City workers and utility maintenance workers. Requiring notification and approval from Ecology (and the Blaine Mini Mart property owner), prior to any subsurface activities, would ensure that communication and controls are in place to reduce potential exposure to workers and that any removed contaminated soil is properly disposed of.

Although the groundwater plume presumably extends beneath Peace Portal Drive, it is assumed that the plume does not extend beyond the right-of-way boundary on the southwestern side of the road. Therefore, all subsurface work conducted in potentially contaminated areas will be encompassed under the Soil Management Plan, and any additional institutions such as deed restrictions are not anticipated.

Additional institutional controls that will be implemented for the property during cleanup activities include installation of physical measures such as fences, signs, and locks to prevent tampering with onsite wells, monitoring, and remediation equipment.

# 6.0 Justification for Selected Cleanup Action

MTCA specifies minimum requirements that the selected cleanup action is required to meet. These requirements and evaluative procedures must be applied to the selection of a cleanup action. The justification rationale for selecting Alternative 1 for the Blaine site is based on the response that attends each of these requirements and procedures, as summarized below. These MTCA minimum requirements include what are referred to as "threshold requirements" and several other requirements [WAC 173-340-360(2)], which are summarized below.

## 6.1 Threshold Requirements

Cleanup actions must meet the following minimum threshold requirements.

***Protect human health and the environment***. The selected cleanup action will be protective of human health and the environment through the following actions:

- Through property source removal and a soil management plan, prevent soil dermal contact and ingestion by humans and by ecological organisms, prevent soil dust emissions, prevent the potential for indoor air vapors, and prevent groundwater leaching on the property.
- Through property source removal and ORC application and a soil management plan, prevent groundwater ingestion by humans, prevent dermal contact and inhalation by humans, and prevent the potential for indoor air vapors on the property.

***Comply with cleanup standards.*** The selected cleanup action will be compliant with MTCA Method A CULs and site-specific CULs through a combination of source removal, ORC application, and natural attenuation.

***Comply with applicable state and federal laws.*** The selected cleanup action will be compliant with all state and federal laws.

***Provide for compliance monitoring.*** The selected cleanup action will satisfy the requirement for compliance monitoring.

## 6.2 Other MTCA Requirements

Cleanup actions must meet the following MTCA requirements.

***Use of Permanent Solutions.*** A permanent solution is defined as a cleanup action in which MTCA cleanup standards can be met without further action being required. MTCA further specifies that a disproportionate cost analysis will be used to determine if a cleanup action uses permanent solutions to the maximum extent practicable. Alternative 1 selection was based in part on the evaluation criteria in this analysis, as presented in the FFS Report and described below in Section 6.3.

***Reasonable Restoration Time Frame.*** The selected cleanup action will provide a reasonable restoration time frame at the site [WAC 173-340-360(4)]. As discussed in the FFS Report, the

time estimated to reach CULs in groundwater and soil in areas beneath the City right-of-way, under both natural attenuation and use of ORC, is difficult or impossible to determine with the available limited information. However, through excavation of on-property soil source removal and with addition of ORC, the time frame is expected to shorten significantly and is the alternative presented in the FFS with the shortest restoration time. Alternative 1 was selected in part due to the shorter restoration time frame (along with the ease and relatively low cost of ORC application).

***Consideration of Public Concerns.*** This includes community concerns regarding the alternative and the extent to which the alternative addresses those concerns. Included are concerns from individuals, community groups, local government, tribes, federal and state agencies, and any other organization that may have interest in the site. Public concerns will be determined during the public comment period; anticipated concerns are included in the FFS Report and are expected to generate an equal degree of concerns between the two alternatives.

***Groundwater Cleanup Actions.*** In the case where the selected cleanup action relies on nonpermanent actions (e.g., groundwater monitoring), MTCA requires that other measures be taken, such as treatment or removal of the contaminant source. Groundwater cleanup at the Blaine site will be instituted through source removal of the contaminated soil on the property and application of ORC. Although the source (soil) will not be removed to complete entirety, the majority of the contaminated soil (upgradient source material) will be removed. A combination of soil source removal with application of ORC, in combination with institutional controls is acceptable and is expected to have an effect on downgradient contamination.

***Soil Cleanup Actions at Residential Areas.*** MTCA states that for current or potential future residential areas, soil with hazardous substance concentrations that exceed CULs must be treated, removed, or contained. The selected cleanup action will remove all identified contamination on the property and will also affect downgradient soil.

## 6.3 Disproportionate Cost Analysis

Although cost was not a significant discriminator between the two alternatives, the evaluation criteria in the disproportionate cost analysis were used to analyze the pros and cons of each alternative. These criteria are listed in MTCA [WAC 173-340-360(3)(f)] and, together with restoration time frame, were used to determine the preferred alternative for the Blaine site. The costs and benefits to be compared in a disproportionate cost analysis include the following evaluation criteria.

***Protectiveness.*** This includes the overall protectiveness of human health and the environment, including the degree to which risk is reduced, the time required to reduce risk and attain cleanup standards, the onsite and offsite risks resulting from implementing the alternative, and the expected improvement of overall environmental quality.

Both alternatives, by removing the contaminated soil, would be approximately equivalent in overall protectiveness. However, applying ORC as proposed in Alternative 1 may be considered more protective, as ORC is believed to decrease the overall time frame for groundwater restoration.

***Permanence.*** This includes the degree of permanent reduction of toxicity, mobility or volume of hazardous substances, including the adequacy of the alternative in destroying contaminants, the reduction or elimination of contaminant releases or sources, the irreversibility of the waste treatment process, and the characteristics and quantity of treatment residuals.

Both alternatives provide relatively permanent solutions by removal of the contaminated soil from the site. However, applying ORC to assist with biodegradation in the groundwater, as proposed in Alternative 1, provides a slightly more thorough and more certain reduction in groundwater contamination (specifically for the downgradient groundwater).

***Cost.*** This includes the cost to implement the alternative, including the total cost of construction, the net present value of any long-term costs (including operation, maintenance, and monitoring), and agency oversight costs. Total present value costs estimated in the FFS are $692,000 for Alternative 1 and $606,000 for Alternative 2.

***Long-Term Effectiveness.*** This includes the degree of certainty that the alternative will be successful, reliability of the alternative during the time that contaminants remain onsite exceeding CULs, the magnitude of residual risk with the alternative in place, and the effectiveness of controls to manage the treatment residues or remaining wastes.

Both alternative 1 and 2 are expected to have a good degree of success, by removal of all on property contaminated soil. However, applying ORC, as proposed in Alternative 1, may be considered slightly more permanent and aggressive approach in the reduction of downgradient groundwater contamination. Therefore, alterative 1 is expected to have a low magnitude of residual risk for removal of contaminates.

***Short-Term Risks.*** This includes the risk to human health and the environment during construction and implementation and the effectiveness of risk mitigation measures.

Alternatives 1 and 2 are very similar potential for short-term risks because of the similarity of the alternatives. Both of these alternatives have the risk of exposing workers and neighbors to petroleum vapors and dust during soil removal, loading, and dewatering. In addition, the number of truck loads of soil and backfill that are transported through Blaine to Everett may impact local residents and workers, with resultant traffic and noise concerns. There are negligible implementation risks or concerns involved with ORC application in an open excavation.

***Technical and Administrative Implementability.*** This refers to the ability of the alternative to be implemented, including: technical possibility; availability of offsite facilities, services, and materials; administrative and regulatory requirements; scheduling, size, and complexity; monitoring requirements; access for construction and monitoring; and integration with existing operations at the site and other current or potential remedial actions.

The two alternatives have similarly high degrees of technical possibility, use standard construction techniques, have all offsite services readily available, are expected to comply with all regulations, are each equally subject to schedule impacts, require monitoring, and are equally effected by potential access constraints within the site.

***Consideration of Public Concerns.*** This includes community concerns regarding the alternative and the extent to which the alternative addresses those concerns (described in Section 6.2 above).

In conclusion, considering that both alternatives present similar implementation risks and other concerns, but that Alternative 1 provides additional restoration benefits, this alternative has been identified as the selected remedial alternative for the Blaine site. Alternative 1 meets the goals of MTCA in that it is protective of human health and the environment; it meets the preference for a permanent solution, active remediation, and reasonable (although unknown) restoration time frame; it is expected to have relatively low short-term risks; it is readily implementable; it takes into account currently anticipated public concerns; and it is compatible with the future land use of the property.

# 7.0 Additional Requirements

## 7.1 Compliance Monitoring Plan

According to WAC 173-340-410(3), a Compliance Monitoring Plan shall be prepared for all cleanup actions and shall include:

- A sampling and analysis plan meeting the requirements of WAC 173-340-820, which shall explain in the statement of objectives how the purposes of compliance monitoring requirements [WAC 173-340-401 (1)] are met (plan to be prepared prior to institution of the cleanup action).
- Data analysis and evaluation procedures used, to demonstrate and confirm compliance and justification for these procedures, including:
    - A description of any statistical method to be employed, or
    - If sufficient data are not available before writing the plan to propose a reliable statistical method to demonstrate and confirm compliance, a contingency plan proposing one or more reliable statistical methods to demonstrate and confirm compliance, and the conditions under which the methods would be used at the facility.
- Other information as required by Ecology.

## 7.2 Worker Safety Plan

A site safety and health plan will be prepared in compliance with WAC 173-340-810(2) and with WAC 296-62 (general occupational health standards). The site safety and health plan will be submitted to the Ecology Site Manager for possible review and comment.

## 7.3 Public Participation Plan

WAC 173-340-600(9) outlines the requirements for public participation plans for cleanup sites. The public participation plan for this site has already been prepared and shall be updated by the Ecology Site Manager.

## 7.4 Cleanup Work Plan

WAC 173-340-400 outlines the requirements for plans describing the cleanup action, which will be referred to as the "Cleanup Work Plan." At the discretion of the Ecology Site Manager, the Cleanup Work Plan shall include an engineering design report, construction plans and specifications, and an operation and maintenance plan, per WAC 173-340-400(4)(a-c).

# 8.0 Applicable or Relevant and Appropriate Requirements

WAC 173-340-700(6)(a) states: "In addition to establishing minimum requirements for cleanup standards, applicable state and federal laws may also impose certain technical and procedural requirements for performing cleanup actions." In addition, per WAC 173-340-710(4), any relevant and appropriate requirements, criteria, or limitations established under state or federal law that address problems or situations encountered at the site will be addressed and acted upon appropriately. A preliminary list of federal/state ARARs (applicable or relevant and appropriate requirements) that are pertinent to actions at this site includes the following:

- Hazardous Waste Cleanup / MTCA Cleanup Regulation (RCW 70.105D, WAC 173-340)
- Water Well Construction / Minimum Standards for Construction and Maintenance of Wells (RCW 18.104, WAC 173-160)
- Washington State Water Quality Standards for Ground Waters (WAC 173-200)
- Washington State Public Water Supplies, MCLs (WAC 246-290; Federal MCLs, 40 CFR 141)
- State Environmental Policy Act (SEPA) (RCW 43.21C, WAC 197-11); this will trigger some of the individual permits from the City (listed below)
- Hazardous Waste Management / Dangerous Waste Regulations (40 CFR 261.24.10-11; RCW 70.105, WAC 173-303)
- Solid Waste Management / Minimum Functional Standards for Solid Waste Handling (RCW 70.95, WAC 173-304 and 173-350)
- Transportation of Hazardous Material (49 USC 5101-5127; 49 CFR 171 to 180)

In addition, a preliminary list of specific permits from the City of Blaine includes the following:

- Demolition Permit Application (City of Blaine Community Development Services Department)
- Notification of Demolition (Northwest Clean Air Agency)
- Construction and Demolition Permit Attachment – Waste Management Declaration (City of Blaine Community Development Services Department)
- Land Disturbance Permit Application – Fill and Grade Permit (City of Blaine Community Development Services Department)
- Mechanical Permit Application (City of Blaine Community Development Services Department)

# 9.0 Cleanup Schedule

A schedule for implementing the cleanup action will be developed in the Cleanup Work Plan following public comment and finalization of the Cleanup Action Plan. Currently, it is anticipated that the schedule will be as follows, subject to modification by Ecology:

- Remove canopy, dispenser islands, and associated structures: March 2011
- Excavation of contaminated soil: March-April 2011
- Regrade/restore site: April 2011
- Install compliance groundwater monitoring wells: April-May 2011
- Initiate groundwater monitoring: April-May 2011
- Conclude 4$^{th}$ Quarter groundwater monitoring event: January-February 2012

# 10.0 References

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# Figures


DEPARTMENT OF ECOLOGY
State of Washington

**Figure 1. Location Map for the Blaine Mini Mart Site**

EXISTING POWER POLE

EXISTING WOOD FENCE

EXISTING CURB

EXISTING PLANTER AND SIGN

FOOD MART

STORAGE GARAGE

FUEL DISPENSER CANOPY

UNDERGROUND TANK AREA

EXISTING CONCRETE ECOLOGY BLOCKS

Peace Portal Drive

B7 SB-25 SB-22 SB-24 SB-08 SB-09 SB-10 SB-15B SB-12 B1 SB-14 SB-15A SB-11 SB-13 SB-18 B6 MW-2 MW-5 B5 SB-19 MW-3 SB-20 B4 SB-17 MW-1 SB-16 MW-4 SB-28 B3 SB-21 SB-23 SB-27 SB-26 OW-3 OW-1 OW-2 B2

N

0' 10' 20'

LEGEND

B2 2005 Boring Locations

SB-21 2010 Boring Locations

MW-1 Groundwater Monitoring Well Locations

Approximate Extent of Impacted Soil Exceeding Cleanup Levels (Dashed Where Inferred).

DEPARTMENT OF ECOLOGY State of Washington

Blaine Mini-Mart
2530 Peace Portal Drive
Blaine, Washington

# FIGURE 2

Site Sampling Locations and Extent of Soil Contamination

DATE: 09/09/10

DRAWING: Blaine_Soil Conc.dwg

EXISTING CHAIN LINK FENCE

EXISTING POWER POLE

EXISTING WOOD FENCE

EXISTING CURB

EXISTING PLANTER AND SIGN

FOOD MART

STORAGE GARAGE

N

0' 10' 20'

MW-5

MW-2

MW-3

FUEL DISPENSER CANOPY

MW-1

MW-4

OW-3

UNDERGROUND TANK AREA

OW-1

OW-2

Peace Portal Drive

EXISTING CONCRETE ECOLOGY BLOCKS

LEGEND

MW-1 Monitoring Well Locations

Approximate Extent of Dissolved-Phase Contaminant Concentration Exceeding Cleanup Levels (Dashed Where Inferred).

DEPARTMENT OF ECOLOGY State of Washington

Blaine Mini-Mart
2530 Peace Portal Drive
Blaine, Washington

# FIGURE 3

Extent of Groundwater Contamination- March 2010

DATE: 06/07/10

DRAWING: Blaine_GW_ajw_060410.dwg

EXISTING CHAIN LINK FENCE

EXISTING POWER POLE

EXISTING WOOD FENCE

EXISTING CURB

EXISTING PLANTER AND SIGN

B7

FOOD MART

SB–08

SB–09

Storage Garage

SB–25

SB–24

SB–22

5

10'

15'

20'

SB–18

SB–10

SB–15B

SB–12

5'

B1

SB–14

SB–15A

SB–11

B6

MW–2

MW–5

APPROXIMATE AREAS TO BE EXCAVATED

B5

SB–19

OW–3

Peace Portal Drive

MW–3

FUEL DISPENSER CANOPY

SB–20

UNDERGROUND TANK AREA

B4

MW–1

SB–17

SB–16

MW–4

OW–1

OW–2

B2

SB–28

B3

SB–21

SB–23

5'

EXISTING CONCRETE ECOLOGY BLOCKS

SB–27

SB–26

N

0' 10' 20'

LEGEND

| | |
|---|---|
| B2 | 2005 Boring Locations |
| SB–21 | 2010 Boring Locations |
| MW–1 | Groundwater Monitoring Well Locations |
| | Area of Contamination, Lateral Extent of combined MTCA Cleanup Level Exceedances (Approximate Location) |
| 10' | Extent of Contamination at Stated Depth (Feet Below Ground Surface, Approximate Location) |
| | Approximate Location of Soil to be Excavated |
| | Approximate Area of ORC Application |
| | Approximate Area for Trench Box Excavation |

Note: Contamination depth is given in feet and represents the combined vertical range of soil contamination at each boring for all hazardous substances constituents.

DEPARTMENT OF ECOLOGY
State of Washington

Blaine Mini-Mart
2530 Peace Portal Drive
Blaine, Washington

# FIGURE 4

Selected Cleanup Action Features

DATE: 07/08/10

DRAWING: Soil Con Depth.dwg