

# SITE HAZARD ASSESSMENT

## Worksheet 1

### Summary Score Sheet

#### SITE INFORMATION:

Chevron Station 90129  
4700 Brooklyn Avenue NE  
Seattle, King County, WA 98105

Cleanup Site ID: 10632  
Facility/Site ID: 81966648

|           |     |                |            |
|-----------|-----|----------------|------------|
| Section:  | 8   | Latitude:      | 47.66340   |
| Township: | 25N | Longitude:     | -122.31400 |
| Range:    | 04E | Tax/Parcel ID: | 8816400985 |

*Site scored/ranked for the Hazardous Sites List Publication: February 2018*

#### SITE DESCRIPTION:

The Chevron Station 90129 site (Site) is a former gasoline station located in Seattle, King County, Washington. The 0.37-acre property is located approximately 3,600 feet from Portage Bay, and zoned for mixed (SM-U 75-240) use.

The property is located on the northeast corner of NE 47th Street and Brooklyn Avenue NE. It contains a service station building, a canopy, and parking areas. The area surrounding the property is a mix of commercial and residential uses. Another gasoline service station is located on the southwest corner of the intersection. To the north of the subject property is a parking lot for a grocery store. To the east across an alley is a bank. To the south across NE 47th Street is a church. To the west across Brooklyn Avenue NE are stores and apartments.

The Site is currently operated as parking space by FH Brooklyn, LLC.

The property is 870 feet northwest of the University of Washington campus and 1,000 feet southeast of University Playground Park. The park features a baseball diamond, tennis courts, and playground structures.

#### SITE BACKGROUND:

A summary of prior operations/tenants at the subject property is presented below.

| <u>From</u> | <u>To</u> | <u>Operator/Tenant</u>  | <u>Activity</u>                   |
|-------------|-----------|-------------------------|-----------------------------------|
|             | 2003      | Chevron USA, Inc.       | Gasoline service station          |
| 2003        | 2004      | Bedrock Northwest, Inc. | Gasoline service station          |
| 2004        | 2007      | H&S Oil LLC             | Gasoline service station          |
| 2007        | 2015      | WASU Inc.               | Gasoline service station          |
| 2015        | 2017      | FH Brookly, LLC         | Not operating since November 2016 |

#### SITE CONTAMINATION:

In 1990 the Chevron Station 90129 site was reported to Washington State Department of Ecology (Ecology) and placed on the Confirmed and Suspected Contaminated Sites List (CSCSL).

The property reportedly began operating as a gasoline service station in 1919. It experienced four station reconfigurations and closed operations in November 2016. Spills and leaks are presumed to be the source of petroleum constituents in soil and ground water. Chlorinated volatile organic compounds have also been detected in ground water, possibly from nearby historical businesses, such as an auto repair shop and several "cleaning and drying" operations.

Environmental sampling was conducted at the property on at least seven occasions between 1989 and 2016.

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### Summary Score Sheet

In an investigation conducted in 1990, up to 2.27 feet of free product were observed on the groundwater. In November 2016, the thickness of free product ranged up to 0.98 feet.

Gasoline range hydrocarbons (GRO), diesel range hydrocarbons, oil-range hydrocarbons, benzene, toluene, ethylbenzene, and xylenes have been reported at concentrations above their Method A cleanup levels (CULs) in both soil and groundwater. Naphthalene and carcinogenic polycyclic aromatic hydrocarbons have been reported at concentrations above their Method A CULs in soil. Dissolved lead, cis-1,2-dichloroethene, vinyl chloride, and methyl-tert-butyl ether have been reported at concentrations above their Method A CULs in groundwater.

In November and December 1990, a soil vapor study was conducted at 4557 Brooklyn Avenue NE, which is southwest of Chevron Station 90129. GRO, benzene, and xylenes were detected at concentrations exceeding current soil vapor screening levels for sub-slab samples. The report concluded that the soil vapors had migrated to the southwest from the Chevron station, but the direction of ground water flow from the Chevron site varies toward the southeast or northeast.

The maximum concentrations detected in soil and ground water at Chevron Station 90129 during the most recent sampling event (November 2016) are summarized in Tables 1 and 2.

#### **REMEDIATION ACTIVITIES:**

In December 1989, four underground storage tanks (USTs), two pump islands, and associated fuel lines were removed from the northern portion of the property. Two USTs were 12,000-gallon steel tanks used for gasoline, one was a 5,000-gallon steel tank used for gasoline, and one was a 1,000-gallon abandoned tank, for which the fuel type was not determined. Approximately 450 cubic yards of contaminated soil were disposed of off site.

In February 1990, a vapor extraction system was installed. A portable incineration combustion unit operated between 1990 and 1991. An air sparging unit began operating in March 1991. A ground water aeration line was installed in 1994. By January 1996, it was estimated that 20,852 pounds of volatile organic vapors had been removed from the site. There is no record of the system deactivation date.

In 1992, approximately 17 cubic yards of contaminated soil were disposed of off site.

In February 2017, three 12,000-gallon USTs were removed from the property.

In February 2017, three USTs were removed from the property. Two were double-walled, 12,000-gallon gasoline tanks and one was a double-walled, 12,000-gallon diesel tank.

#### **CURRENT SITE CONDITIONS:**

Nineteen MTCA sites are located within 0.25 miles of the property. The closest are Erickson Property (CSID 7601), across the intersection to the southwest; University District PCE Plume (CSID 12030), 550 feet west; Avalon University District (CSID 12970) 575 feet southwest; UW Surface Lot 1 (CSID 12374), 800 feet southwest; University Presbyterian Church (CSID 8083), 700 feet south; and Core Campus Seattle LLC (CSID 14327), 500 feet northeast.

Historically, an auto repair facility operated 625 feet south of the property and five "cleaning and drying" facilities operated in the vicinity of the property.

Water supply in the area is provided by the City of Seattle, which obtains its water from the South Fork Tolt River and Cedar River watersheds. However, one well within a two-mile radius of the property is listed for domestic water supply. Although it is not known whether this well is in use, it was assumed to supply three people. One well within a two-mile radius is listed for irrigation supply. It was assumed to irrigate 0.25 acres.

The approximate depth to groundwater is 15 to 19 feet below ground surface, with groundwater flowing to the southeast to northeast. Subsurface soils are sand and silt.

**SITE HAZARD ASSESSMENT**  
**Worksheet 1**  
**Summary Score Sheet**

**SPECIAL CONSIDERATIONS:**

Checked boxes indicate routes applicable for Washington Ranking Method (WARM) scoring

**Surface Water**

No observed release

**Air**

Volatile organic compounds (VOCs) detected in soil and groundwater

**Groundwater**

Petroleum constituents and chlorinated solvents detected in soil and groundwater

**ROUTE SCORES:**

Surface Water/ Human Health:

Surface Water/ Environment:

Air/ Human Health: 48.1

Air/ Environment: 1.6

Groundwater/ Human Health: 40.9

**Overall Rank: 1**

**REFERENCES:**

- 1 Aspect. 2017. On-Property Remedial Investigation Data Report, 4700 Brooklyn Avenue NE. January 17.
  - 2 Leidos. 2016. Fourth Quarter 2015 Groundwater Monitoring Report, Chevron Service Station No. 90129. February 18.
  - 3 Leidos. 2017. Final Remedial Investigation Work Plan, Former Chevron Service Station No. 90129. May 26.
  - 4 Riley Group. 2015. Baseline Environmental Assessment Report, Chevron Station No. 9-0129. March 31.
  - 5 SAIC. 2011. Site Assessment Report, Chevron Service Station No. 9-0129. February 17.
  - 6 Seacor. 1992. Results of Soil Vapor Study, 4557 Brooklyn Avenue NE, Seattle. March 2.
  - 7 SoundEarth. 2016. Summary of Brooklyn Chevron No. 9-0129 Ecology File Review and Groundwater Flow. November 3.
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**SITE HAZARD ASSESSMENT**  
**Worksheet 2**  
**Route Documentation**

Cleanup Site ID: 10632

Chevron Station 90129

Facility/Site ID: 81966648

**1. SURFACE WATER ROUTE**

**List those substances to be considered for scoring:**

not scored

**Explain the basis for choice of substances to be used in scoring:**

**List those management units to be considered for scoring:**

**Explain basis for choice of unit to be used in scoring:**

**2. AIR ROUTE**

**List those substances to be considered for scoring:**

Gasoline (benzene), diesel (naphthalene), and vinyl chloride

**Explain the basis for choice of substances to be used in scoring:**

Detected in groundwater during last round of sampling

**List those management units to be considered for scoring:**

Groundwater

**Explain basis for choice of unit to be used in scoring:**

Detections during last round of sampling

**3. GROUNDWATER ROUTE**

**List those substances to be considered for scoring:**

Gasoline (benzene), diesel (naphthalene), and vinyl chloride

**Explain the basis for choice of substances to be used in scoring:**

Detected in groundwater in last round of sampling

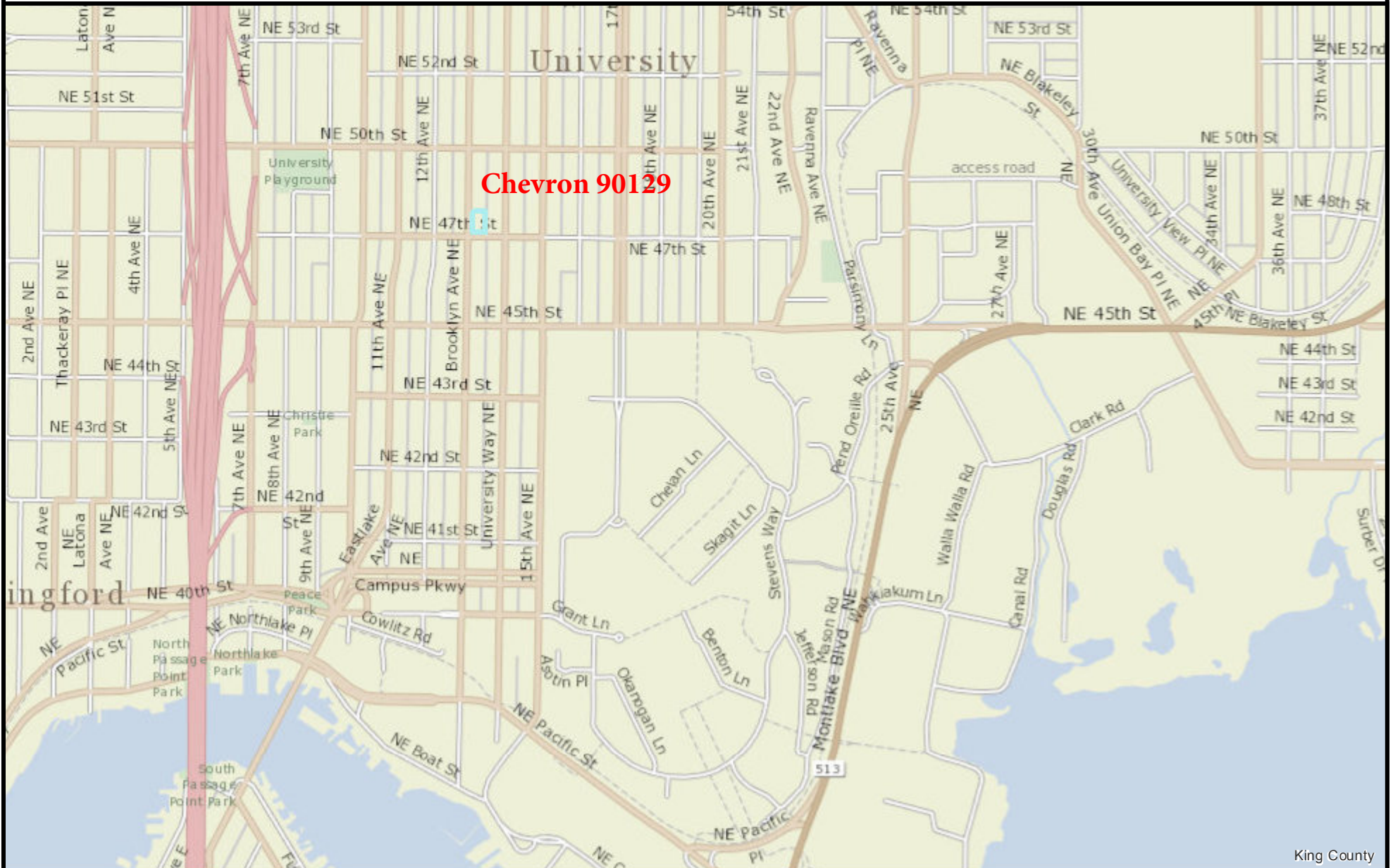
**List those management units to be considered for scoring:**

Groundwater

**Explain basis for choice of unit to be used in scoring:**

Detections during last round of sampling

# Figure 1. Chevron 90129 Site Location



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Notes:



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# Figure 3. Chevron 90129 Current Site Layout



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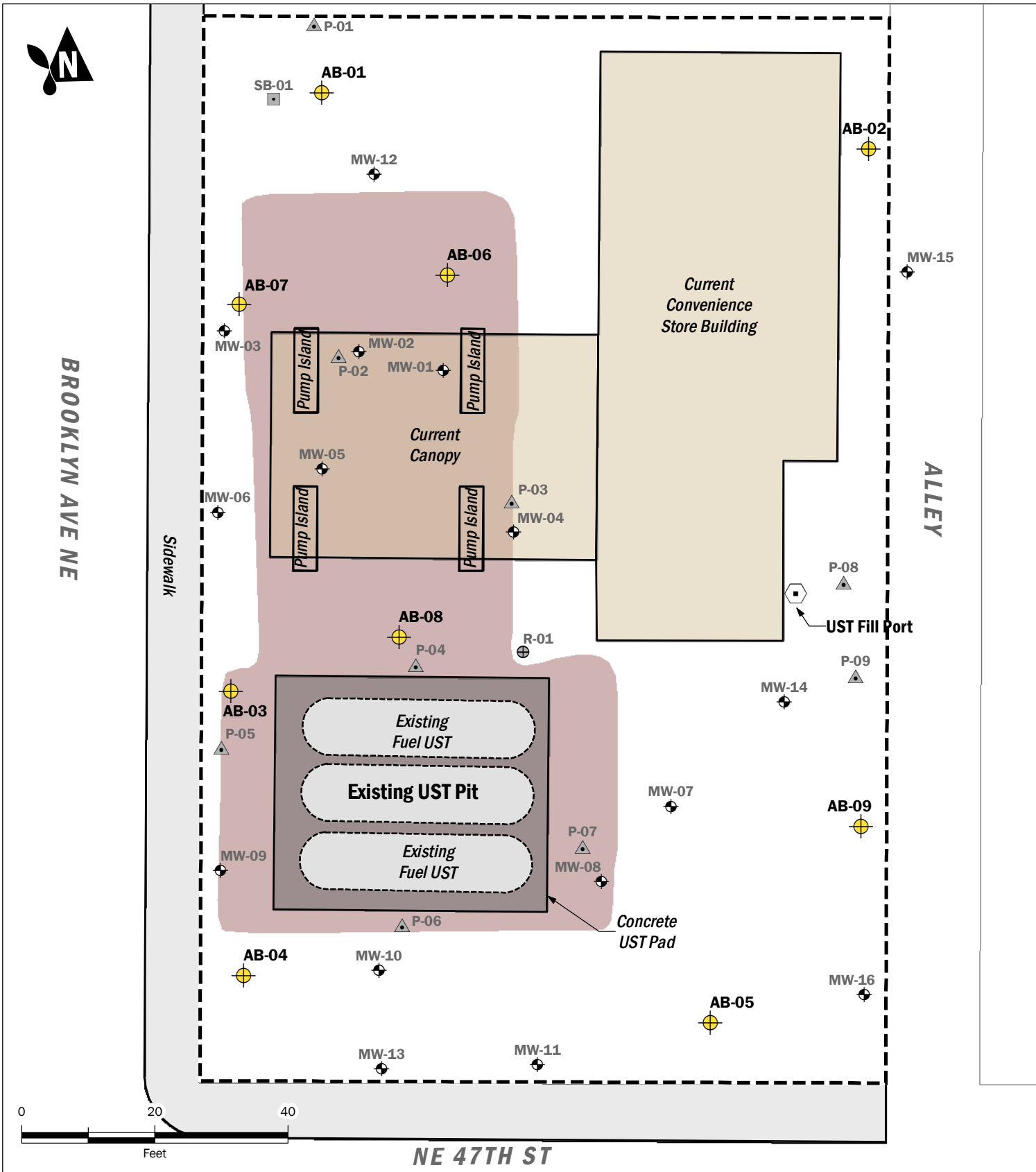
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Notes:



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- Soil Boring (Aspect, 2016)
- Monitoring Well
- Product Recovery Well
- Soil Boring
- Test Probe
- Property Boundary
- 1989 Soil Excavation Boundary

### Figure 4. 2016 Sampling Locations

#### Exploration Locations

On-Property Remedial Investigation Data Report  
4700 Brooklyn Avenue NE  
Seattle, Washington

|  |                       |                   |                        |
|--|-----------------------|-------------------|------------------------|
|  | JAN-2017              | BY:<br>DLC / EAC  | FIGURE NO.<br><b>2</b> |
|  | PROJECT NO.<br>160092 | REVISED BY:<br>-- |                        |



**Table 1. Maximum Concentrations of Analytes Exceeding Soil Method A in November 2016, Chevron 90129**

| Analyte                               | Maximum Concentration (mg/kg) | Location | Depth (feet bgs) | Method A (mg/kg) |
|---------------------------------------|-------------------------------|----------|------------------|------------------|
| Gasoline range hydrocarbons           | 1,100                         | AB-7     | 19               | 30               |
| Benzene                               | 0.15 J                        | AB-7     | 19               | 0.03             |
| Naphthalene                           | 6.4                           | AB-6     | 17               | 5                |
| Carcinogenic PAH toxicity equivalents | 0.15 J                        | AB-7     | 6                | 0.1              |

**Table 2. Maximum Concentrations of Analytes Exceeding Groundwater Method A in November 2016, Chevron 90129**

| Analyte                     | Maximum Concentration (µg/L) | Location | Method A (µg/L) |
|-----------------------------|------------------------------|----------|-----------------|
| Gasoline range hydrocarbons | 120,000                      | MW-12    | 800             |
| Diesel range hydrocarbons   | 8,800                        | MW-12    | 500             |
| Lead, dissolved             | 17.2 J                       | MW-11    | 15              |
| Benzene                     | 5,500                        | MW-12    | 5               |
| Toluene                     | 6,300                        | MW-12    | 1,000           |
| Ethylbenzene                | 2,300                        | MW-12    | 700             |
| Xylenes                     | 14,100                       | MW-12    | 1,000           |
| Vinyl chloride              | 0.22                         | MW-13    | 0.2             |
| 1,2-Dichloroethane          | 21                           | MW-9     | 5               |

## Worksheet 4

### Surface Water Route

**CSID:** 10632

**Site:** Chevron Station 90129

Not scored.

# Worksheet 5

## Air Route

CSID: 10632

Site: Chevron Station 90129

### 1.0 SUBSTANCE CHARACTERISTICS

#### 1.1 Introduction

No scoring in Section 1.1.

#### 1.2 Human Toxicity

| Substance            | Amb. Air Stnd. Value |       | Acute Toxicity Value |       | Chronic Toxicity Value |       | Carcinogenicity |       |
|----------------------|----------------------|-------|----------------------|-------|------------------------|-------|-----------------|-------|
|                      | (ug/m <sup>3</sup> ) | Score | (mg/m <sup>3</sup> ) | Score | (ug/m <sup>3</sup> )   | Score | WOE             | Score |
| Gasoline (benzene)   | 0.0345               | 10    | 31947                | 3     | 8.57E-03               | 8     | 2.73E-02        | 5     |
| Diesel (naphthalene) | 0.0294               | 10    | --                   | X     | 8.57E-04               | 10    | 5.95E-02        | 5     |
| Vinyl chloride       | 0.0128               | 10    | 460123               | 1     | 2.86E-02               | 5     | 3.10E-02        | 5     |

Maximum score: 10

Bonus points: 2

Source: WARM Toxicity Database

Human Toxicity Score: 12

Range: 1-12

#### 1.3 Mobility

##### Gaseous Mobility

| Substance            | Vapor Pressure |       | Henry's Law Value         |       |
|----------------------|----------------|-------|---------------------------|-------|
|                      | (mm Hg)        | Score | (atm-m <sup>3</sup> /mol) | Score |
| Gasoline (benzene)   | 95             | 4     | 0.00556                   | 4     |
| Diesel (naphthalene) | 0.082          | 3     | 0.00048                   | 3     |
| Vinyl chloride       | 2700           | 4     | 0.0271                    | 4     |

Maximum score: 4

Source: WARM Toxicity Database

##### Particulate Mobility

Soil type:

Erodibility factor:

Climatic factor:

Mobility value:

Source:

Mobility Score: 4

Range: 0-4

#### 1.4 Human Toxicity/Mobility

Source: WARM Scoring Manual

Human Tox/Mobil Score: 24

Range: 1-24

1.5 Environmental Toxicity/Mobility

| Substance            | Acute                         |       |
|----------------------|-------------------------------|-------|
|                      | Value<br>(ug/m <sup>3</sup> ) | Score |
| Gasoline (benzene)   | 3.19E+04                      | 3     |
| Diesel (naphthalene) | --                            | X     |
| Vinyl chloride       | 4.60E+05                      | 1     |

Maximum score 3  
Source: WARM Toxicity Database

Environmental Toxicity Score: 3  
Range: 1-10

Environmental Tox/Mobil Score: 6  
Range: 1-24

1.6 Substance Quantity

Quantity: 1,800 cubic yards  
Basis: Half the 0.37-acre property, 2-foot thickness  
Source: Aspect (2017) Figure 6

Substance Quantity Score: 7  
Range: 1-10

2.1 Containment

Description: Contaminated soil and ground water, no vapor collection system  
Basis: Site reports

Containment Score: 5  
Range: 0-10

**SUBSTANCE PARAMETER CALCULATIONS**

Human Health Pathway

SUBh (Human Tox/Mobil + 5) x (Containment +1) + Substance Quantity 181.0

Environmental Pathway

SUBe (Environ. Tox/Mobil + 5) x (Containment +1) + Substance Quantity 73.0

**3.0 TARGETS**

3.1 Nearest Population

Description: Bank to east  
Distance (ft): 35  
Source: iMap

Nearest Population Score: 10  
Range: 0-10

3.2 Nearest Sensitive Environment

Description: University Playground Park  
Distance (ft): 1,000  
Source: iMap

Nearest Sensitive Environment Score: 7  
Range: 0-7

3.3 Population within One-Half Mile

Number: 18,799  
Source: MO CDC

Population within Half Mile Score: 75.0  
Range: 0-75

**TARGET PARAMETER CALCULATIONS**

Human Health Pathway

TARh= Nearest Population + Population within Half Mile

85.0

Environmental Pathway

TARe Nearest Sensitive Environment

7.0

**4.0 RELEASE**

Evid. of release? No observed release  
Source: Site reports

Release Score (REL): 0.0  
Range: 0 or 5

**AIR ROUTE CALCULATIONS**

Human Health Pathway

$AIRh = (SUBh \times 60/329) \times \{REL + (TARh \times 35/85)\} / 24$

48.1

Environmental Pathway

$AIRe = (SUBe \times 60/329) \times \{REL + (TARe \times 35/85)\} / 24$

1.6

Range: 0-100

# Worksheet 6

## Groundwater Route

CSID: 10632

Site: Chevron Station 90129

### 1.0 SUBSTANCE CHARACTERISTICS

#### 1.1 Human toxicity

| Substance            | Drink. Wat. Stnd |       | Acute Toxicity  |       | Chronic Toxicity |       | Carcinogenicity                   |       |
|----------------------|------------------|-------|-----------------|-------|------------------|-------|-----------------------------------|-------|
|                      | Value<br>(ug/L)  | Score | Value<br>(ug/L) | Score | Value<br>(ug/L)  | Score | Adj. CP+o<br>(risk/mg/kg-<br>day) | Score |
| Gasoline (benzene)   | 5                | 8     | 3,306           | 3     | 4.00E-03         | 3     | 5.50E-02                          | 5     |
| Diesel (naphthalene) | --               | X     | 490             | 5     | 2.00E-02         | 1     | --                                | X     |
| Vinyl chloride       | 2                | 8     | 500             | 5     | 3.00E-03         | 3     | 1.50E+00                          | 7     |

Maximum score: 8

Bonus points: 2

Source: WARM Toxicity Database

Human Toxicity Score: 10

Range: 1-12

#### 1.2 Mobility

| Substance            | Solubility      |       |
|----------------------|-----------------|-------|
|                      | Value<br>(ug/L) | Score |
| Gasoline (benzene)   | 1.75E+03        | 3     |
| Diesel (naphthalene) | 3.10E+01        | 1     |
| Vinyl chloride       | 2.76E+03        | 3     |

Maximum value: 3

Source: WARM Toxicity Database

Mobility Score: 3

Range: 1-3

#### 1.3 Substance quantity

Quantity: 1,800 cubic yards

Basis: Half the 0.37-acre property, 2-foot thickness

Source: Aspect (2017) Figure 6

Substance Quantity Score: 4

Range: 1-10

#### 2.1 Containment

Description: Contaminated soil in contact with groundwater

Source: Site reports

Containment Score: 10

Range: 0-10

### SUBSTANCE PARAMETER CALCULATION

SUB = (Human Toxicity + Mobility + 3) x (Containment + 1) + Substance Quantity

180.0

## 2.0 MIGRATION POTENTIAL

### 2.2 Net precipitation

Amount (in.): 37  
Source: Leidos (2017)

Net Precipitation Score: 4  
Range: 0-5

### 2.3 Subsurface Hydraulic Conductivity

Description: Sand and silt  
Source: Leidos (2017)

Hydraulic Conductivity Score: 3  
Range: 1-4

### 2.4 Vertical Depth to Aquifer

Depth (ft): 15-19  
Source: Site reports

Depth to Aquifer Score: 8  
Range: 1-8

## MIGRATION PARAMETER CALCULATION

MIG = Depth to Aquifer + Net Precipitation + Hydraulic Conductivity

15.0

## 3.0 TARGETS

### 3.1 Aquifer Usage

Description: Private supply assumed, but public hook-ups available  
Source: iMap, WDOH Water System Database

Aquifer Use Score: 4  
Range: 1-10

### 3.2 Distance to Nearest Drinking Water Well

Distance (ft): 8,900  
Source: iMap, WDOH Water System Database

Well Distance Score: 1  
Range: 0-5

### 3.3 Population Served by Drinking Water Wells within Two Miles

No. of people: 3  
Source: WDOH Water System Database, Well Log Viewer

Population Served Score: 1.7  
Range: 0-100

### 3.4 Area Irrigated by Wells within Two Miles

Area (acres): 0.25  
Source: Water Resources Explorer

Area Irrigated Score: 0.4  
Range: 0-50

## TARGET PARAMETER CALCULATION

7.1

TAR = Aquifer Use + Well Distance + Population Served + Area Irrigated

**4.0 RELEASE**

Evid. of release? Contaminated groundwater  
Source: Site reports

Release Score (REL): 5.0  
Range: 0 or 5

**GROUND WATER ROUTE CALCULATION**

$$GW = (SUB \times 40/208) \times \{(MIG \times 25/17) + REL + (TAR \times 30/165)\} / 24$$

40.9

Range: 0-100



# Washington Ranking Method

## Route Scoring Summary and Ranking Calculation

**Site Name:** Chevron Station 90129  
**Site Address:** 5040 148th Avenue NE, Redmond, WA 98052  
**CSID:** 10632  
**FSID:** 36542815

| Human Health Route Scores |       |          |
|---------------------------|-------|----------|
| Pathway                   | Score | Quintile |
| Surface water             | 0.0   |          |
| Air                       | 48.1  | 5        |
| Groundwater               | 40.9  | 4        |

| Quintile   | Value |
|------------|-------|
| High (H)   | 5     |
| Middle (M) | 4     |
| Low (L)    |       |

| Human Health Pathway Quintiles - February 2015 |               |      |     |      |             |      |  |
|--|---------------|------|-----|------|-------------|------|--|
| Quintile                                       | Surface Water |      | Air |      | Groundwater |      |  |
| 1  | <=            | 7.9  | <=  | 8.3  | <=          | 23.9 |  |
| 2  |               | 8.0  |     | 15.7 |             | 33.0 |  |
| 3  |               | 15.5 |     | 24.9 |             | 40.2 |  |
| 4  |               | 21.4 |     | 39.0 |             | 50.2 |  |
| 5  | >=            | 29.8 | >=  | 39.1 | >=          | 50.3 |  |

$$(H^2 + 2M + L) / 8$$

Human Health Priority Bin Score: 4.1

| Environmental Route Scores |       |          |
|----------------------------|-------|----------|
| Pathway                    | Score | Quintile |
| Surface water              | 0.0   |          |
| Air                        | 1.6   | 3        |

| Quintile | Value |
|----------|-------|
| High (H) | 3     |
| Low (L)  |       |

| Environmental Pathway Quintiles - February 2015 |               |      |     |      |
|---|---------------|------|-----|------|
| Quintile  | Surface Water |      | Air |      |
| 1   | <=            | 11.5 | <=  | 1.2  |
| 2   |               | 11.6 |     | 1.5  |
| 3   |               | 24.2 |     | 15.2 |
| 4   |               | 32.1 |     | 27.7 |
| 5   | >=            | 49.7 | >=  | 27.8 |

$$(H^2 + 2L) / 7$$

Environmental Priority Bin Score: 1.3

### FINAL MATRIX RANKING

| Human Health Priority | Environmental Priority |   |   |   |   |     |
|-----------------------|------------------------|---|---|---|---|-----|
|                       | 5                      | 4 | 3 | 2 | 1 | n/a |
| 5                     | 1                      | 1 | 1 | 1 | 1 | 1   |
| 4                     | 1                      | 2 | 2 | 2 | 3 | 2   |
| 3                     | 1                      | 2 | 3 | 4 | 4 | 3   |
| 2                     | 2                      | 3 | 4 | 4 | 5 | 3   |
| 1                     | 2                      | 3 | 4 | 5 | 5 | 5   |
| n/a                   | 3                      | 4 | 5 | 5 | 5 | NFA |

n/a - not applicable

NFA - no further action

Site Rank: 1