



CITY OF LACEY
Community & Economic Development Department
420 College Street SE
Lacey, WA 98503
(360) 491-5642

OFFICIAL USE ONLY

Case Number: _____

Date Received: _____

By: _____

Related Case Numbers:

WAC 197-11-960

ENVIRONMENTAL CHECKLIST

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants: [\[help\]](#)

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals: [\[help\]](#)

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background

1. Name of proposed project, if applicable:

Depot District Building: Soil Cleanup.

2. Name of applicant:

City of Lacey

3. Address and phone number of applicant and contact person:

Ashly Smith, Civil Engineer
Capital Projects Manager
City of Lacey
420 College St. SE
Lacey, WA 98503
(360) 870-5138
acsmith@ci.lacey.wa.us

4. Date checklist prepared:

May 26th, 2021

5. Agency requesting checklist:

City of Lacey

6. Proposed timing or schedule (including phasing, if applicable):

Summer or fall of 2021, Project length is anticipated to take less than 5 days to complete.
Anticipated start date of the project is within two weeks of SEPA determination.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

Yes, the City of Lacey proposes construction of new museum and civic center at this location, pending cleanup.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

- A work plan for Ecology was approved by the City of Lacey and Ecology.
- A Remedial Investigation Report was submitted to Ecology and the City of Lacey.
- A soil management plan has been approved by Ecology and the City of Lacey.
- A soil closure report will be submitted to the City of Lacey and Ecology.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

The City has entered into the Voluntary Cleanup Program with Washington State Department of Ecology. Site is pending approval of a No Further Action (NFA) designation for the site. The proposed action is to support application for the NFA.

10. List any government approvals or permits that will be needed for your proposal, if known.

No other known government approvals or permits are required for this proposal.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The project site is located at 5700 Lacey Blvd SE, Lacey WA 98503. The site is being developed for a museum and culture center. Due to the historical industrial nature at the site the City of Lacey has been working closely with Ecology to delineate any potential soil contamination at the site. This proposed project will remove identified contaminated soils from the site, up to approximately 600 cubic yards, within an excavation site of up to 30 feet wide by 30 feet long and up to 17 feet deep located in the north east parking lot of the site. Soils will be excavated in layers to be tested for contaminants and disposed of at a licensed facility in accordance with the approved soil management plan. The goal of the cleanup is to removal all contaminated soil from the delineated sit and back fill the excavation site with uncontaminated soil.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project site is located at 5700 Lacey Blvd SE, Lacey WA 98503. Excavation will occur on the east end of the building in close proximity to Lacey Blvd SE.

B. Environmental Elements

1. Earth

a. General description of the site:

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)?

The project site is in a parking lot and is therefore flat with no steep slopes.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

The U.S. Department of Agriculture (USDA) and Natural Resources Conservation Services (NRCS) lists the soil type on site as Nisqually loamy fine sand. However, previous investigations of the site indicate the site is highly disturbed due to the historic industrial nature of the site (the site included a former train station and several decommissioned factories of various types, all no longer present at the site), with large portions of the project site composed of fill (e.g., gravel for the parking lot base).

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

There are no surface indications or history of unstable soils in the immediate vicinity of the project site.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

This proposed project will remove identified contaminated soils from the site, up to 600 cubic yards, within an excavation site of up to 30 feet wide by 30 feet long and up to 17 feet deep located in the north east parking lot of the site. Soils will be excavated in layers to be tested for contaminants and disposed of at a licensed facility in accordance with the approved soil management plan. The goal of the cleanup is to remove all contaminated soil from the delineated site and backfill the excavation site with uncontaminated soil. Up to 600 cubic yards of fill could be required to backfill the site. Uncontaminated fill from the excavated site will be used to backfill the site when possible.

No grading is proposed at this time.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Best Management Practices (BMPs) will be implemented to avoid any potential erosion due to excavating the site.

- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

The proposed project will remove up to 30 feet by 30 feet (900 square feet) of impervious surface to excavate the site.

- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Best Management Practices (BMPs) will be implemented to reduce or control erosion, or other impacts to the earth.

2. Air

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

The proposed projects only emissions will occur during the excavation and backfilling of the site from typical construction vehicles such as excavators and dump trucks. No emissions will occur from the operation, and maintenance of the project once the project is completed.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

There are no off-site sources of emissions or odors that may affect this proposal.

- c. Proposed measures to reduce or control emissions or other impacts to air, if any:

There are no proposed measures to reduce or control emissions or other impacts to air besides turning of idling equipment when not in use.

3. Water

- a. Surface Water:

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

There is no surface water body on or in the immediate vicinity of the project site.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

The project site will not require any work over, in, or adjacent to (within 200 feet) of any surface bodies of water.

- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

The proposed project does not include dredging, no fill will be removed or placed from a surface water or wetland at the project site.

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

The proposed project will not require surface water withdrawals or diversions.

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

The proposed project does not lie within a 100-year floodplain.

- 6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

The proposed project will not discharge any waste materials to surface waters.

b. Ground Water:

- 1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

The proposed project will not withdraw groundwater from a well for drinking water or other purposes.

- 2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

The proposed project will not discharge waste materials into the ground from septic tanks or other sources.

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

The project site is in a parking lot.
The project area will be restored with compacted gravel.
Net impervious will remain the same as pre-project levels.
Best Management Practices (BMPs) will be used to contain any potential stormwater runoff from the site from entering nearby catch basins.
This includes encapsulating any spoils staged on site to prevent sedimentation from the spoils from entering stormwater system.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

The proposed project will be removing contaminated soils to prevent further contamination of potential ground and surface waters. Contaminated material will be disposed of at an approved hazardous material disposal site, such as Republic.

- 3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

The proposed project will not alter or otherwise affect drainage patterns in the vicinity of the site.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

There are no proposed measures to reduce or control surface, groundwater, runoff water, and drainage patterns impacts besides using Best Management Practices (BMPs). BMPs would include working in dry conditions when possible and placing barriers beneath and around excavated contaminated soil to prevent soil contaminants from entering any potential groundwater, surface water, or nearby catch basins.

4. Plants

- a. Check the types of vegetation found on the site:

- deciduous tree: alder, maple, aspen, **other**
 evergreen tree: fir, cedar, pine, other
 shrubs
 grass
 pasture
 crop or grain
 Orchards, vineyards or other permanent crops.
 wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
 water plants: water lily, eelgrass, milfoil, other
 other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

The proposed project takes place in a parking lot, no vegetation will be removed.

c. List threatened and endangered species known to be on or near the site.

U.S. Fish and Wildlife Service (USFWS) lists the following threatened and endangered species for the project site:

- Mammals: Olympia, Tenino, and Yelm pocket gophers.
- Birds: Marbled Murrelet, Streaked Horned Lark, and Yellow-billed Cuckoo.
- Fish: Bull Trout
- Plants: Golden Paintbrush.

None of these species were observed at the proposed project site located in a parking lot. USFWS does not list any critical habitats for the project site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

The proposed project is a soil remediation project within a parking lot; no landscaping or other measures to enhance the project site are proposed.

e. List all noxious weeds and invasive species known to be on or near the site.

No noxious weeds or invasive species were observed at or near the project site. The project site located site is located within an urban area within a parking lot.

5. Animals

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

House sparrows, American crows, and pigeons were observed at the project site. Project site is located in an urban area in a parking lot.

b. List any threatened and endangered species known to be on or near the site.

U.S. Fish and Wildlife Service (USFWS) lists the following threatened and endangered species for the project site:

- Mammals: Olympia, Tenino, and Yelm pocket gophers.
- Birds: Marbled Murrelet, Streaked Horned Lark, and Yellow-billed Cuckoo.
- Fish: Bull Trout
- Plants: Golden Paintbrush.

None of these species were observed at the proposed project site located in a parking lot. USFWS does not list any critical habitats for the project site.

c. Is the site part of a migration route? If so, explain.

The area is considered part of the Pacific Flyway for migrating birds.

d. Proposed measures to preserve or enhance wildlife, if any:

There are no proposed measures to preserve or enhance wildlife for the proposed project. The proposed project is a soil remediation project in a parking lot in an urban area.

e. List any invasive animal species known to be on or near the site.

No invasive species were observed on or near the project site.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The proposed project is a soil remediation project in a parking lot. No energy will be required to meet the completed projects energy needs.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

This soil remediation project will not affect the potential use of solar energy by adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

This soil remediation project does not feature any energy conservation plans or proposals.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

1) Describe any known or possible contamination at the site from present or past uses.

The proposed project is a soil remediation project to remove delineated contaminated soils from past historical use at the site. Known soil contaminates in the delineated area include heavy metals and Volatile Organic Compounds (VOCs) from previous industrial use of the site.

- 2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

The proposed project is a soil remediation project to remove delineated contaminated soils from past historical use at the site. Known soil contaminants in the delineated area include heavy metals and Volatile Organic Compounds (VOCs) from previous industrial use of the site. Soil will be excavated from the site and lab tested for chemicals of concern for disposal at a licensed facility.

There are no known utilities at the site. However, a utility locating service will be called to investigate for any unmapped utility lines before excavation begins.

- 3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

The proposed project is a soil remediation project to remove delineated contaminated soils from past historical use at the site. Known soil contaminants in the delineated area include heavy metals and Volatile Organic Compounds (VOCs) from previous industrial use of the site. Soil will be excavated from the site and lab tested for chemicals of concern for disposal at a licensed facility. Contaminated soils will be stored on plastic sheeting to prevent contamination of the surrounding area until disposal. Soil disposal will be in accordance with the approved (by Ecology and the City of Lacey) soil management plan.

No toxic or hazardous chemicals will be produced or used during the projects development or construction or at any time during the operating life of the project.

- 4) Describe special emergency services that might be required.

No special emergency services will be required for this project. A project specific Health and Safety Plan will be prepared for the project that outlines what to do in case of an emergency while on site.

- 5) Proposed measures to reduce or control environmental health hazards, if any:

The proposed project includes the use of plastic sheeting to reduce and control environmental health hazards of contaminated soils until disposed of at a licensed facility. Additional measures include the use of appropriate personal protective equipment and Best Management Practices (BMPs) to reduce or control environmental health hazardous.

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

The proposed project is located adjacent to Lacey Blvd SE, a busy traffic arterial.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

The proposed project will include the noise of excavators and dump trucks during the excavation, backfilling, and disposal phase of the project. No additional noises will be produced from the project once disposal of contaminated soils is completed.

3) Proposed measures to reduce or control noise impacts, if any:

There are no proposed measures to reduce or control noise impacts for this project.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

The proposed project is surrounded by areas zoned as CBD 4 (Central Business District) and OSP-1 (Open Space Institutional). The proposed project will not affect current land uses on nearby or adjacent properties.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

The project site has not been used as working farmland or working forest land.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

The project site is not working farmland or working forest land.

c. Describe any structures on the site.

The only structure on site is a warehouse with a parking lot.

d. Will any structures be demolished? If so, what?

No structures will be demolished. However, up to 900 square feet of impervious surface (asphalt in parking lot) may be removed to access and remove contaminated soils from the site.

e. What is the current zoning classification of the site?

CBD 4 (Central Business District)

f. What is the current comprehensive plan designation of the site?

CBD 4 (Central Business District)

g. If applicable, what is the current shoreline master program designation of the site?

No applicable, the project site is not within 200 feet of a shoreline.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

The project site is not classified as a critical are by the City or the county.

i. Approximately how many people would reside or work in the completed project?

No people will reside or work in the completed project once completed, it is a soil remediation project.

j. Approximately how many people would the completed project displace?

No people will be displaced once the project is completed, it is a soil remediation project.

k. Proposed measures to avoid or reduce displacement impacts, if any:

No measures are proposed to avoid or reduce displacement impacts. There are no displacement impacts for this soil remediation project.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

No measures are proposed to ensure this project is compatible with existing and projected land uses and plans. This project is a soil remediation project.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

No measures are proposed to reduce or control impacts to agriculture and forest lands of long-term commercial significance. The proposed project is a soil remediation project. The proposed project is not and has not been a working farm or forest.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

This is a soil remediation project in a parking lot, no housing units will be provided once the project is complete or during construction. There are no housing units at the project site.

- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

This is a soil remediation project in a parking lot, no housing units are present at the project site. No housing units will be eliminated for this project during construction or after project completion.

- c. Proposed measures to reduce or control housing impacts, if any:

This is a soil remediation project in a parking lot, there are no proposed measures to reduce or control housing impacts. There are no housing units present at the project site.

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

This is a soil remediation project in a parking lot, no structures will be affected beyond the removal of the asphalt to access the soil. No structures are proposed for this project.

- b. What views in the immediate vicinity would be altered or obstructed?

This is a soil remediation project in a parking lot, no structures will be affected beyond the removal of the asphalt to access the soil. No structures are proposed for this project. Views in the immediate vicinity will not be altered or obstructed due to the proposed project during construction or when construction is completed.

- b. Proposed measures to reduce or control aesthetic impacts, if any:

This is a soil remediation project in a parking lot, no structures will be affected beyond the removal of the asphalt to access the soil. No structures are proposed for this project. Views in the immediate vicinity will not be altered or obstructed due to the proposed project during construction or when construction is completed. No measures to reduce or control aesthetic impacts are proposed for this project.

11. Light and Glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

This is a soil remediation project in a parking lot. The project will take place during daylight hours and the use of any type of lighting is not part of the proposed project. The proposed project will not produce any light or glare.

- b. Could light or glare from the finished project be a safety hazard or interfere with views?

This is a soil remediation project in a parking lot. The project will take place during daylight hours and the use of any type of lighting is not part of the proposed project. The proposed project will not produce any light or glare. No light or glare from the finished project will be a safety hazard or interfere with views.

c. What existing off-site sources of light or glare may affect your proposal?

This is a soil remediation project in a parking lot. No existing off-site sources of light or glare will affect this proposed project.

d. Proposed measures to reduce or control light and glare impacts, if any:

This is a soil remediation project in a parking lot. The project will take place during daylight hours and the use of any type of lighting is not part of the proposed project. The proposed project will not produce any light or glare. No measures are proposed to reduce or control light and glare impacts for this project.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

This is a soil remediation project in a parking lot. Informal recreational opportunities adjacent to the project site include a bike path. No other designated or informal recreation opportunities are in the immediate vicinity.

b. Would the proposed project displace any existing recreational uses? If so, describe.

This is a soil remediation project in a parking lot. Informal recreational opportunities adjacent to the project site include a bike path. No other designated or informal recreation opportunities are in the immediate vicinity. The proposed project will not displace any existing recreational uses.

There is a depot park open nearby with a new food truck court, but this is well outside the project area.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

This is a soil remediation project in a parking lot. Informal recreational opportunities adjacent to the project site include a bike path. No other designated or informal recreation opportunities are in the immediate vicinity. No measures are proposed to reduce or control impacts on recreation or recreation opportunities as part of this project.

13. Historic and cultural preservation

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.

This is a soil remediation project in a parking lot. There are no buildings that are over 45 years old that are listed or eligible for national, state, or local preservation registers.

- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

This is a soil remediation project in a parking lot and appears to be in previously disturbed soil, evidenced by the high level of fill material observed during initial hazmat investigations.

No landmarks, features, or other evidence or historical use or occupation was observed within the project site.

No material evidence, artifacts, or areas of cultural importance were observed on or near the site.

No professional studies to identify the above-mentioned resources was conducted for the project site.

- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

Multiple site visits were conducted at the project site during a remedial investigation for soil contaminants. The remedial investigation was approved by the City of Lacey and Ecology.

- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

This is a soil remediation project in a parking lot. No measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources are proposed besides a stop work order and consulting with the City of Lacey on how to proceed with the soil remediation project if any cultural resources are encountered.

14. Transportation

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

This is a soil remediation project in a parking lot. The parking lot can be accessed from Clearbrook Dr SE and Lacey Blvd SE.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

This is a soil remediation project in a parking lot. The site is not currently served by public transit. The nearest public transit stop is located within ½ a mile west on Lacey Blvd SE from the project site.

- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

This is a soil remediation project in a parking lot. No new parking spaces will be eliminated or created once the project is completed.

- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

This is a soil remediation project in a parking lot. No new or improvements to existing roads, streets, pedestrian, bicycle, state transportation facilities, or driveways are required.

- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

This is a soil remediation project in a parking lot. The project does not occur in the immediate vicinity of water, rail, or air transportation.

- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

This is a soil remediation project in a parking lot. Vehicular trips will not be affected by the project.

- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

This is a soil remediation project in a parking lot. The project will not affect or be affected by the movement of agricultural and forest products on roads or streets in the area.

- h. Proposed measures to reduce or control transportation impacts, if any:

This is a soil remediation project in a parking lot. No measures to reduce or control transportation impacts are proposed.

15. Public Services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

This is a soil remediation project in a parking lot. The project would not result in an increased need for public services.

b. Proposed measures to reduce or control direct impacts on public services, if any.

This is a soil remediation project in a parking lot. No measures to reduce or control direct impacts on public services are proposed.

16. Utilities

a. Circle utilities currently available at the site:

electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system,
other _____

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

This is a soil remediation project in a parking lot. No new utilities are proposed.

C. Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee _____

Position and Agency/Organization _____

Date Submitted: _____

APPENDIX A

Vicinity Map

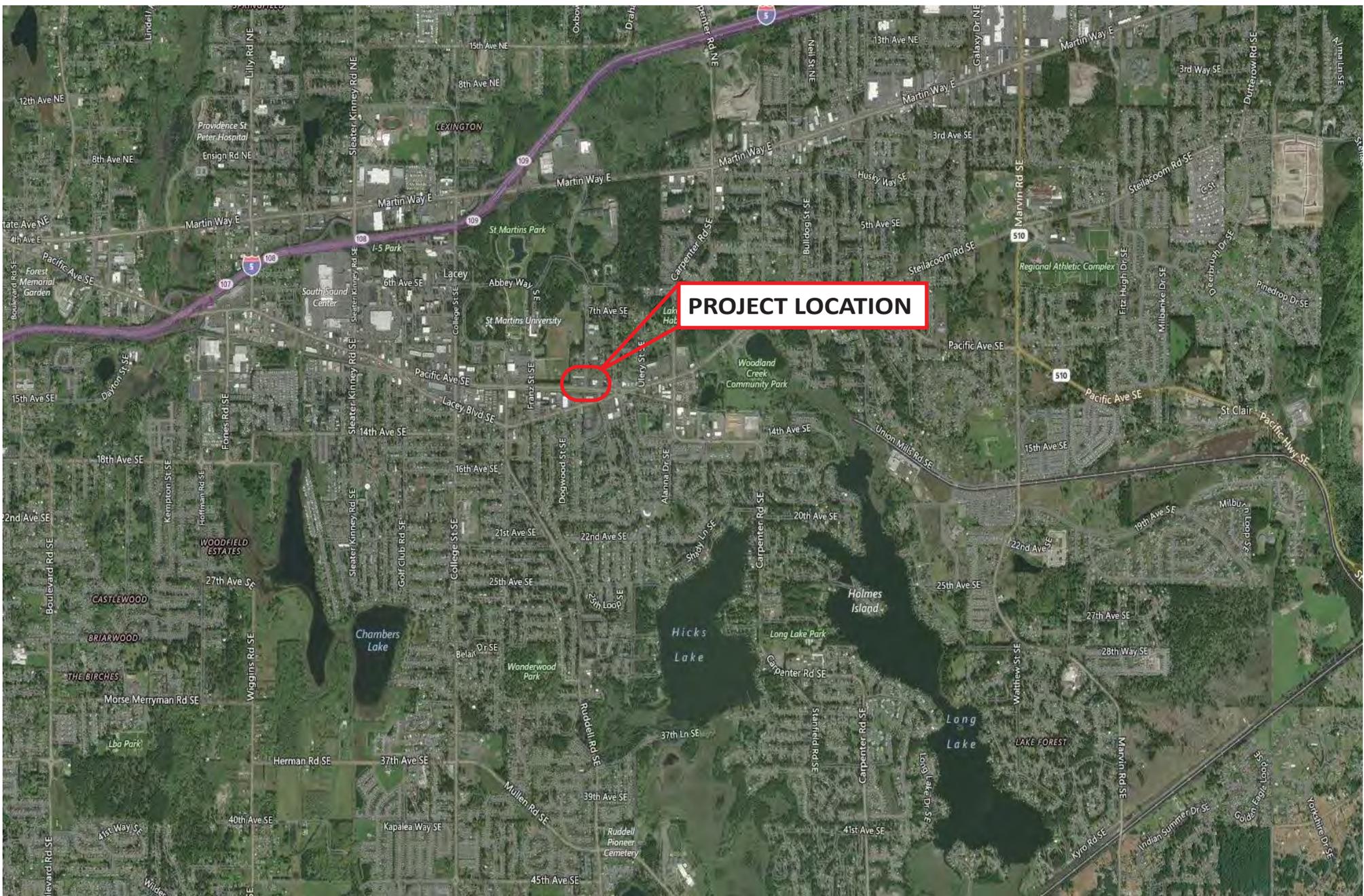


Figure 1
 Vicinity Map
 Deport District Building Remedial Investigation
 Voluntary Cleanup Program Project No. SW1556



APPENDIX B

Project Area



Project Area

Deport District Building Remedial Investigation
Voluntary Cleanup Program Project No. SW1556



**Project Area: Approximately
30 ft by 30 ft and up to 17
feet below ground surface**

APPENDIX C

USDA NRCS

Soil Mapping

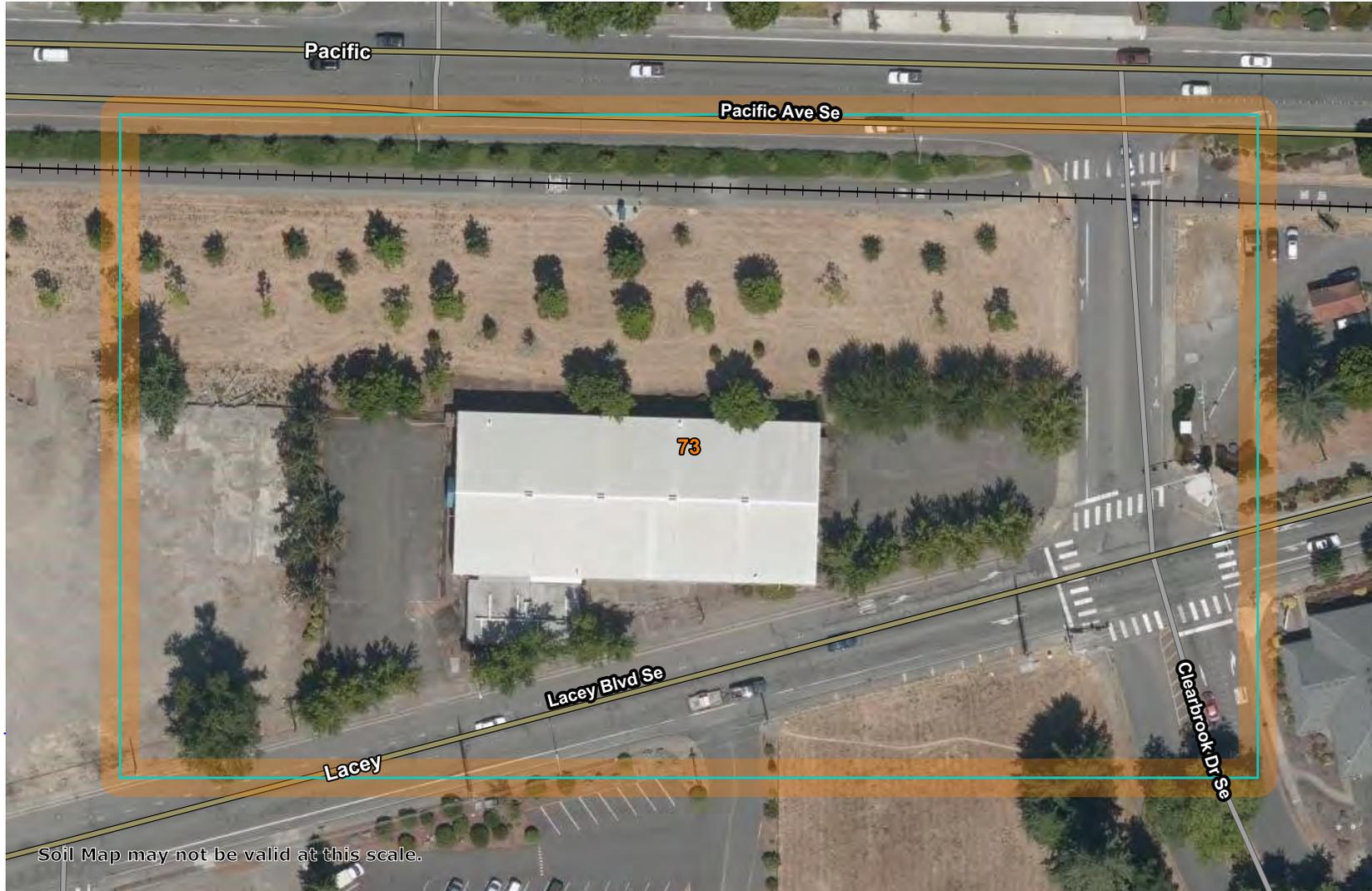
Soil Map—Thurston County Area, Washington

122° 48' 37" W

122° 48' 28" W

47° 2' 13" N

47° 2' 13" N



47° 2' 9" N

47° 2' 9" N

122° 48' 37" W

122° 48' 28" W



Map Scale: 1:949 if printed on A landscape (11" x 8.5") sheet.

0 10 20 40 60 Meters

0 45 90 180 270 Feet

Map projection: Web Mercator Corner coordinates: WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

5/26/2021
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Thurston County Area, Washington

Survey Area Data: Version 14, Jun 4, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 22, 2018—Jul 27, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
73	Nisqually loamy fine sand, 0 to 3 percent slopes	4.3	100.0%
Totals for Area of Interest		4.3	100.0%

APPENDIX D

USFWS: IPAC Report

WDFW: PHS Report



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
Phone: (360) 753-9440 Fax: (360) 753-9405
<http://www.fws.gov/wafwo/>

In Reply Refer To:

May 26, 2021

Consultation Code: 01EWF00-2021-SLI-1184

Event Code: 01EWF00-2021-E-02315

Project Name: Depot District Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated and proposed critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. The species list is currently compiled at the county level. Additional information is available from the Washington Department of Fish and Wildlife, Priority Habitats and Species website: <http://wdfw.wa.gov/mapping/phs/> or at our office website: http://www.fws.gov/wafwo/species_new.html. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether or not the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). You may visit our website at <http://www.fws.gov/pacific/eagle/for> information on disturbance or take of the species and information on how to get a permit and what current guidelines and regulations are. Some projects affecting these species may require development of an eagle conservation plan: (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Also be aware that all marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas. The importation of marine mammals and marine mammal products into the U.S. is also prohibited. More information can be found on the MMPA website: <http://www.nmfs.noaa.gov/pr/laws/mmpa/>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Related website:

National Marine Fisheries Service: http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

Attachment(s):

- Official Species List
-

Project Summary

Consultation Code: 01EWF00-2021-SLI-1184

Event Code: 01EWF00-2021-E-02315

Project Name: Depot District Project

Project Type: ** OTHER **

Project Description: Soil Cleanup

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@47.0364312,-122.80939337234658,14z>



Counties: Thurston County, Washington

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Washington Fish And Wildlife Office

510 Desmond Drive Se, Suite 102

Lacey, WA 98503-1263

(360) 753-9440

Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Olympia Pocket Gopher <i>Thomomys mazama pugetensis</i> There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6713	Threatened
Tenino Pocket Gopher <i>Thomomys mazama tumuli</i> There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6290	Threatened
Yelm Pocket Gopher <i>Thomomys mazama yelmensis</i> There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7257	Threatened

Birds

NAME	STATUS
Marbled Murrelet <i>Brachyramphus marmoratus</i> Population: U.S.A. (CA, OR, WA) There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Streaked Horned Lark <i>Eremophila alpestris strigata</i> There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7268	Threatened
Yellow-billed Cuckoo <i>Coccyzus americanus</i> Population: Western U.S. DPS There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bull Trout <i>Salvelinus confluentus</i> Population: U.S.A., conterminous, lower 48 states There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened

Flowering Plants

NAME	STATUS
Golden Paintbrush <i>Castilleja levisecta</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7706	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.



Priority Habitats and Species on the Web



Report Date: 05/27/2021

PHS Species/Habitats Overview:

Occurrence Name	Federal Status	State Status	Generalized Location
Big brown bat	N/A	N/A	Yes
Little Brown Bat	N/A	N/A	Yes
Yuma myotis	N/A	N/A	Yes

PHS Species/Habitats Details:

Big brown bat	
Scientific Name	<i>Eptesicus fuscus</i>
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	<i>Myotis lucifugus</i>
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Yuma myotis	
Scientific Name	<i>Myotis yumanensis</i>
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necessary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

Big brown bat	
Scientific Name	<i>Eptesicus fuscus</i>
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Little Brown Bat	
Scientific Name	<i>Myotis lucifugus</i>
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

Yuma myotis	
Scientific Name	<i>Myotis yumanensis</i>
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release (360-902-2543) for obtaining information about masked sensitive species and habitats.
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	N
Display Resolution	TOWNSHIP
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00605

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necessary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

APPENDIX E

DNR: FPARS Report

Forest Practices Activity Map



Source: Esri, Maxar, GeoEye, Earthstar, Community, Department of Natural Resources (DNR), Forest Practices Division

Map Symbols	Additional Information	Legal Description
<ul style="list-style-type: none"> --- Harvest Boundary - - - Road Construction ~ Stream ▨ RMZ / WMZ Buffers ⊗ Rock Pit ● Landing ▽ Waste Area 🌲 Clumped WRTS/GRTS 🏠 Existing Structure 		<p>Legal Description</p> <p>S21 T18.0N R01.0W, S22 T18.0N R01.0W S20 T18.0N R01.0W, S17 T18.0N R01.0W S16 T18.0N R01.0W, S39 T18.0N R01.0W S15 T18.0N R01.0W</p>
 <p>WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES</p>	<p>Extreme care was used during the compilation of this map to ensure its accuracy. However, due to changes in data and the need to rely on outside information, the Department of Natural Resources cannot accept responsibility for errors or omissions, and therefore, there are no warranties that accompany this material.</p>	<p>0 0.25 Miles</p> <p>Date: 5/27/2021 Time: 11:24:02 AM</p>

	<h2>FPARS Exhibit</h2>	<h3>Depot District Building</h3> <p>5700 Lacey Blvd SE, Lacey WA 98503</p>
--	------------------------	--

APPENDIX F

Soil Management Plan

Soil Management Plan

Depot District Building

Project Location

Depot District Building
5700 Lacey Blvd SE
Lacey, WA 98503

Ecology Voluntary Cleanup Program

Project No. SW1556
Site ID No. 12610

March 13, 2021



5016 Lacey Blvd. SE, Lacey WA 9850, www.skillings.com

Prepared for:

City of Lacey:
Ashley Smith, Civil Engineer
Capital Project Manager
City of Lacey Public Works
420 College St SE
Lacey, WA 98503

Prepared by:

Skillings Inc.

Environmental Project Team:

Patrick Skillings, Vice President
Project Manager

Grant Gilmore, Environmental Manager
QA/QC

Frank Stevick, Project Scientist
Field investigation
Report author

Eli Pogue, Staff Scientist
Field Assistant

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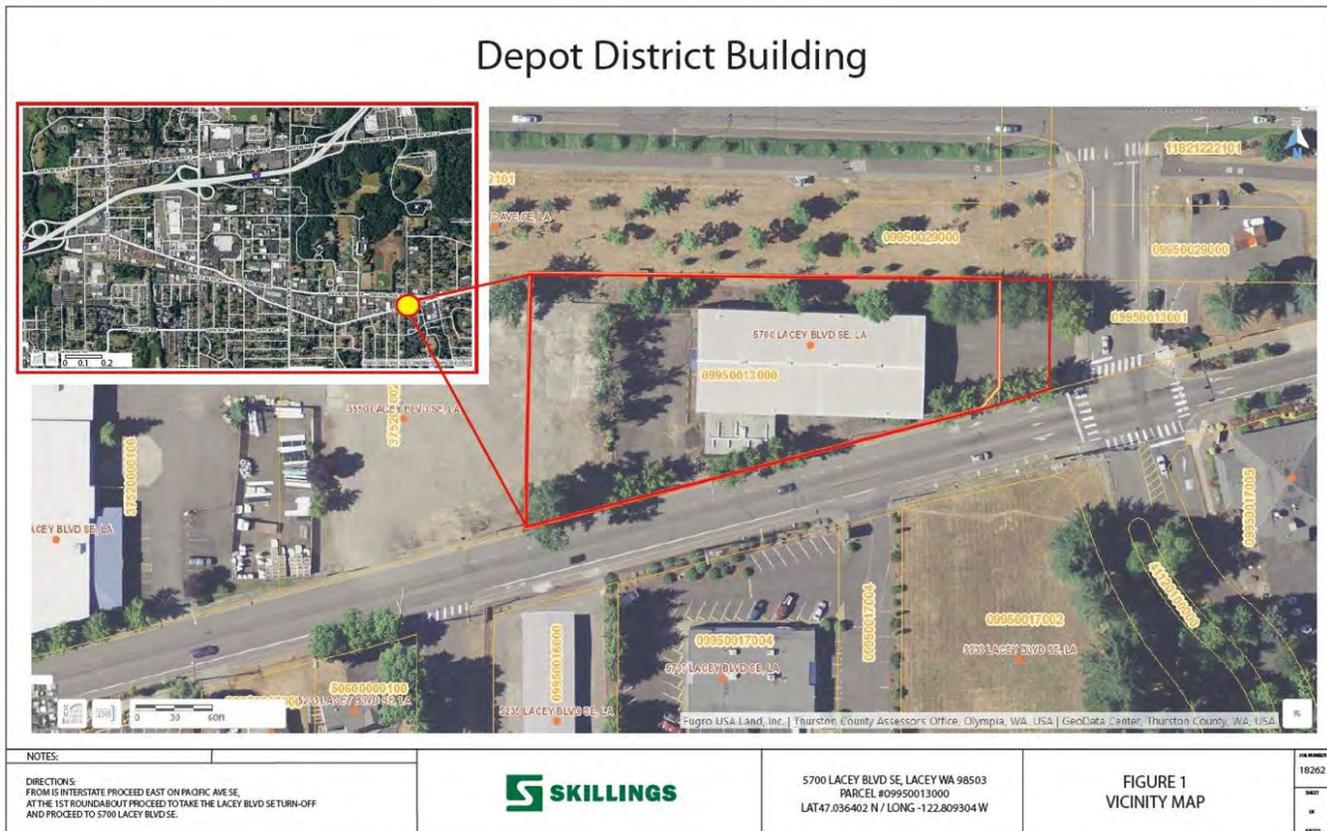
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Appendix A: Reference tables

1.0 Introduction

The City of Lacey is in the process of establishing a museum and cultural center facility, and parking areas on a 1.01-acre parcel (Thurston County tax parcel number 09950013000; Figure 1) located at 5700 Lacey Boulevard SE, Lacey WA 98503 (here after referred to as the Property, but also referenced as the Depot District Building by the Washington State Department of Ecology Volunteer Cleanup Program). The Property is currently occupied by a vacant warehouse with attached office area and parking areas to the east and west of the building. Prior to its current use the Property was used as a train depot, a plywood factory, and a carpet distribution center. These activities gave cause to suspect potential ground contamination had occurred. Subsurface investigations by Skillings Inc., and others (GeoEngineers, 1992; Geotech, 1992; Geotech, 1992; Parametrix, 1990) found contaminated soils, contaminated groundwater, and underground storage tanks (USTs) on the Property. Groundwater monitoring wells were installed to investigate groundwater contamination and the contaminated soils delineated. The contaminated soils on the Property have been identified as the potential source of the contaminated groundwater. These contaminated soils will need to be investigated and removed before the establishment of the museum and cultural center, and parking areas can continue by the City of Lacey. This Soil Management Plan (SMP) has been prepared as a reference for the City of Lacey and contractor(s) for the excavation and removal of contaminated soils on the Property.

Figure 1. Vicinity Map for the Depot District Building.

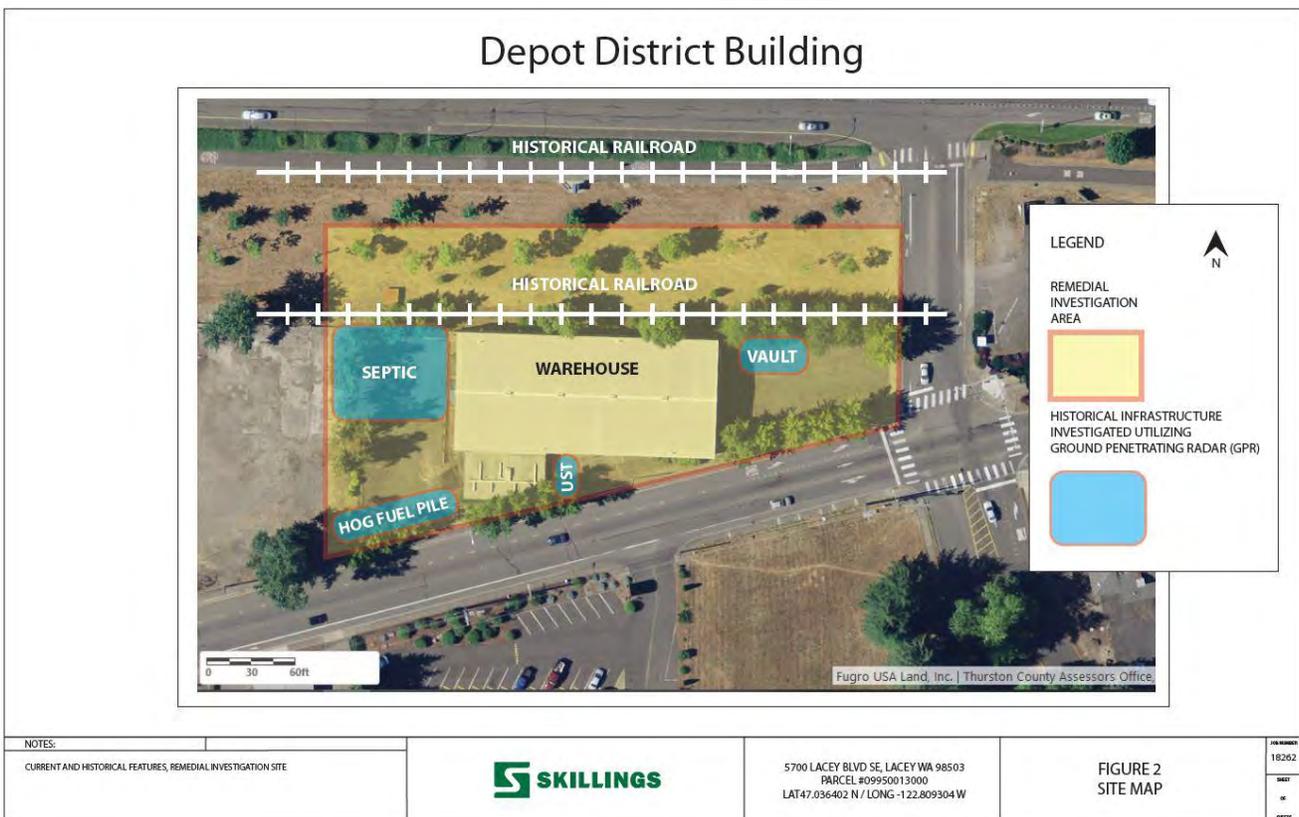


2.0 Background

2.1 History of the Property

The Property is currently occupied by a warehouse and small attached office building (Figure 2). Prior to the 1950's the Property and adjacent properties were used as a railroad depot before the property was transformed into a plywood facility followed by a commercial carpet distribution and then a sales center. From the mid-1950's until approximately the mid 1980's, the Property was used as a plywood manufacturing facility by the Lacey Plywood Company and Lacey Co-Ply Association Inc. The Carpet Exchange company purchased the property around 1992 and occupied it until 2009 at which point QC Lacey LLC purchased the property. Under QC Lacey LLC the Property was left vacant until purchased by the City of Lacey in 2016.

Figure 2. Historical use of the Property and areas of previous investigations.



Based on the historical use of the Property we assumed petroleum compounds would be present. Previous investigations by Parametrix (1990), GeoEngineers (1992), Geotech Consultants (1992) and Skillings Inc. (2017) confirmed this assumption. These previous investigations found evidence of Volatile Organic Compounds (VOC) above Model Toxics Control Act (MTCA: WAC 173-340) Method A cleanup levels in the soil and in the ground water. Skillings Inc., 2015 Remedial Investigation (RI) attempted to delineate the extent of the petroleum contamination on the Property with additional soil and ground water testing (Figure 3). These results were

submitted to the Washington State Department of Ecology (ECY) for an opinion on further action requirements at the Property. ECY issued an opinion letter on April 18, 2018 for further action to investigate potential soil and groundwater contamination at the Property. Specifically, for petroleum hydrocarbons in the soil, groundwater, and air. Skillings Inc., submitted a Work Plan for *Additional Sub-surface Investigation (Version 2.0)* to ECY to investigate petroleum hydrocarbons COCs on November 2, 2018, which was approved on January 4, 2019. Skillings Inc., submitted an RI report on February 13, 2020 with findings to ECY for cleanup approval. ECY submitted an opinion letter on May 7, 2020 recommending the decommissioning of four monitoring wells (Figure 4) installed for the 2020 Skillings Inc. RI and the removal of contaminated soils by excavation. Excavation of the contaminated soils will be concentrated around Skillings, Inc. 2015 RI boring sites three, five, six, seven, eight and nine and source well SC GW1 (Figure 3).

Figure 3. Boring and well locations from Skillings Inc., 2015 Remedial Investigation of the Property. Color of the circles indicate the results of laboratory testing of soils and water at these locations.

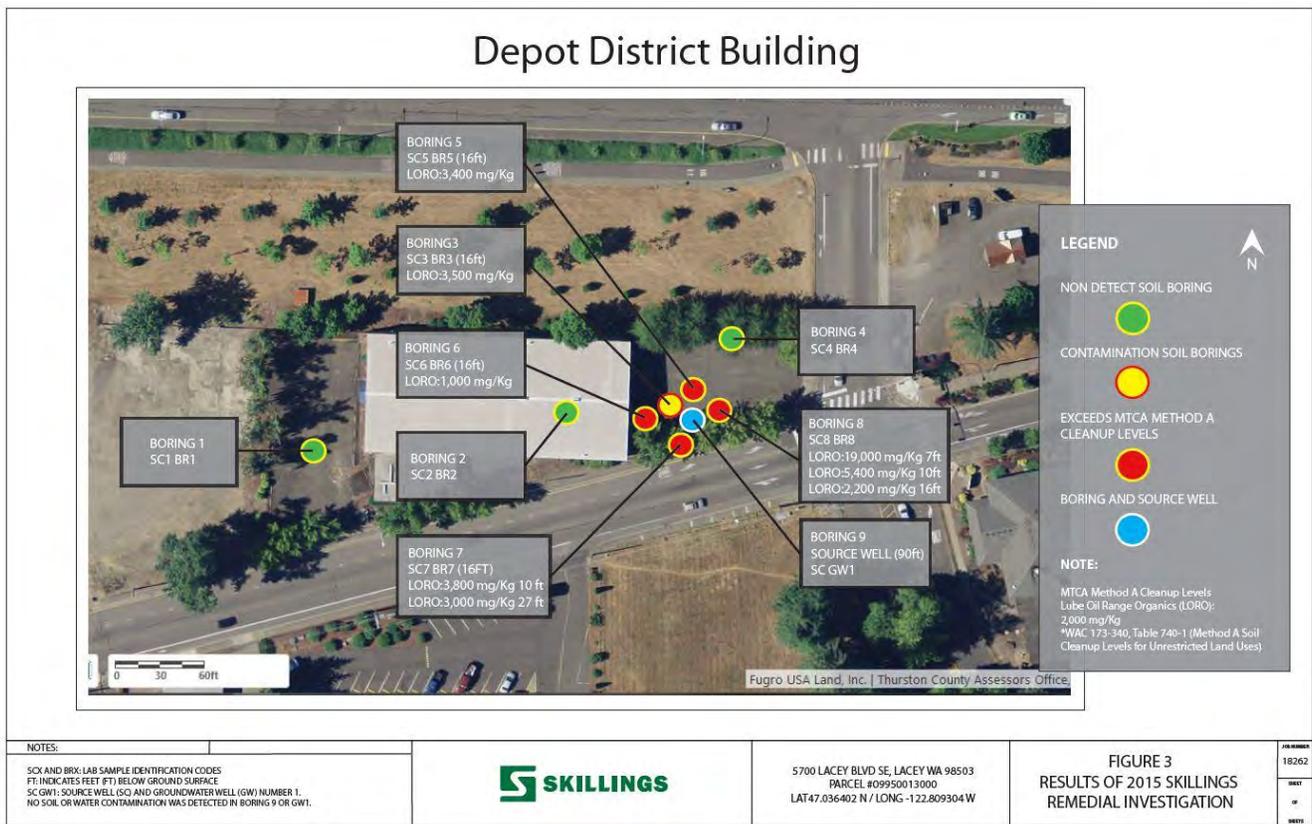
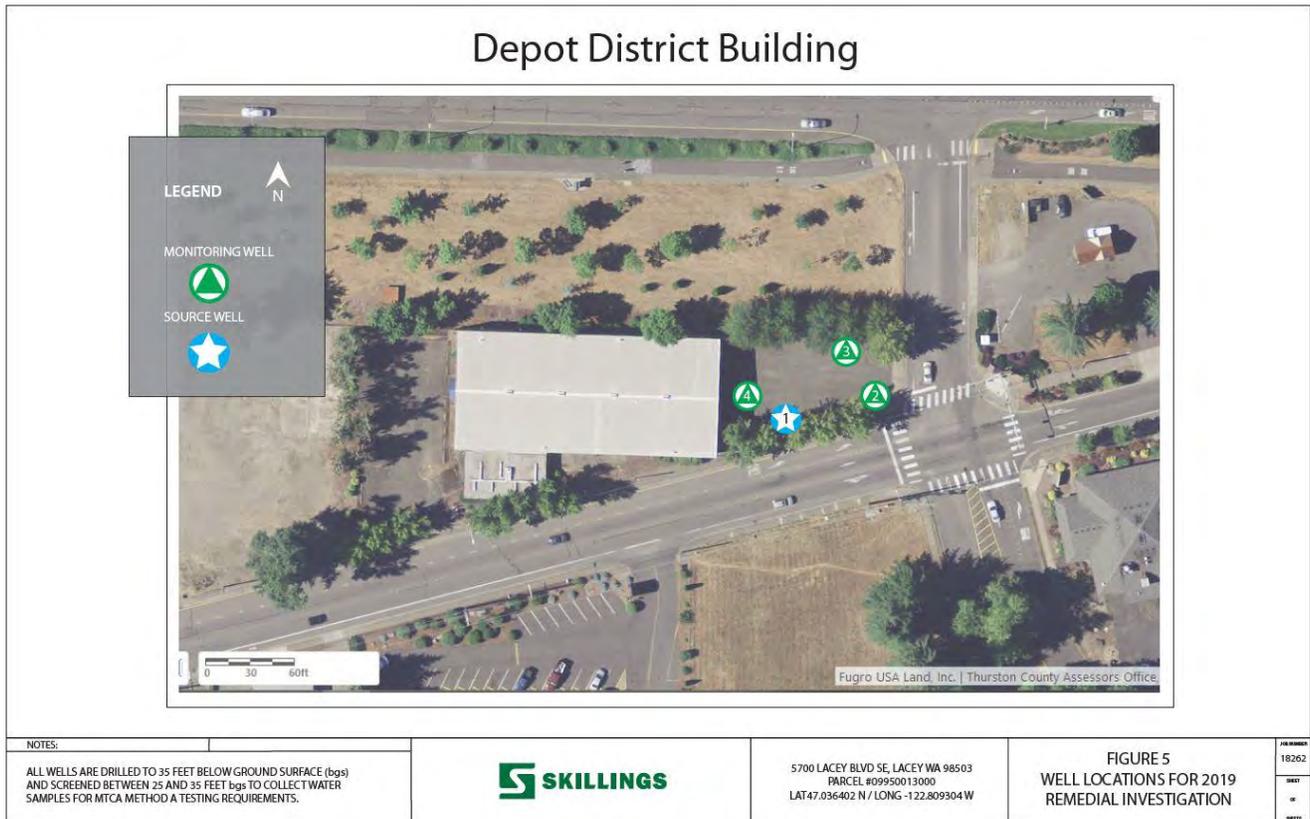


Figure 4. Location of four monitoring well installed for Skillings Inc., 2020 Remedial Investigation. These wells were decommissioned in accordance with Washington State Department of Ecology’s cleanup recommendations for the Property on February 9th, 2021.



2.1 History of Property Investigations

2.1.1 1990: Parametrix Conducted a Phase I Environmental Site Assessment

Parametrix documented the following findings at the Property:

- Presence of a former septic system
- Presence of round concrete vault, use unknown
- Presence of a former spray paint and construction forms treatment area
- One Underground Storage Tank (UST)

2.1.2 1992: GeoEngineering Conducted a Phase II Environmental Site Assessment

GeoEngineering documented the following findings at the Property:

- One 500-gallon light oil UST removed adjacent to the eastern wall of the office building in 1989
 - 70 Cubic Yards (CY) of petroleum contaminated soil was reportedly removed when UST was removed:
 - Excavation extended to nine feet below ground surface (bgs)

- Excavation tested for petroleum hydrocarbons using NWTPH-HCID
- Two above ground storage tanks and three additional UST's were removed from the Property in 1991 and 1989:
 - Above ground tank 1 housed 25,000 gallons of caustic liquid soda
 - Above ground tank 2 housed 39,000 gallons of resin above ground
 - UST 1 was a 1,000 gallon diesel tank
 - UST 2 was a 2,000 gallon gasoline tank
 - UST 3 was a 10,000 tank diesel tank
 - Above ground tanks were removed in 1991 during the demolition of above ground facilities
 - UST 1, 2, and 3 are unrelated to UST found in 1990 Parametrix Phase I Environmental Site Assessment of the Property

2.1.3 1992: GeoTech Consultants Conducted a Phase I Environmental Site Assessment

No new recognized environmental conditions were reported by Geotech for the Property.

2.1.4 1992: GeoTech Consultants Conducted a Phase II Environmental Site Assessment

- Geotech Consultants installed one monitoring well (MW-1) screened from 41 ft bgs to 51 ft bgs on the Property
- GeoTech Consultants assessed a 100-gallon above ground storage tank associated with a fire pumphouse, analyzing shallow soils for diesel and heavy oils.

2.1.5 2015: Skillings Inc., Conducted a Phase II Environmental Site Assessment

Skillings Inc., conducted the following activities during the Phase II Environmental Assessment:

- Eight direct push borings were made to sample soils for contaminants
- Soil samples were analyzed for gasoline, diesel, heavy oil, and volatile organic compounds
- Exceedances of the MTCA Method A cleanup levels for only heavy oil were identified at borings 5, 6, 7, and 8 (Figure 3)
- One monitoring well was installed, SC-GW1 (Figure 3)
- No petroleum hydrocarbons were detected in groundwater sampled at approximately 85-90 feet bgs

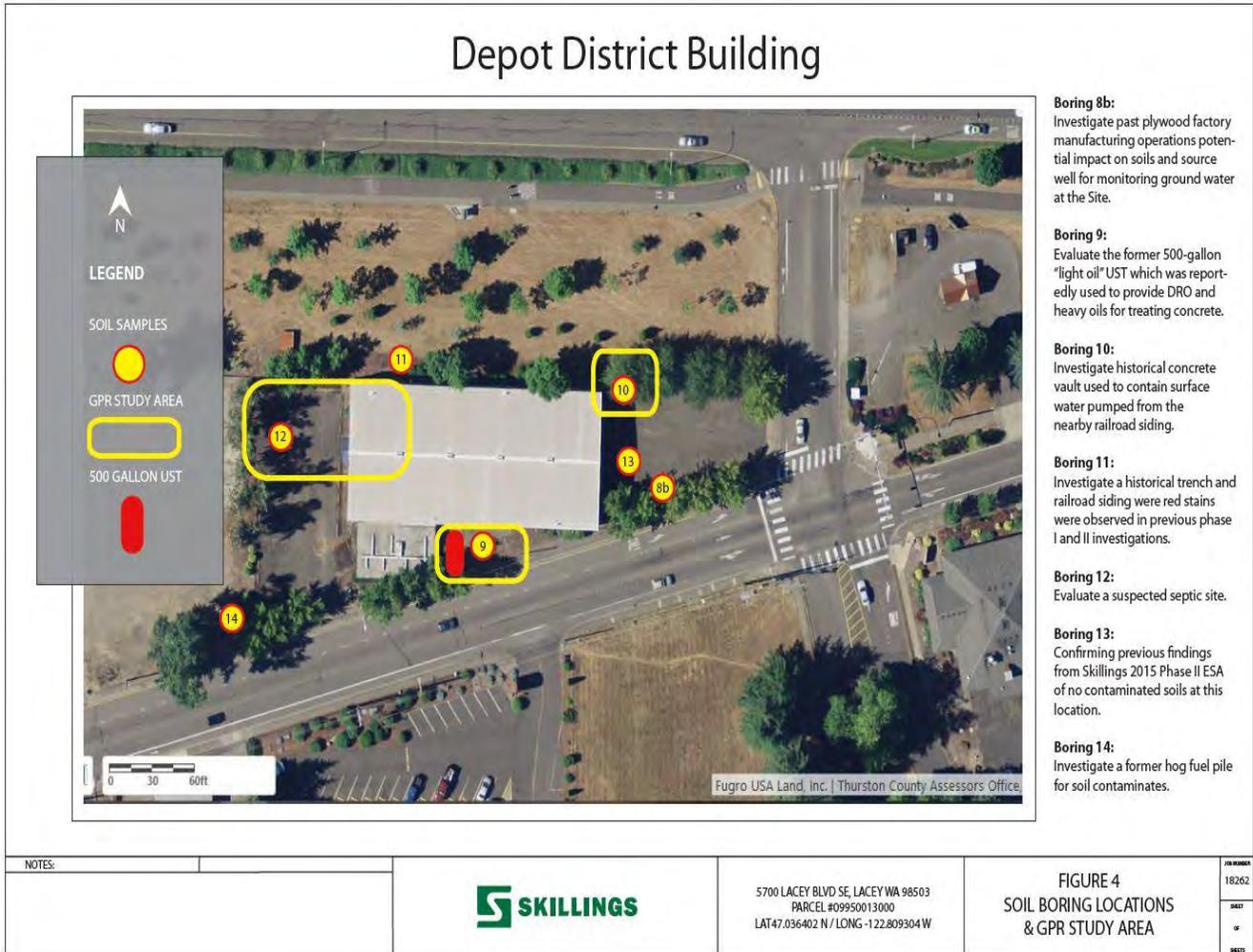
2.1.6 2019 - 2020 Skillings Inc., Remedial Investigation

Skillings Inc., conducted the following activities during their remedial investigation of the Property:

- Conducted a Ground Penetrating Radar (GPR) survey of the Property (Figure 5)
- Conducted seven borings to test for soil contaminants 8b, 9, 10, 11, 12, 13, and 14 (Figure 5)
- Soil borings were tested for Resource Conservation and Recovery Act (RCRA) metals, Diesel Range Organics (DRO), heavy oils, Volatile Organic Compounds (VOCs), Total Petroleum Hydrocarbons (TPH), n-hexane, phenols, Volatile Petroleum Hydrocarbons (VPH), and Extractable Petroleum Hydrocarbons (EPH)
- Installed one source monitoring well and three delineation wells (Figure 4)

- Water sample were tested for RCRA metals, DRO's, heavy oils, VOCs, TPH, n-hexane, phenols, VPH and EPH
- Conducted and completed a Terrestrial Ecological Evaluation (TEE)

Figure 5. 2019 to 2020 Skillings Inc., remedial investigation locations.



3.0 Contamination Encountered at the Property

3.1 Skillings Inc., 2015 Phase II Environmental Site Assessment

Skillings Inc., 2015 Phase II Environmental Site Assessment encountered exceedances of the MTCA Method A cleanup levels for heavy oil at borings 5,6,7, and 8 (Figure 3; red circles). No groundwater exceedances were recorded.

3.2 Skillings Inc., 2019 to 2020 Remedial Investigation

3.2.1 Soils

RCRA 8 Metals and Chromium Soil Testing

Skillings Inc., tested the Property at eight locations (Figure 5) for Resource Conservation and Recovery Act (RCRA) metals. RCRA includes eight metals: Lead (Pb), Cadmium (Cd), Chromium (Cr), Arsenic (Ag), Barium (Ba), Selenium (Se), and Mercury (Hg). Only Cr and Ba were detected on the Property in 2019 (Table 1).

Chromium detected at the Property listed in Table 1 was total chromium, trivalent (Cr III or Cr 3+) plus hexavalent (Cr VI or Cr 6+). MTCA Method B cleanup levels for chromium III is 2,000 mg/kg. MTCA cleanup levels for chromium VI is 19 mg/kg. Additional chromium soil testing at the Property was conducted to identify which type of chromium was present, chromium III or chromium VII. The results of this additional soil testing for chromium VI came back as “nd”, which indicates the total chromium reported in Table 1 is chromium III, with a MTCA cleanup level of 2,000 mg/kg. Chromium levels at the Property did not exceed MTCA levels during our remedial investigation.

Table 1. Soil RCRA 8 metal results using EPA test method 6020 by boring location. Chromium is reported as total chromium (trivalent plus hexavalent). Trivalent chromium MTCA cleanup level is 2,000 mg/kg and hexavalent chromium MTCA Method B cleanup level is 19 mg/kg. Additional chromium testing at the Depot District Building site indicated only trivalent chromium was present (Appendix G). Therefore, the total chromium reported below is in effect only trivalent chromium with a MTCA cleanup level of 2,000 mg/kg based on the additional chromium testing at the site. ND indicates not detected at laboratory detection limits listed in bold at the bottom of the table.

Boring #	Sample Depth ft bgs	Lead (Pb) (mg/kg)	Cadmium (Cd) (mg/kg)	Chromium (Cr) (mg/kg)	Arsenic (As) (mg/kg)	Silver (Ag) (mg/kg)	Barium (Ba) (mg/kg)	Selenium (Se) (mg/kg)	Mercury (Hg) (mg/kg)
8b	7.5	nd	nd	29	nd	nd	83	nd	nd
10	15	nd	nd	24	nd	nd	nd	nd	nd
11	10	nd	nd	24	nd	nd	51	nd	nd
12	10	nd	nd	24	nd	nd	72	nd	nd
13a	16	nd	nd	44	nd	nd	52	nd	nd
13b	20	nd	nd	28	nd	nd	60	nd	nd
13c	24	nd	nd	25	nd	nd	nd	nd	nd
14	5	nd	nd	24	nd	nd	85	nd	nd
MTCA Cleanup levels		250 (mg/kg)	2.0 (mg/kg)	19 /2,000 (mg/kg)	20.0 (mg/kg)	*	*	*	2.0 (mg/kg)
Detection Limit		5.0 mg/kg	1.0 mg/kg	5.0 mg/kg	5.0 mg/kg	20 mg/kg	50 mg/kg	20 mg/kg	0.5 mg/kg

*No value listed in WAC 173-340-900, Table 740-1 for Method A Soil Cleanup Levels for Unrestricted Land Uses. Values were compared to Ecology's Cleanup Levels and Risk Calculation (CLARK) soil tables instead.

Barium results for the Property were compared to the Cleanup Levels and Risk Calculation (CLARC) tables. Detection limits of barium were below the most stringent values in ECY's CLARK tables for metals and therefore below MTCA cleanup levels.

VPH, EPH, and n-Hexane

All seven borings were tested for Volatile Petroleum Hydrocarbons (VPH) and Extractable Petroleum Hydrocarbons (EPH) and n-hexane. The 2020 Skillings Inc. RI report indicated no VPH, EPH, or n-hexane detections above the listed reporting limits of the lab.

Phenols

No phenols were detected in the soils using the EPA approved 8270D SIM/35550C testing method.

3.2.2 Monitoring Wells

Skillings Inc., sampled one source well (Well 1) and three delineation wells (Wells 2-4; Figure 4). All four wells are 35 bgs and screened between 25 and 30 feet bgs. Well locations were in accordance with ECY's recommendations in the November 18th Further Remedial Action letter. Depth was based on the observed water table level during drilling. Wells were installed in March of 2019. Wells were decommissioned on February 9th, 2021. Well water testing results are broken out by testing regiment below: RCR8 8 metals; VPH, EPH, and n-hexane; and phenols. Wells were tested quarterly.

A new monitoring well will be established on the perimeter of the cleanup site after all known soils have been removed.

RCRA 8 Metals

The results of quarterly (Q1-Q4) are presented in Table 2. Well one is the source well and wells two through three are the delineation wells. Well four was dry in Q2-Q4 and was not sampled due to low water levels (indicated via a dash (-) in Table 2). The source well (well 1) in Q4 was also dry and not sampled. Ecology recommended testing only for arsenic (As), barium (Ba), diesel range organics DRO and lube oil range organics (i.e., heavy oils; Table 3) in the fourth quarter. The results of four quarters of testing based on ECY's recommendations indicated no potential groundwater contamination above MTCA Method A cleanup levels for groundwater (WAC 173-340-720) at the Property. Silver (Ag) and selenium (Se) are not listed in WAC 173-340; Table 720-1, for MTCA A cleanup levels for groundwater. Skillings Inc., therefore had to compare test results to the CLARK tables. Silver and Se levels for our Q1 to Q3 water samples were below all listed CLARK values for ground water and therefore below any of ECY's cleanup standards for groundwater.

Additional chromium testing was completed with well water samples to verify the presence of chromium III on the Property. Chromium III was present within well water samples. Chromium VI was not detected.

Table 2. Groundwater tests for RCRA 8 metals for the Depot District Building. “Nd” indicates not detected at laboratory detection limits. Well one is the source well. Wells two through four are delineation wells. A dash (-) indicates well was not sampled due to low water levels. An asterisk (*) indicates these tests were not required by ECY. A double asterisk (**) indicates the results had to be compared to the CLARK values for ground water and therefore below any of ECY’s cleanup standards for groundwater.

Sampling Quarter (Q) and Well Number	Sample Depth ft bgs	Lead (Pb) (mg/kg)	Cadmium (Cd) (mg/kg)	Total Chromium (Cr) (mg/kg)	Arsenic (As) (mg/kg)	Silver (Ag) (mg/kg)	Barium (Ba) (mg/kg)	Selenium (Se) (mg/kg)	Mercury (Hg) (mg/kg)
Q1									
Well 1	35	2.2	nd	nd	2	nd	91	nd	nd
Well 2	35	nd	nd	nd	2.4	nd	1300	nd	nd
Well 3	35	nd	nd	nd	nd	nd	180	nd	nd
Well 4	35	44	nd	3.8	nd	nd	110	nd	nd
Q2									
Well 1	35	8.8	nd	4	nd	nd	61	nd	nd
Well 2	35	4.7	nd	9.3	nd	nd	290	nd	nd
Well 3	35	6.2	nd	9.2	nd	nd	170	nd	nd
Well 4	-	-	-	-	-	-	-	-	-
Q3									
Well 1	35	3.3	0.6	4.4	0.3	0.2	22.8	0.3	0.001
Well 2	35	11.2	0.3	20.1	1.5	0.2	113	0.3	0.001
Well 3	35	17.1	0.4	37.1	1.9	0.2	175	0.3	0.001
Well 4	-	-	-	-	-	-	-	-	-
Q4									
Well 1	35	-	-	-	-	-	-	-	-
Well 2	35	*	*	*	3.6	*	290	*	*
Well 3	35	*	*	*	4.0	*	600	*	*
Well 4	35	-	-	-	-	-	-	-	-
MTCA Cleanup levels		15 (ug/L)	5 (ug/L)	50 (ug/L)	5 (ug/L)	**	2,000 (ug/L)	**	2 (ug/L)

Table 3. Gasoline (GRO), diesel (DRO), and heavy oil contaminant testing at the Depot District Building site. Wells that were unable to be sampled due to low water levels at marked with a dash (-). An asterisk (*) indicates Ecology did not require the indicated chemical test. “nd” stands for not detected.

Well Type and #	Sample Depth ft bgs	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	Heavy Oils
Q1				
Well 1	35	250	350	nd
Well 2	35	140	nd	nd
Well 3	35	120	nd	nd
Well 4	35	nd	nd	nd
Q2				
Well 1	35	nd	nd	nd
Well 2	35	nd	nd	nd
Well 3	35	nd	nd	nd
Well 4	35	-	-	-
Q3				
Well 1	35	nd	nd	nd
Well 2	35	nd	nd	nd
Well 3	35	nd	nd	nd
Well 4	35	-	-	-
Q4				
Well 1	35	-	-	-
Well 2	35	*	nd	nd
Well 3	35	*	nd	nd
Well 4	35	-	-	-
MTCA Cleanup levels		800 (ug/L)	500 (ug/L)	500 (ug/L)

VPH, EPH, and n-Hexane

All four wells were tested quarterly for Volatile Petroleum Hydrocarbons (VPH) and Extractable Petroleum Hydrocarbons (EPH) and n-hexane. For easier comparison Total Petroleum Hydrocarbons (TPH), were broken out by the following chemical regiments: Gasoline Range Organics (GRO), Diesel Range Organics (DRO), heavy oils, and Volatile Organic Compounds (VOC). N-hexane was tested within the VOC testing regiment.

MTCA Method A cleanup levels for groundwater for GRO, DRO and heavy oils were not exceeded (Table 3). VOC's were only detected in Q1. The lab detected 2-butanone (MEK; 16 ug/L) and xylenes (3 ug/L) in well one. MEK levels had to be compared to the CLARK tables and were found to be below all ground water cleanup levels within the CLARK tables. Xylene MTCA Method A cleanup levels for groundwater is 1,000 ug/L (WAC 173-340-720: Table 720-1), well above our detection of 16 ug/L. N-hexane was not detected in any of the wells.

Phenols

Phenols were only detected in Q1 of our testing. In Q1 Skillings, Inc. detected naphthalene (0.28 ug/L), 2-methylnaphthalene (0.31 ug/L), and 1-methylnaphthalene (0.31 ug/L). MTCA Method A cleanup levels for naphthalene in groundwater is 160 ug/L (WAC 173-720; Table 720-1). We did not exceed MTCA cleanup levels for naphthalene. One-methylnaphthalene and 2-methylnaphthalene are not listed in Table 720-1. We therefore compared our results to the CLARK tables. One-methylnaphthalene and 1-methylnaphthalene did not exceed any of the CLARK values listed and therefore should not be considered above MTCA cleanup levels. Well four was not sampled in Q2-Q4 due to low water levels. Well one, the source well was dry in Q4 and was not able to be sampled.

4.0 Potential Contamination

Based on the historical use of the Property and investigations/remediation completed to date the following contaminated soils and debris are potentially present in the excavation area:

- Total Petroleum Hydrocarbons (TPH) as gasoline in the soil, groundwater, and potentially air/vapor form
- TPH as diesel in the soil, groundwater, and potentially air/vapor form
- TPH as heavy oil in the soil, groundwater, and potentially air/vapor form
- Associated with heavy oil release in groundwater and/or soil are:
 - Benzene
 - Toluene
 - Ethylbenzene
 - Total xylenes (BTEX)
 - Naphthalenes
 - Polycyclic Aromatic Hydrocarbons (PAH), included carcinogenic PAHs (cPAHs)
 - Arsenic
 - Lead
 - Barium
- Chromium in the soil
- Undocumented wells and monuments
- Undocumented Underground Storage Tanks (UTS)
- The Property is located within the projected boundaries of the Tacoma Smelter Plume
- Bentonite from decommissioned wells

5.0 Handling Encountered Contamination

5.1 Field Screening and Observation

The excavation site to remove contaminated soils will center around Skillings, Inc. 2015 borings locations three, five, six, seven, eight, and nine (Figure 3). Boring nine was extended to 90 feet bgs to accommodate a source well (SC-GWI), which has since been decommissioned (Figure 3). The estimated excavation dimensions are 30 feet long by 30 feet wide and up to 16 feet deep. During excavation workers should be observant for

indications of subsurface infrastructure (e.g., USTs) or debris and contamination such as stained soil or soil with noticeable odors. A photoionization detector (PID) is recommended to assist workers screening for potential sampling locations based on their soil observations. Prior to sampling a health and safety plan should be drafted and approved in accordance with Subsection 4.2 of ECYs *Guidance for Remediation of Petroleum Contaminated Sites* (2016; Pub. No. 10.09.057) and SEPA approved if required.

Sampling of the excavation site will be in accordance with ECY's *Guidance for Remediation of Petroleum Contaminated Sites* (2016) using the following recommendations:

- During excavation, the soils on the sidewalls and bottom of the excavation site will be photographed and mapped
- Soil samples of the sidewalls, and bottom of the excavation site will be retained in case physical analysis of the soil is required
- Soil samples for laboratory analysis will be discrete, not composite samples¹
- All four sidewalls and the bottom of the excavation site will be sampled (i.e., a minimum of five discrete samples)
- ECY recommends at least one sample for every 20 feet horizontally along the sidewalls
- ECY recommends at least one sample for every 400 square feet of exposed bottom
- If using a backhoe to collect samples, make sure the bucket is clean of other soil before sampling
- If practical sample directly from the middle of the backhoe bucket, from soils that have not contacted the sides of the bucket
- Ensure that samples are “fresh” by exposing new soils prior to sampling
- The laboratory will provide an appropriate number of sample containers with required preservatives (Table 4)
- Soil samples will be delivered to an approved state laboratory for testing in accordance with laboratory sample protocols within 24 hours
- Table 5 outlines ECYs soil testing recommendation for the Property as outlined in their May 7th, 2020 further action letter to the City of Lacey

Table 4. Each soil sample location will require seven (7) sample containers (last column on the right) filled with soil to be analyzed at the laboratory.

Matrix	Analysis	# of Samples	Container Type	Container Size	Preservations	Containers per Sample
Soil	VOC, NWTPH-Gx	1	VOA	20 ml	EPA 5035 + MeOH	2
Soil	NWTPH-Dx, Lead, PCB	1	Jar	4 oz	N/A	1
Soil	VPH, n-Hexane	1	VOA	40 ml	EPA 5035 + MeOH	2
Soil	EPH, PAH + Naphthalene's, phenol	1	Jar	4 oz	N/A	2

¹ Page 63 of Washington State Department of Ecology Pub. No. 10.09.057

Table 5. Washington State Departments of Ecology recommended soil testing regiment for the Property as outlined in their May 7th, 2020 further action letter to the City of Lacey.

Chemical Compounds	Analysis
Volatile Petroleum Compounds	
Benzene	VOC
Toluene	VOC
Ethyl benzene	VOC
Xylenes	VOC
n-Hexane	n-Hexane
Fuel Additives and Blending Compounds	
Dibromoethane, 1-2 (EDB)	VOC
Dichloroethane, 1-2 (EDC)	VOC
Methyl tertiary-butyl ether (MTBE)	VOC
Lead	Lead
Other Petroleum Components	
Carcinogenic PAHs	PAH
Naphthalene	Naphthalene
Other Petroleum Compounds	
Polychlorinated Biphenyls (PCBs)	PCB
Halogenated Volatile Organic Compounds (VOC)	VOC
Other Compounds	
Volatile Petroleum Hydrocarbons (VPH)	VPH
Extractable Petroleum Hydrocarbons (EPH)	EPH
Phenols	Phenols
Gasoline Range Organics	NWTPH-Gx
Diesel Range Organics	NWTHP-Dx
Heavy Oils	NWTHP-Dx

5.2 Stockpiling and Sampling of Contaminated Soils

If stockpiling of soils (e.g., excavation spoils) is required, spoils will be placed on and covered by plastic sheeting. All stockpiled soil with suspected contamination will be sampled at a frequency consistent with ECY guidelines (Table 6) and/or the requirements of the disposal facility. Laboratory analysis of suspected contaminated spoils will be in accordance with ECY May 7th, 2020 no further action letter, which includes all the requirements for unknown oil and waste oils outlined in WAC 173-340-900 Table 830-1 and the analysis listed below, which are the same as Table 5:

- Total Petroleum Hydrocarbons (TPH) as gasoline in the soil: NWTPH-Gx analysis
- TPH as diesel in the soil: NWTPH-Dx analysis
- TPH as heavy oil in the soil: NWTPH-Dx analysis
- Volatile Petroleum Hydrocarbons (VPH)
- Extractable Petroleum Hydrocarbons (EPH)
- N-hexane
- Naphthalenes
- Polycyclic Aromatic Hydrocarbons (PAH), included carcinogenic PAHs (cPAHs)
- Phenols
- Stockpile samples will be composite samples²

Table 6 list the sample container requirements with preservation type and number of samples (7) containers per sample location, when adequately characterizing stockpiled soils (Table 5).

Table 6. Typical number of samples needed to adequately characterize stockpiled soils (Ecology, 2016).

Cubic Yards of Soil	Minimum Number of Samples
0-100	3
101-500	5
501-1,000	7
1,001-2,000	10
>2,000	10 + 1 for each additional 500 cubic yards

5.3 Soil Re-use

Re-use of excavated soils from the cleanup site will be considered with the approval of the City of Lacey and ECYs *Guidance for Remediation of Petroleum Contaminated Sites* (2016) Chapter 12. Table 7 lists four categories of possible re-use of spoils from the excavation site based on ECY's recommended soil analysis listed in Table 5. Table 8 lists acceptable use by category. Both tables are reproductions from ECYs *Guidance*

² ECY May 7th, 2020 no further action letter page 4, bullet point 5.

for Remediation of Petroleum Contaminated Sites (2016) Chapter 12. Full details of the tables including limitations can be found in Appendix A. Dilution of contaminated soils to achieve a re-use category is a violation of Washington State solid and hazardous waste laws.³ If re-use is not an option to backfill the excavation site, clean soil will be transported from an approved off-site facility to be used as backfill.

Table 7. Washington State Departments of Ecology’s recommended testing for potential soil re-use by category (Ecology, 2016). Additional details can be found in Appendix A.

Parameter	Analytical Method	Soil Category			
		1 No detectable Petroleum Components (mg/kg)	2 Commercial Fill Above Water Table (mg/kg)	3 Paving Base Materials & Road Construction (mg/kg)	4 Landfill Daily Covers or Asphalt Manufacturing (mg/kg)
Total Petroleum Hydrocarbons					
Gasoline Range Organics	NWTPH-Gx	<5	5-30	>30-100	>100
Diesel Range Organics	NWTPH-Dx	<25	25-200	>200-500	>500
Heavy Fuels and Oils	NWTPH-Dx	<100	100-200	>200-500	>500
Mineral Oil	NWTPH-Dx	<100	100-200	>200-500	>500
Volatile Petroleum Components					
Benzene	SW8260B	<0.005	0.005 – 0.03	0.03 or less	See Appendix A, Table 12.2
Ethylbenzene	SW8260B	<0.005	0.005 - 6	6 or less	>6
Toluene	SW8260B	<0.005	0.005 - 7	7 or less	>7
Xylenes	SW8260B	<0.005	0.0015 - 9	9 or less	>9
Fuel Additives & Blending Components					
(MTBE) Methyl Tert-Butyl Ether	SW8260B	<0.005	0.005 – 0.1	0.1 - less	>0.1
Lead	SW6010A	<17	17 – 50	>50 -220	See Appendix A, Table 12.2
Other Petroleum Compounds					
Polychlorinated Biphenyls (PCBs)	SW8082	<0.04	<0.04	<0.04	See Appendix A, Table 12.2
Naphthalenes	SW8260B	<0.05	0.05 - 5	5 or less	>5
cPAH	SW8270C	<0.05	0.05 -0.1	>0.1 - 2	>2
Other Petroleum Characteristics					
Odors	Smell	No detectable odor			
Staining	Visual	No unusual color or staining			
Sheet Test	*	No visible sheet			

³ ECY’s *Guidance for Remediation of Petroleum Contaminated Sites* (2016), page 191.

*No visible sheen observed on water when approximately one tablespoon of soil placed in approximately ½ liter of water held in a shallow pan (like a gold pan or similar container).

Table 8. Soil re-use categories and their acceptable uses (Ecology, 2016). Limitations are listed in Appendix A.

Category	Acceptable Use
<p>Category 1 Soils: Soils with no detectable / quantifiable levels of petroleum hydrocarbons or constituents using the analytical methods listed in Table 7.3⁴ and are not suspected of being contaminated with any other hazardous substances</p>	<ul style="list-style-type: none"> • Can be used anywhere the use is allowed under other regulations. • Any use allowed for Category 2, 3 & 4 soils
<p>Category 2 Soils: Soils with residual levels of petroleum hydrocarbons that could have adverse impacts on the environment in some circumstances.</p>	<ul style="list-style-type: none"> • Any use allowed for Category 3 & 4 soils. • Backfill at cleanup sites above the water table. • Fill in commercial or industrial areas above the water table. • Road and bridge embankment construction in areas above the water table.
<p>Category 3 Soils: Soils with moderate levels of residual petroleum contamination that could have adverse impacts on the environment unless re-used in carefully controlled situations.</p>	<ul style="list-style-type: none"> • Any use allowed fir Category 4 soils. • Used as pavement base material under public and private paved streets and roads. • Use as pavement base material under commercial and industrial parking lots.
<p>Category 4 Soils: Soils with high levels of petroleum contamination that should not be re-used except in very limited circumstances.</p>	<ul style="list-style-type: none"> • Use in the manufacture of asphalt. <ul style="list-style-type: none"> • Use as daily cover in a lined municipal solid waste or limited purpose landfill provided this is allowed under the landfill operating permit.

⁴ Table 7.3: Recommended Analytical Methods in ECY’s *Guidance for Remediation of Petroleum Contaminated Sites (2016)*, page 105. Appendix A includes a copy of Table 7.3.

5.4 Transportation

Transportation of contaminated soil will be in compliance with WAC 173-350-300. If dangerous waste is encountered, the material will be transported in accordance with WAC 173-303-240.

A full listing of dangerous waste can be found in WAC 173-303-9905.

5.5 Disposal

Contaminated soil above MTCA cleanup levels or not approved for re-use will be disposed at an off-site facility permitted and licensed to accept the material. Estimated cubic yards and tonnage of disposed materials will be reported to ECY in the form of disposal receipt documentation.

5.6 Monitoring Wells

The four known monitoring wells within the Property were decommissioned in accordance with WAC 173-160 by a licensed driller on February 9th, 2021. If any undocumented well or monuments are discovered during the excavation of the cleanup site, the City will be notified, and a licensed drill used to decommission the well(s) in accordance with WAC 173-160. Any existing monuments within the cleanup area will be protected during excavation to prevent damage from occurring.

6.0 Summary

This Soil Management Plan has been prepared as a reference for the City of Lacey and contractor(s) for the excavation and removal of contaminated soils on the Property. Contaminated soils have been detected in the vicinity of boring nine from a 2015 Skillings Inc. remedial investigation (figure 3) and source well one from a 20109-2020 Skillings Inc. remedial investigation (Figure 4). The contaminated soils on the Property have been identified as the potential source of the contaminated groundwater and therefore will need to be removed as a final cleanup action before the City of Lacey can proceed with site development. An estimated 30 feet by 30 feet by 16 feet bgs excavation is required to remove the contaminated soil centered around source well one from Skillings Inc. 2019-2020 remedial investigation.

Contaminated soils will be removed by an approved contractor to an approved disposal facility. Skillings Inc. will conduct the recommended soil testing in accordance with ECYs *Guidance for Remediation of Petroleum Contaminated Sites* (2016; Pub. No. 10.09.057) for the chemical compounds listed in Table 5. At least five discrete soil samples will be taken from the excavation site for laboratory analysis, one for each side wall (one every 20 horizontal feet) and one for the bottom of the excavation (one for every 400 square feet of area). Excavation spoils will be tested for contaminants (Table 7) using composite samples (Table 6) and evaluated for re-use based on the results (Tables 7 and 8). Re-use of the spoils will only occur with the approval by the City of Lacey.

7.0 References

- Ecology. (2016). *Guidance for Remediation of Petroleum Contaminated Sites, Revised June 2016 Publication No. 10-09-057*. Olympia: Washington State Department of Ecology.
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APPENDIX A

Washington State Department of Ecology Guidance for Remediation of Petroleum Contaminated Sites Referenced Tables

1. Table 830-1 Required Testing for Petroleum Releases
 - a. WAC 173-340-900
2. Table 6.8: Number of Soil Borings and Soil Samples at Well-Characterized Petroleum-Contaminated Sites
3. Table 6.9: Typical Number of Samples Needed to Adequately Characterize Stockpiled Soil
4. Table 7.2: Best Management Practices Testing Recommendations for Various Petroleum Products
5. Table 7.3: Recommended Analytical Methods
6. Table 7.4: Supplemental Groundwater Analysis Typically Needed to Support a Natural Attenuation Demonstration
7. Table 12.1: Guidelines for Re-use of Petroleum Contaminated Soils
8. Table 12.2: Description and Recommended Best Management Practice for Soil Categories
9. Table 740-1 Method A Soil Cleanup Levels for Unrestricted Land Uses

Table 830-1
Required Testing for Petroleum Releases.

	Gasoline Range Organics (GRO) (1)	Diesel Range Organics (DRO) (2)	Heavy Oils (DRO) (3)	Mineral Oils (4)	Waste Oils and Unknown Oil (5)
Volatile Petroleum Compounds					
Benzene	X (6)	X (7)			X (8)
Toluene	X (6)	X (7)			X (8)
Ethyl benzene	X (6)	X (7)			X (8)
Xylenes	X (6)	X (7)			X (8)
n-Hexane	X (9)				
Fuel Additives and Blending Compounds					
Dibromoethane, 1-2 (EDB); and Dichloroethane, 1-2 (EDC)	X (10)				X (8)
Methyl tertiary-butyl ether (MTBE)	X (11)				X (8)
Total Lead and Other Additives	X (12)				X (8)
Other Petroleum Components					
Carcinogenic PAHs		X (13)	X (13)		X (8)
Naphthalenes	X (14)	X (14)	X (14)		X (14)
Other Compounds					
Polychlorinated Biphenyls (PCBs)			X (15)	X (15)	X (8)
Halogenated Volatile Organic Compounds (VOCs)					X (8)
Other	X (16)	X (16)	X (16)	X (16)	X (16)
Total Petroleum Hydrocarbons Methods					
TPH Analytical Method for Total TPH (Method A Cleanup Levels) (17)	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx	NWTPH-Dx	NWTPH-Gx & NWTPH-Dx
TPH Analytical Methods for TPH fractions (Methods B or C) (17)	VPH	EPH	EPH	EPH	VPH and EPH

[Editor's Note: See next page for the footnotes associated with Table 830-1.]

Use of Table 830-1: An "X" in the box means that the testing requirement applies to ground water and soil if a release is known or suspected to have occurred to that medium, unless otherwise specified in the footnotes. A box with no "X" indicates (except in the last two rows) that, for the type of petroleum product release indicated in the top row, analyses for the hazardous substance(s) named in the far-left column corresponding to the empty box are not typically required as part of the testing for petroleum releases. However, such analyses may be required based on other site-specific information. Note that testing for Total Petroleum Hydrocarbons (TPH) is required for every type of petroleum release, as indicated in the bottom two rows of the table. The testing method for TPH depends on the type of petroleum product released and whether Method A or Method B or C is being used to determine TPH cleanup levels. See WAC 173-340-830 for analytical procedures. **The footnotes to this table are important for understanding the specific analytical requirements for petroleum releases.**

Footnotes:

- (1) The following petroleum products are common examples of GRO: automotive and aviation gasolines, mineral spirits, standard solvents, and naphtha. To be in this range, 90 percent of the petroleum components need to be quantifiable using the NWTPH-Gx; if NWTPH-HCID results are used for this determination, then 90 percent of the "area under the TPH curve" must be quantifiable using NWTPH-Gx. Products such as jet fuel, diesel No. 1, kerosene, and heating oil may require analysis as both GRO and DRO depending on the range of petroleum components present (range can be measured by NWTPH-HCID). (See footnote 17 on analytical methods.)
- (2) The following petroleum products are common examples of DRO: Diesel No. 2, fuel oil No. 2, light oil (including some bunker oils). To be in this range, 90 percent of the petroleum components need to be quantifiable using the NWTPH-Dx quantified against a diesel standard. Products such as jet fuel, diesel No. 1, kerosene, and heating oil may require analysis as both GRO and DRO depending on the range of petroleum components present as measured in NWTPH-HCID.
- (3) The following petroleum products are common examples of the heavy oil group: Motor oils, lube oils, hydraulic fluids, etc. Heavier oils may require the addition of an appropriate oil range standard for quantification.
- (4) Mineral oil means non-PCB mineral oil, typically used as an insulator and coolant in electrical devices such as transformers and capacitors.
- (5) The waste oil category applies to waste oil, oily wastes, and unknown petroleum products and mixtures of petroleum and nonpetroleum substances. Analysis of other chemical components (such as solvents) than those listed may be required based on site-specific information. Mixtures of identifiable petroleum products (such as gasoline and diesel, or diesel and motor oil) may be analyzed based on the presence of the individual products, and need not be treated as waste and unknown oils.
- (6) When using Method A, testing soil for benzene is required. Furthermore, testing ground water for BTEX is necessary when a petroleum release to ground water is known or suspected. If the ground water is tested and toluene, ethyl benzene or xylene is in the ground water above its respective Method A cleanup level, the soil must also be tested for that chemical. When using Method B or C, testing the soil for BTEX is required and testing for BTEX in ground water is required when a release to ground water is known or suspected.
- (7)(a) For DRO releases from other than home heating oil systems, follow the instructions for GRO releases in Footnote (6).
- (b) For DRO releases from typical home heating oil systems (systems of 1,100 gallons or less storing heating oil for residential consumptive use on the premises where stored), testing for BTEX is not usually required for either ground water or soil. Testing of the ground water is also not usually required for these systems; however, if the ground water is tested and benzene is found in the ground water, the soil must be tested for benzene.
- (8) Testing is required in a sufficient number of samples to determine whether this chemical is present at concentrations of concern. If the chemical is found to be at levels below the applicable cleanup level, then no further analysis is required.
- (9) Testing for n-hexane is required when VPH analysis is performed for Method B or C. In this case, the concentration of n-hexane should be deleted from its respective fraction to avoid double-counting its concentration. n-Hexane's contribution to overall toxicity is then evaluated using its own reference dose.
- (10) Volatile fuel additives (such as dibromoethane, 1-2 (EDB) (CAS# 106-93-4) and dichloroethane, 1-2 (EDC) (CAS# 107-06-2)) must be part of a volatile organics analysis (VOA) of GRO contaminated ground water. If any is found in ground water, then the contaminated soil must also be tested for these chemicals.
- (11) Methyl tertiary-butyl ether (MTBE) (CAS# 1634-04-4) must be analyzed in GRO contaminated ground water. If any is found in ground water, then the contaminated soil must also be tested for MTBE.
- (12)(a) For automotive gasoline where the release occurred prior to 1996 (when "leaded gasoline" was used), testing for lead is required unless it can be demonstrated that lead was not part of the release. If this demonstration cannot be made, testing is required in a sufficient number of samples to determine whether lead is present at concentrations of concern. Other additives and blending compounds of potential environmental significance may need to be considered for testing, including: tertiary-butyl alcohol (TBA); tertiary-amyl methyl ether (TAME); ethyl tertiary-butyl ether (ETBE); ethanol; and methanol. Contact the department for additional testing recommendations regarding these and other additives and blending compounds.
- (b) For aviation gasoline, racing fuels and similar products, testing is required for likely fuel additives (especially lead) and likely blending compounds, no matter when the release occurred.
- (13) Testing for carcinogenic PAHs is required for DRO and heavy oils, except for the following products for which adequate information exists to indicate their absence: Diesel No. 1 and 2, home heating oil, kerosene, jet fuels, and electrical insulating mineral oils. The carcinogenic PAHs include benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(k)fluoranthene, benzo(a)anthracene, and benzo(b)fluoranthene.
- (14)(a) Except as noted in (b) and (c), testing for the non-carcinogenic PAHs, including the "naphthalenes" (naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene) is not required when using Method A cleanup levels, because they are included in the TPH cleanup level.
- (b) Testing of soil for naphthalenes is required under Methods B and C when the inhalation exposure pathway is evaluated.
- (c) If naphthalenes are found in ground water, then the soil must also be tested for naphthalenes.
- (15) Testing for PCBs is required unless it can be demonstrated that: (1) the release originated from an electrical device manufactured for use in the United States after July 1, 1979; (2) oil containing PCBs was never used in the equipment suspected as the source of the release (examples of equipment where PCBs are likely to be found include transformers, electric motors, hydraulic systems, heat transfer systems, electromagnets, compressors, capacitors, switches and miscellaneous other electrical devices); or, (3) the oil released was recently tested and did not contain PCBs.
- (16) Testing for other possible chemical contaminants may be required based on site-specific information.
- (17) The analytical methods NWTPH-Gx, NWTPH-Dx, NWTPH-HCID, VPH, and EPH are methods published by the Department of Ecology and available on the department's Internet web site: <http://www.ecy.wa.gov/programs/tcp/cleanup.html>.

Table 6.8 Number of Soil Borings and Soil Samples Reported at Well-Characterized Petroleum-Contaminated Sites (1)				
Category of Site	Number of Soil Borings		Number of Soil Samples for Chemical Analysis (2)	
	Within the Source Property Boundary (3)	Off-Property Areas	Within the Source Property Boundary (3)	Off-Property Areas
Service Stations	20 to 30 soil borings <u>per acre</u>	Insufficient data	35 to 45 soil samples <u>per acre</u>	Insufficient data
Other Petroleum Contaminated Facilities	20 to 35 soil borings <u>per acre</u>	10 to 30 <u>additional</u> soil borings (4)	30 to 50 soil samples <u>per acre</u>	Insufficient data

(1) Based on 29 facilities located in Western Washington.

(2) This is the number of samples analyzed in a laboratory and doesn't not include field screening to determine which samples to send to a laboratory for analysis.

(3) Most UST facilities are on properties substantially smaller than 1 acre, so the actual number of on-site soil borings will be less than the number shown. For example: A 100 X 150 foot parcel = 15,000 s.f. or 0.344 acres. At the above ranges, this would require 7 to 12 borings and 10 to 17 soil samples.

(4) Based on sites with large off-property groundwater plumes. The number of borings is in addition to on-property soil borings.

Table 6.8 Number of soil borings and soil samples reported at well-characterized petroleum-contaminated sites (1).

Table 6.9 Typical Number of Samples Needed to Adequately Characterize Stockpiled Soil (1)	
Cubic Yards of Soil	Number of Samples for Chemical Analysis
0-100	3
101-500	5
501-1000	7
1001-2000	10
>2000	10 + 1 for each additional 500 cubic yards

(1) Source: 1995 Guidance for Remediation of Petroleum Contaminated Soil.

Table 6.9 Typical number of samples needed to adequately characterize stockpiled soil (1.)

Table 7.2 Best Management Practices Testing Recommendations for Various Petroleum Products (1)						
Hazardous Substance OR Chemical of Concern	PETROLEUM PRODUCT (2)					
	Gasoline	Naphtha & Mineral Spirits	Middle Distillates (3)	Heavy Oils	Mineral Oil	Waste Oil & Crude Oil
Total Petroleum Hydrocarbons						
Method A (NWTPH-Gx or Dx)	✓	✓	✓	✓	✓	✓
Method B or C (VPH)	✓	✓	✓			✓
Method B or C (EPH)			✓	✓	✓	✓
Volatile Petroleum Compounds						
Benzene	✓		✓	✓		✓
Toluene	✓		✓	✓		✓
Ethylbenzene	✓		✓	✓		✓
Xylenes (m-, o-, p-)	✓	✓	✓	✓		✓
n-Hexane	✓					✓
Fuel Additives and Blending Compounds						
MTBE	✓					✓
Ethylene Dibromide (EDB)	✓					✓
Ethylene Dichloride (EDC)	✓					✓
Other Additives and Blending Compounds (e.g., ethanol, methanol, TBA, TAME, ETBE)	✓ (See 7.10)					✓
Other Petroleum Components						
Carcinogenic PAHs (4)				✓		✓
Naphthalenes (Naphthalene, 1-Methyl and 2-Methyl)	✓ (See 7.8)	✓	✓	✓		✓
Metals						
Cadmium, Chromium, Nickel and Zinc						✓
Lead	✓					✓
Other Non-Petroleum Contaminants (5)						
PCBs				✓	✓	✓
Halogenated VOCs						✓
Other Site Contaminants	✓	✓	✓	✓	✓	✓
<p>(1) This table presents simplified sampling recommendations based on Table 830-1 in the MTCA rule and practical experience.</p> <p>(2) See the definitions of products in Table 7.1. If the type of petroleum hydrocarbons present is not known or there is a mixture of petroleum products at the site, then test one or more representative samples using the NWTPH-HCID method to determine the appropriate analytical method(s). For a mixture of products, both methods may need to be used. Consult with Ecology for testing recommendations for petroleum products not identified in this table.</p> <p>(3) Heating oil does not need to be analyzed for BTEX.</p> <p>(4) The following cPAHs must be included in this analysis: benz(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; benzo(a)pyrene; chrysene; dibenz(a,h)anthracene; and, indeno(1,2,3-cd)pyrene.</p> <p>(5) Analyze for any non-petroleum contaminants that are known or suspected of being present at the site. For example, if the diesel was used as a pesticide carrier in orchard spraying, testing for pesticides should be conducted. Another example is testing to demonstrate natural attenuation is occurring at the site (see Table 7.4 and Ecology Publication No. 05-09-091).</p>						

Table 7.2 Best management practices testing recommendations for various petroleum products (1).

Table 7.3 Recommended Analytical Methods (1) (continued next page)				
Hazardous Substance OR Chemical of Concern	SOIL/SEDIMENT (2)		GROUNDWATER & SURFACE WATER	
	Analytical Method	PQL (mg/kg)	Analytical Method	PQL (µg/l)
Total Petroleum Hydrocarbons				
Gasoline	Identification using NWTPH-HCID	NA	Identification using NWTPH-HCID	NA
Diesel		NA		NA
Heavy Oil		NA		NA
Method A-Gasoline	NWTPH-Gx	5	NWTPH-Gx	250
Method A-Diesel	NWTPH-Dx	25	NWTPH-Dx	250
Method A-Heavy Oil	NWTPH-Dx	100	NWTPH-Dx	500
Method B or C	VPH	5	VPH	50
Method B or C	EPH	5	EPH	50
Volatile Petroleum Compounds				
Benzene	EPA Method 8260 or 8021	0.005	EPA Method 8260 or 8021	1
Toluene	EPA Method 8260 or 8021	0.005	EPA Method 8260 or 8021	1
Ethylbenzene	EPA Method 8260 or 8021	0.005	EPA Method 8260 or 8021	1
Xylenes (m-, o-, p-)	EPA Method 8260 or 8021	0.005 for each isomer	EPA Method 8260 or 8021	1 for each isomer
n-Hexane	EPA Method 8260	0.005	EPA Method 8260	1
Fuel Additives and Blending Compounds				
MTBE	EPA Method 8260*	0.001	EPA Method 8260	1
Ethylene Dibromide (EDB)	EPA Method 8260* or 8011	0.001	EPA Method 504.1	0.01
Ethylene Dichloride (EDC)	EPA Method 8260* or 8021	0.001	EPA Method 8260 or 8021	1
Ethanol	EPA Method 8260 or 8015	0.05 (estimate)	EPA Method 8260 or 8021	50 (estimate)
Methanol	EPA Method 8015	0.02 (estimate)	EPA Method 8015	20 (estimate)
Tertiary-butyl alcohol (TBA)	EPA Method 8260 or 8015	0.05 (estimate)	EPA Method 8260 or 8021	50 (estimate)
Tertiary-amyl methyl ether (TAME)	EPA Method 8260 or 8015	0.05 (estimate)	EPA Method 8260 or 8021	50 (estimate)
Ethyl tertiary-butyl ether (ETBE)	EPA Method 8260 or 8015	0.05 (estimate)	EPA Method 8260 or 8021	50 (estimate)
Other Additives and Blending Compounds	Chemical-specific	NA	Chemical-specific	NA

Table 7.3 Recommended analytical methods (1).

*Method 8260 may need to be modified (8260 sim) to achieve the necessary PQL.

Table 7.3 Recommended Analytical Methods (continued from previous page) (1)				
Hazardous Substance OR Chemical of Concern	SOIL/SEDIMENT (2)		GROUNDWATER & SURFACE WATER	
	Analytical Method	PQL (mg/kg)	Analytical Method	PQL (µg/l)
Other Petroleum Components				
Carcinogenic PAHs	EPA Method 8270 sim	0.05 for each cPAH	EPA Method 8270 sim	0.02 for each cPAH
Naphthalene	EPA Method 8270	0.5	EPA Method 8270	1
1-Methyl Naphthalene	EPA Method 8270	0.5	EPA Method 8270	1
2-Methyl Naphthalene	EPA Method 8270	0.5	EPA Method 8270	1
Metals				
Cadmium	EPA 6000 or 7000 Series	0.1	EPA Method SW 7131	0.1
Chromium (Total)	EPA 6000 or 7000 Series	0.5	EPA 6000 or 7000 Series	0.5
Lead	EPA 6000 or 7000 Series	0.1	EPA 6000 or 7000 Series	0.1
Nickel	EPA 6000 or 7000 Series	0.1	EPA 6000 or 7000 Series	0.1
Zinc	EPA 6000 or 7000 Series	5	EPA 6000 or 7000 Series	5
Other Non-Petroleum Contaminants				
PCBs	EPA Method 8082	0.04	EPA Method 8082	0.1
PCB Congeners	EPA Method 1668C	varies (3)	EPA Method 1668C	varies (3)
Halogenated VOCs	EPA Method 8260 or 8021	0.005 for each VOC	EPA Method 8260 or 8021	5 for each VOC
Other Site Contaminants	Chemical-specific	NA	Chemical-specific	NA
<p>NA = Not applicable</p> <p>(1) The PQLs recommended in this table were developed in consultation with Ecology’s Manchester Lab.</p> <p>(2) Values are determined on a dry weight basis.</p> <p>(3) Values vary for different congeners. See the Method for more information.</p> <p>See also:</p> <p>Ecology Technical Memorandum #4: Determining Compliance with Method A Cleanup Levels for Diesel and Heavy Oil http://www.ecy.wa.gov/biblio/0409086.html</p> <p>Ecology Technical Memorandum #5: Collecting and Preparing Soil Samples for VOC Analysis http://www.ecy.wa.gov/biblio/0409087.html</p> <p>Ecology Technical Memorandum #7: “Soil Moisture Corrected Reporting by EPA Method 8000C” http://www.ecy.wa.gov/biblio/0809042.html</p>				

Table 7.4 Supplemental Groundwater Analyses Typically Needed to Support a Natural Attenuation Demonstration	
Parameter / Substance	Analytical Method
Dissolved Oxygen	Standard Method 4500-0 (field meter)
Oxidation-Reduction (Redox) Potential (ORP or eh)	Standard Method 2580 (field meter)
pH	EPA Method 150.2 or 9040C (field pH meter)
Specific Conductivity	EPA Method 120.1 or 9050 A (field conductivity meter)
Temperature	EPA Method 170.1 (field thermometer)
Nitrate	4500-NO ₃ -I
Soluble Manganese	EPA Method 200.7 (ICP)
Soluble Ferrous Iron	EPA Method 200.7 (ICP)
Sulfate	EPA Method 300.0
Alkalinity	EPA Method 310.2
Methane	Standard Method 6211 (combustible gas meter)
See also: Ecology Publication No. 05-09-091, <i>Guidance on Remediation of Petroleum-Contaminated Groundwater by Natural Attenuation</i> found at: http://www.ecy.wa.gov/biblio/0509091.html	

Table 7.4 Supplemental groundwater analyses typically needed to support a natural attenuation demonstration.

Table 12.1 Guidelines for Reuse of Petroleum-Contaminated Soil					
Parameter	Analytical Method	Soil Category (8)(9)(10)			
		1 No detectable Petroleum Components (mg/kg)	2 Commercial Fill Above Water Table (mg/kg)	3 Paving Base Material & Road Construction (mg/kg)	4 Landfill Daily Cover or Asphalt Manufacturing (mg/kg)
Total Petroleum Hydrocarbons (1)(2) See Table 7.1 for petroleum products that fall within these categories.					
Gasoline Range Organics	NWTPH-Gx	<5	5 - 30	>30 - 100	>100
Diesel Range Organics	NWTPH-Dx	<25	25 - 200	>200 - 500	>500
Heavy Fuels and Oils*	NWTPH-Dx	<100	100 - 200	>200 – 500	>500
Mineral Oil	NWTPH-Dx	<100	100 - 200	>200 – 500	>500
Volatile Petroleum Components					
Benzene	SW8260B	<0.005	0.005 - 0.03	0.03 or less	See Table 12.2
Ethylbenzene	SW8260B	<0.005	0.005 - 6	6 or less	>6
Toluene	SW8260B	<0.005	0.005 - 7	7 or less	>7
Xylenes (3)	SW8260B	<0.015	0.015 - 9	9 or less	>9
Fuel Additives & Blending Components					
(MTBE) Methyl Tert-Butyl Ether	SW8260B	<0.005	0.005 - 0.1	0.1 or less	>0.1
Lead	SW6010A	<17	17 - 50	>50 - 220	See Table 12.2
Other Petroleum Components					
Polychlorinated (4) Biphenyls (PCBs)	SW8082	<0.04	<0.04	<0.04	See Table 12.2
Naphthalenes (5)	SW8260B	<0.05	0.05 - 5	5 or less	>5
cPAHs (6)	SW8270C	<0.05	0.05 - 0.1	>0.1 - 2	>2
Other Petroleum Characteristics (Applies to soils contaminated with any petroleum product.)					
Odors	Smell	No detectable odor			
Staining	Visual	No unusual color or staining			
Sheen Test	See Footnote # 7	No visible sheen			
IMPORTANT: See Table 12.2 and the footnotes to this Table on the following pages! Test soil for the parameters specified in Table 7.2. *Does NOT include waste oil contaminated soils, which should be disposed of in a landfill. “<” means less than; “>” means greater than					

Table 12.1 Guidelines for reuse of petroleum-contaminated soil.

Table 12.2 Description and Recommended Best Management Practices for Soil Categories in Table 12.1 (continued next page)		
Category	Acceptable Uses	Limitations
<p>Category 1 Soils: Soils with no detectable/ quantifiable levels of petroleum hydrocarbons or constituents using the analytical methods listed in Table 7.3 and are not suspected of being contaminated with any other hazardous substances.</p>	<ul style="list-style-type: none"> • Can be used anywhere the use is allowed under other regulations. • Any use allowed for Category 2, 3 & 4 soils. 	<ul style="list-style-type: none"> • These soils should be odor-free.
<p>Category 2 Soils: Soils with residual levels of petroleum hydrocarbons that could have adverse impacts on the environment in some circumstances.</p>	<ul style="list-style-type: none"> • Any use allowed for Category 3 & 4 soils. • Backfill at cleanup sites above the water table. • Fill in commercial or industrial areas above the water table. • Road and bridge embankment construction in areas above the water table. 	<ul style="list-style-type: none"> • These soils may have a slight petroleum odor, depending on the sensitivity of the individual. This should be considered when reusing these soils. • Should be placed above the highest anticipated high water table. If seasonal groundwater elevation information is not available, place at least 10 feet above the current water table. • Should not be placed within 100 feet of any private drinking water well or within the 10 year wellhead protection area of a public water supply well. • Should not be placed in or directly adjacent to wetlands or surface water where contact with water is possible. • Should not be placed under a surface water infiltration facility or septic drain field. • Any other limitations in state or local regulations.
<p>Category 3 Soils: Soils with moderate levels of residual petroleum contamination that could have adverse impacts on the environment unless re-used in carefully controlled situations.</p>	<ul style="list-style-type: none"> • Any use allowed for Category 4 soils. • Use as pavement base material under public and private paved streets and roads. • Use as pavement base material under commercial and industrial parking lots. 	<ul style="list-style-type: none"> • Should be placed above the highest anticipated high water table. If seasonal ground water elevation information is not available, place at least 10 feet above the water table. • Should be a maximum of 2 feet thick to minimize potential for leaching or vapor impacts. • Should not be placed within 100 feet of any private drinking water well or within the 10 year wellhead protection area of a public water supply well. • Should not be placed in or directly adjacent to wetlands or surface water. • Should not be placed under a surface water infiltration facility or septic drain field. • When exposed, runoff from area in use should be contained or treated to prevent entrance to storm drains, surface water or wetlands. • Any other limitations in state or local regulations.

Table 12.2 Description and recommended best management practices for soil categories in Table 12.1 (continued next page).

Table 12.2 (continued) Description and Recommended Best Management Practices for Soil Categories in Table 12.1		
Category	Acceptable Uses	Limitations
<p>Category 4 Soils: Soils with high levels of petroleum contamination that should not be re-used except in very limited circumstances.</p>	<ul style="list-style-type: none"> • Use in the manufacture of asphalt. • Use as daily cover in a lined municipal solid waste or limited purpose landfill provided this is allowed under the landfill operating permit. 	<p><u>Landfill Limitations:</u></p> <p>The soil should be tested for and pass the following tests:</p> <ul style="list-style-type: none"> ➤ Free liquids test. Soils that contain free liquids cannot be landfilled without treatment. ➤ TCLP for lead and benzene. Unless exempt under WAC 173-303-071(3)(t), soils that fail a TCLP for lead or benzene must be disposed of as hazardous waste. ➤ Flammability test. Soils that fail this test must be disposed of as hazardous waste. ➤ Bioassay test under WAC 173-303-100(5). Soils that fail this test must be disposed of as hazardous waste. ➤ PCBs. Soils with a total PCB content of 2 ppm or more must be disposed of as hazardous waste. <p>Soil used for daily cover should be stockpiled within the landfill lined fill area.</p> <p>Soil containing more than 10,000 mg/kg TPH should be buried immediately with other wastes or daily covered to limit potential worker exposure.</p> <p>Any additional limitations specified in the landfill permit or in other state or local regulations.</p> <p><u>Asphalt Manufacturing Limitations:</u></p> <p>Soil storage areas should be contained in a bermed area to minimize contact with surface water runoff from adjacent areas. Runoff from storage areas should be considered contaminated until tested to prove otherwise.</p> <p>Soil storage areas should also be lined and covered with a roof or secured tarp to minimize contact with precipitation and potential groundwater contamination. Leachate from storage areas should be considered contaminated until tested to prove otherwise.</p> <p>The soil should be tested for and pass the following tests:</p> <ul style="list-style-type: none"> ➤ TCLP for lead and benzene. Unless exempt under WAC 173-303-071(3)(t), soils that fail a TCLP for lead or benzene must be disposed of as hazardous waste. ➤ Flammability test. Soils that fail this test must be disposed of as hazardous waste. ➤ Bioassay test under WAC 173-303-100(5). Soils that fail this test must be disposed of as hazardous waste. ➤ No detectable levels of PCBs in soil (<0.04 mg/kg). <p>Precautions should be taken to minimize worker exposure to soil storage piles and any dust or vapors from these piles prior to feeding into the asphalt batch plant.</p>
<p>IMPORTANT: See the following page for additional information!</p>		

Notes to Table 12.1:

Contaminated soils can be treated to achieve these concentrations but dilution with clean soil to achieve these concentrations is a violation of Washington State solid and hazardous waste laws.

(1) See Table 7.1 for a description of what products fall within these general categories. If the product released is unknown, use the limitations for gasoline range organics. If the soil is contaminated from releases from more than one product, use the limitations for both products. For example, if the release is a mixture of gasoline and diesel, the soil should be tested for components of both gas and diesel and the limitations for both fuels and their components used.

(2) The concentrations for diesel, heavy oil and mineral oil are not additive. Use the TPH product category most closely representing the TPH mixture and apply the limitations for that product to the mixture. ***The reuse of waste oil contaminated soil is not allowed due to the wide variety of contaminants likely to be present.***

(3) Value is total of m, o, & p xylenes.

(4) Value is the total of all PCBs. Only heavy oil and mineral oil contaminated soils need to be tested for PCBs. Soil contaminated with a spill from a regulated PCB containing device must be disposed of in a TSCA permitted landfill, regardless of the PCB concentration. Other PCB contaminated soils may be disposed of in a municipal solid waste landfill permitted to receive such materials, provided the concentration does not exceed 2 ppm PCBs (WAC 173-303-9904).

(5) Value is total of naphthalene, 1-methyl naphthalene and 2-methyl naphthalene. Only diesel and heavy oil contaminated soils need to be tested for naphthalenes.

(6) The value is the benzo(a)pyrene equivalent concentration of the following seven cPAHs. See Appendix C for how to calculate a toxic equivalent concentration. The seven cPAHs are as follows: benz(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; benzo(a)pyrene; chrysene; dibenz(a,h)anthracene; and, indeno(1,2,3-cd)pyrene. Only diesel and heavy oil contaminated soils need to be tested for cPAHs. Soils contaminated with more than 1% polycyclic aromatic hydrocarbons, as that term is defined in WAC 173-303-040 (which is more expansive than the above list), must be disposed of as hazardous waste.

(7) No visible sheen observed on water when approximately one tablespoon of soil placed in approximately ½ liter of water held in a shallow pan (like a gold pan or similar container).

(8) A soil in a lower category can be used for uses specified in any higher category. This means that:

- A category 1 soil can be used for any use specified in categories 1, 2, 3 and 4.
- A category 2 soil can be used for any use specified in categories 2, 3 and 4.
- A categories 3 soil can be used for any use specified in categories 3 and 4.

(9) ***If an environmental site assessment or soil or groundwater analyses indicate contaminants other than common petroleum constituents and naturally occurring levels of metals are likely to be present in the soil of interest at the site (for example, solvents or pesticides), do not reuse the soil.*** The soil should instead be treated using appropriate technology to address all contaminants or landfilled at a solid waste or hazardous waste facility permitted to receive these materials.

(10) Soils in categories 2, 3 and 4 should be stockpiled consistent with the soil storage recommendations in Subsection 11.3 of this guidance.

Table 830-1
Required Testing for Petroleum Releases.

	Gasoline Range Organics (GRO) (1)	Diesel Range Organics (DRO) (2)	Heavy Oils (DRO) (3)	Mineral Oils (4)	Waste Oils and Unknown Oil (5)
Volatile Petroleum Compounds					
Benzene	X (6)	X (7)			X (8)
Toluene	X (6)	X (7)			X (8)
Ethyl benzene	X (6)	X (7)			X (8)
Xylenes	X (6)	X (7)			X (8)
n-Hexane	X (9)				
Fuel Additives and Blending Compounds					
Dibromoethane, 1-2 (EDB); and Dichloroethane, 1-2 (EDC)	X (10)				X (8)
Methyl tertiary-butyl ether (MTBE)	X (11)				X (8)
Total Lead and Other Additives	X (12)				X (8)
Other Petroleum Components					
Carcinogenic PAHs		X (13)	X (13)		X (8)
Naphthalenes	X (14)	X (14)	X (14)		X (14)
Other Compounds					
Polychlorinated Biphenyls (PCBs)			X (15)	X (15)	X (8)
Halogenated Volatile Organic Compounds (VOCs)					X (8)
Other	X (16)	X (16)	X (16)	X (16)	X (16)
Total Petroleum Hydrocarbons Methods					
TPH Analytical Method for Total TPH (Method A Cleanup Levels) (17)	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx	NWTPH-Dx	NWTPH-Gx & NWTPH-Dx
TPH Analytical Methods for TPH fractions (Methods B or C) (17)	VPH	EPH	EPH	EPH	VPH and EPH

[Editor's Note: See next page for the footnotes associated with Table 830-1.]

Use of Table 830-1: An "X" in the box means that the testing requirement applies to ground water and soil if a release is known or suspected to have occurred to that medium, unless otherwise specified in the footnotes. A box with no "X" indicates (except in the last two rows) that, for the type of petroleum product release indicated in the top row, analyses for the hazardous substance(s) named in the far-left column corresponding to the empty box are not typically required as part of the testing for petroleum releases. However, such analyses may be required based on other site-specific information. Note that testing for Total Petroleum Hydrocarbons (TPH) is required for every type of petroleum release, as indicated in the bottom two rows of the table. The testing method for TPH depends on the type of petroleum product released and whether Method A or Method B or C is being used to determine TPH cleanup levels. See WAC 173-340-830 for analytical procedures. **The footnotes to this table are important for understanding the specific analytical requirements for petroleum releases.**

Footnotes:

- (1) The following petroleum products are common examples of GRO: automotive and aviation gasolines, mineral spirits, standard solvents, and naphtha. To be in this range, 90 percent of the petroleum components need to be quantifiable using the NWTPH-Gx; if NWTPH-HCID results are used for this determination, then 90 percent of the "area under the TPH curve" must be quantifiable using NWTPH-Gx. Products such as jet fuel, diesel No. 1, kerosene, and heating oil may require analysis as both GRO and DRO depending on the range of petroleum components present (range can be measured by NWTPH-HCID). (See footnote 17 on analytical methods.)
- (2) The following petroleum products are common examples of DRO: Diesel No. 2, fuel oil No. 2, light oil (including some bunker oils). To be in this range, 90 percent of the petroleum components need to be quantifiable using the NWTPH-Dx quantified against a diesel standard. Products such as jet fuel, diesel No. 1, kerosene, and heating oil may require analysis as both GRO and DRO depending on the range of petroleum components present as measured in NWTPH-HCID.
- (3) The following petroleum products are common examples of the heavy oil group: Motor oils, lube oils, hydraulic fluids, etc. Heavier oils may require the addition of an appropriate oil range standard for quantification.
- (4) Mineral oil means non-PCB mineral oil, typically used as an insulator and coolant in electrical devices such as transformers and capacitors.
- (5) The waste oil category applies to waste oil, oily wastes, and unknown petroleum products and mixtures of petroleum and nonpetroleum substances. Analysis of other chemical components (such as solvents) than those listed may be required based on site-specific information. Mixtures of identifiable petroleum products (such as gasoline and diesel, or diesel and motor oil) may be analyzed based on the presence of the individual products, and need not be treated as waste and unknown oils.
- (6) When using Method A, testing soil for benzene is required. Furthermore, testing ground water for BTEX is necessary when a petroleum release to ground water is known or suspected. If the ground water is tested and toluene, ethyl benzene or xylene is in the ground water above its respective Method A cleanup level, the soil must also be tested for that chemical. When using Method B or C, testing the soil for BTEX is required and testing for BTEX in ground water is required when a release to ground water is known or suspected.
- (7)(a) For DRO releases from other than home heating oil systems, follow the instructions for GRO releases in Footnote (6).
- (b) For DRO releases from typical home heating oil systems (systems of 1,100 gallons or less storing heating oil for residential consumptive use on the premises where stored), testing for BTEX is not usually required for either ground water or soil. Testing of the ground water is also not usually required for these systems; however, if the ground water is tested and benzene is found in the ground water, the soil must be tested for benzene.
- (8) Testing is required in a sufficient number of samples to determine whether this chemical is present at concentrations of concern. If the chemical is found to be at levels below the applicable cleanup level, then no further analysis is required.
- (9) Testing for n-hexane is required when VPH analysis is performed for Method B or C. In this case, the concentration of n-hexane should be deleted from its respective fraction to avoid double-counting its concentration. n-Hexane's contribution to overall toxicity is then evaluated using its own reference dose.
- (10) Volatile fuel additives (such as dibromoethane, 1-2 (EDB) (CAS# 106-93-4) and dichloroethane, 1-2 (EDC) (CAS# 107-06-2)) must be part of a volatile organics analysis (VOA) of GRO contaminated ground water. If any is found in ground water, then the contaminated soil must also be tested for these chemicals.
- (11) Methyl tertiary-butyl ether (MTBE) (CAS# 1634-04-4) must be analyzed in GRO contaminated ground water. If any is found in ground water, then the contaminated soil must also be tested for MTBE.
- (12)(a) For automotive gasoline where the release occurred prior to 1996 (when "leaded gasoline" was used), testing for lead is required unless it can be demonstrated that lead was not part of the release. If this demonstration cannot be made, testing is required in a sufficient number of samples to determine whether lead is present at concentrations of concern. Other additives and blending compounds of potential environmental significance may need to be considered for testing, including: tertiary-butyl alcohol (TBA); tertiary-amyl methyl ether (TAME); ethyl tertiary-butyl ether (ETBE); ethanol; and methanol. Contact the department for additional testing recommendations regarding these and other additives and blending compounds.
- (b) For aviation gasoline, racing fuels and similar products, testing is required for likely fuel additives (especially lead) and likely blending compounds, no matter when the release occurred.
- (13) Testing for carcinogenic PAHs is required for DRO and heavy oils, except for the following products for which adequate information exists to indicate their absence: Diesel No. 1 and 2, home heating oil, kerosene, jet fuels, and electrical insulating mineral oils. The carcinogenic PAHs include benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(k)fluoranthene, benzo(a)anthracene, and benzo(b)fluoranthene.
- (14)(a) Except as noted in (b) and (c), testing for the non-carcinogenic PAHs, including the "naphthalenes" (naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene) is not required when using Method A cleanup levels, because they are included in the TPH cleanup level.
- (b) Testing of soil for naphthalenes is required under Methods B and C when the inhalation exposure pathway is evaluated.
- (c) If naphthalenes are found in ground water, then the soil must also be tested for naphthalenes.
- (15) Testing for PCBs is required unless it can be demonstrated that: (1) the release originated from an electrical device manufactured for use in the United States after July 1, 1979; (2) oil containing PCBs was never used in the equipment suspected as the source of the release (examples of equipment where PCBs are likely to be found include transformers, electric motors, hydraulic systems, heat transfer systems, electromagnets, compressors, capacitors, switches and miscellaneous other electrical devices); or, (3) the oil released was recently tested and did not contain PCBs.
- (16) Testing for other possible chemical contaminants may be required based on site-specific information.
- (17) The analytical methods NWTPH-Gx, NWTPH-Dx, NWTPH-HCID, VPH, and EPH are methods published by the Department of Ecology and available on the department's Internet web site: <http://www.ecy.wa.gov/programs/tcp/cleanup.html>.

Table 6.8 Number of Soil Borings and Soil Samples Reported at Well-Characterized Petroleum-Contaminated Sites (1)				
Category of Site	Number of Soil Borings		Number of Soil Samples for Chemical Analysis (2)	
	Within the Source Property Boundary (3)	Off-Property Areas	Within the Source Property Boundary (3)	Off-Property Areas
Service Stations	20 to 30 soil borings <u>per acre</u>	Insufficient data	35 to 45 soil samples <u>per acre</u>	Insufficient data
Other Petroleum Contaminated Facilities	20 to 35 soil borings <u>per acre</u>	10 to 30 <u>additional</u> soil borings (4)	30 to 50 soil samples <u>per acre</u>	Insufficient data

(1) Based on 29 facilities located in Western Washington.

(2) This is the number of samples analyzed in a laboratory and doesn't not include field screening to determine which samples to send to a laboratory for analysis.

(3) Most UST facilities are on properties substantially smaller than 1 acre, so the actual number of on-site soil borings will be less than the number shown. For example: A 100 X 150 foot parcel = 15,000 s.f. or 0.344 acres. At the above ranges, this would require 7 to 12 borings and 10 to 17 soil samples.

(4) Based on sites with large off-property groundwater plumes. The number of borings is in addition to on-property soil borings.

Table 6.8 Number of soil borings and soil samples reported at well-characterized petroleum-contaminated sites (1).

Table 6.9 Typical Number of Samples Needed to Adequately Characterize Stockpiled Soil (1)	
Cubic Yards of Soil	Number of Samples for Chemical Analysis
0-100	3
101-500	5
501-1000	7
1001-2000	10
>2000	10 + 1 for each additional 500 cubic yards

(1) Source: 1995 Guidance for Remediation of Petroleum Contaminated Soil.

Table 6.9 Typical number of samples needed to adequately characterize stockpiled soil (1.)

Table 7.2 Best Management Practices Testing Recommendations for Various Petroleum Products (1)						
Hazardous Substance OR Chemical of Concern	PETROLEUM PRODUCT (2)					
	Gasoline	Naphtha & Mineral Spirits	Middle Distillates (3)	Heavy Oils	Mineral Oil	Waste Oil & Crude Oil
Total Petroleum Hydrocarbons						
Method A (NWTPH-Gx or Dx)	✓	✓	✓	✓	✓	✓
Method B or C (VPH)	✓	✓	✓			✓
Method B or C (EPH)			✓	✓	✓	✓
Volatile Petroleum Compounds						
Benzene	✓		✓	✓		✓
Toluene	✓		✓	✓		✓
Ethylbenzene	✓		✓	✓		✓
Xylenes (m-, o-, p-)	✓	✓	✓	✓		✓
n-Hexane	✓					✓
Fuel Additives and Blending Compounds						
MTBE	✓					✓
Ethylene Dibromide (EDB)	✓					✓
Ethylene Dichloride (EDC)	✓					✓
Other Additives and Blending Compounds (e.g., ethanol, methanol, TBA, TAME, ETBE)	✓ (See 7.10)					✓
Other Petroleum Components						
Carcinogenic PAHs (4)				✓		✓
Naphthalenes (Naphthalene, 1-Methyl and 2-Methyl)	✓ (See 7.8)	✓	✓	✓		✓
Metals						
Cadmium, Chromium, Nickel and Zinc						✓
Lead	✓					✓
Other Non-Petroleum Contaminants (5)						
PCBs				✓	✓	✓
Halogenated VOCs						✓
Other Site Contaminants	✓	✓	✓	✓	✓	✓
<p>(1) This table presents simplified sampling recommendations based on Table 830-1 in the MTCA rule and practical experience.</p> <p>(2) See the definitions of products in Table 7.1. If the type of petroleum hydrocarbons present is not known or there is a mixture of petroleum products at the site, then test one or more representative samples using the NWTPH-HCID method to determine the appropriate analytical method(s). For a mixture of products, both methods may need to be used. Consult with Ecology for testing recommendations for petroleum products not identified in this table.</p> <p>(3) Heating oil does not need to be analyzed for BTEX.</p> <p>(4) The following cPAHs must be included in this analysis: benz(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; benzo(a)pyrene; chrysene; dibenz(a,h)anthracene; and, indeno(1,2,3-cd)pyrene.</p> <p>(5) Analyze for any non-petroleum contaminants that are known or suspected of being present at the site. For example, if the diesel was used as a pesticide carrier in orchard spraying, testing for pesticides should be conducted. Another example is testing to demonstrate natural attenuation is occurring at the site (see Table 7.4 and Ecology Publication No. 05-09-091).</p>						

Table 7.2 Best management practices testing recommendations for various petroleum products (1).

Table 7.3 Recommended Analytical Methods (1) (continued next page)				
Hazardous Substance OR Chemical of Concern	SOIL/SEDIMENT (2)		GROUNDWATER & SURFACE WATER	
	Analytical Method	PQL (mg/kg)	Analytical Method	PQL (µg/l)
Total Petroleum Hydrocarbons				
Gasoline	Identification using NWTPH-HCID	NA	Identification using NWTPH-HCID	NA
Diesel		NA		NA
Heavy Oil		NA		NA
Method A-Gasoline	NWTPH-Gx	5	NWTPH-Gx	250
Method A-Diesel	NWTPH-Dx	25	NWTPH-Dx	250
Method A-Heavy Oil	NWTPH-Dx	100	NWTPH-Dx	500
Method B or C	VPH	5	VPH	50
Method B or C	EPH	5	EPH	50
Volatile Petroleum Compounds				
Benzene	EPA Method 8260 or 8021	0.005	EPA Method 8260 or 8021	1
Toluene	EPA Method 8260 or 8021	0.005	EPA Method 8260 or 8021	1
Ethylbenzene	EPA Method 8260 or 8021	0.005	EPA Method 8260 or 8021	1
Xylenes (m-, o-, p-)	EPA Method 8260 or 8021	0.005 for each isomer	EPA Method 8260 or 8021	1 for each isomer
n-Hexane	EPA Method 8260	0.005	EPA Method 8260	1
Fuel Additives and Blending Compounds				
MTBE	EPA Method 8260*	0.001	EPA Method 8260	1
Ethylene Dibromide (EDB)	EPA Method 8260* or 8011	0.001	EPA Method 504.1	0.01
Ethylene Dichloride (EDC)	EPA Method 8260* or 8021	0.001	EPA Method 8260 or 8021	1
Ethanol	EPA Method 8260 or 8015	0.05 (estimate)	EPA Method 8260 or 8021	50 (estimate)
Methanol	EPA Method 8015	0.02 (estimate)	EPA Method 8015	20 (estimate)
Tertiary-butyl alcohol (TBA)	EPA Method 8260 or 8015	0.05 (estimate)	EPA Method 8260 or 8021	50 (estimate)
Tertiary-amyl methyl ether (TAME)	EPA Method 8260 or 8015	0.05 (estimate)	EPA Method 8260 or 8021	50 (estimate)
Ethyl tertiary-butyl ether (ETBE)	EPA Method 8260 or 8015	0.05 (estimate)	EPA Method 8260 or 8021	50 (estimate)
Other Additives and Blending Compounds	Chemical-specific	NA	Chemical-specific	NA

Table 7.3 Recommended analytical methods (1).

*Method 8260 may need to be modified (8260 sim) to achieve the necessary PQL.

Table 7.3 Recommended Analytical Methods (continued from previous page) (1)				
Hazardous Substance OR Chemical of Concern	SOIL/SEDIMENT (2)		GROUNDWATER & SURFACE WATER	
	Analytical Method	PQL (mg/kg)	Analytical Method	PQL (µg/l)
Other Petroleum Components				
Carcinogenic PAHs	EPA Method 8270 sim	0.05 for each cPAH	EPA Method 8270 sim	0.02 for each cPAH
Naphthalene	EPA Method 8270	0.5	EPA Method 8270	1
1-Methyl Naphthalene	EPA Method 8270	0.5	EPA Method 8270	1
2-Methyl Naphthalene	EPA Method 8270	0.5	EPA Method 8270	1
Metals				
Cadmium	EPA 6000 or 7000 Series	0.1	EPA Method SW 7131	0.1
Chromium (Total)	EPA 6000 or 7000 Series	0.5	EPA 6000 or 7000 Series	0.5
Lead	EPA 6000 or 7000 Series	0.1	EPA 6000 or 7000 Series	0.1
Nickel	EPA 6000 or 7000 Series	0.1	EPA 6000 or 7000 Series	0.1
Zinc	EPA 6000 or 7000 Series	5	EPA 6000 or 7000 Series	5
Other Non-Petroleum Contaminants				
PCBs	EPA Method 8082	0.04	EPA Method 8082	0.1
PCB Congeners	EPA Method 1668C	varies (3)	EPA Method 1668C	varies (3)
Halogenated VOCs	EPA Method 8260 or 8021	0.005 for each VOC	EPA Method 8260 or 8021	5 for each VOC
Other Site Contaminants	Chemical-specific	NA	Chemical-specific	NA
<p>NA = Not applicable</p> <p>(1) The PQLs recommended in this table were developed in consultation with Ecology’s Manchester Lab.</p> <p>(2) Values are determined on a dry weight basis.</p> <p>(3) Values vary for different congeners. See the Method for more information.</p> <p>See also:</p> <p>Ecology Technical Memorandum #4: Determining Compliance with Method A Cleanup Levels for Diesel and Heavy Oil http://www.ecy.wa.gov/biblio/0409086.html</p> <p>Ecology Technical Memorandum #5: Collecting and Preparing Soil Samples for VOC Analysis http://www.ecy.wa.gov/biblio/0409087.html</p> <p>Ecology Technical Memorandum #7: “Soil Moisture Corrected Reporting by EPA Method 8000C” http://www.ecy.wa.gov/biblio/0809042.html</p>				

Table 7.4 Supplemental Groundwater Analyses Typically Needed to Support a Natural Attenuation Demonstration	
Parameter / Substance	Analytical Method
Dissolved Oxygen	Standard Method 4500-0 (field meter)
Oxidation-Reduction (Redox) Potential (ORP or eh)	Standard Method 2580 (field meter)
pH	EPA Method 150.2 or 9040C (field pH meter)
Specific Conductivity	EPA Method 120.1 or 9050 A (field conductivity meter)
Temperature	EPA Method 170.1 (field thermometer)
Nitrate	4500-NO ₃ -I
Soluble Manganese	EPA Method 200.7 (ICP)
Soluble Ferrous Iron	EPA Method 200.7 (ICP)
Sulfate	EPA Method 300.0
Alkalinity	EPA Method 310.2
Methane	Standard Method 6211 (combustible gas meter)
See also: Ecology Publication No. 05-09-091, <i>Guidance on Remediation of Petroleum-Contaminated Groundwater by Natural Attenuation</i> found at: http://www.ecy.wa.gov/biblio/0509091.html	

Table 7.4 Supplemental groundwater analyses typically needed to support a natural attenuation demonstration.

Table 12.1 Guidelines for Reuse of Petroleum-Contaminated Soil					
Parameter	Analytical Method	Soil Category (8)(9)(10)			
		1 No detectable Petroleum Components (mg/kg)	2 Commercial Fill Above Water Table (mg/kg)	3 Paving Base Material & Road Construction (mg/kg)	4 Landfill Daily Cover or Asphalt Manufacturing (mg/kg)
Total Petroleum Hydrocarbons (1)(2) See Table 7.1 for petroleum products that fall within these categories.					
Gasoline Range Organics	NWTPH-Gx	<5	5 - 30	>30 - 100	>100
Diesel Range Organics	NWTPH-Dx	<25	25 - 200	>200 - 500	>500
Heavy Fuels and Oils*	NWTPH-Dx	<100	100 - 200	>200 – 500	>500
Mineral Oil	NWTPH-Dx	<100	100 - 200	>200 – 500	>500
Volatile Petroleum Components					
Benzene	SW8260B	<0.005	0.005 - 0.03	0.03 or less	See Table 12.2
Ethylbenzene	SW8260B	<0.005	0.005 - 6	6 or less	>6
Toluene	SW8260B	<0.005	0.005 - 7	7 or less	>7
Xylenes (3)	SW8260B	<0.015	0.015 - 9	9 or less	>9
Fuel Additives & Blending Components					
(MTBE) Methyl Tert-Butyl Ether	SW8260B	<0.005	0.005 - 0.1	0.1 or less	>0.1
Lead	SW6010A	<17	17 - 50	>50 - 220	See Table 12.2
Other Petroleum Components					
Polychlorinated (4) Biphenyls (PCBs)	SW8082	<0.04	<0.04	<0.04	See Table 12.2
Naphthalenes (5)	SW8260B	<0.05	0.05 - 5	5 or less	>5
cPAHs (6)	SW8270C	<0.05	0.05 - 0.1	>0.1 - 2	>2
Other Petroleum Characteristics (Applies to soils contaminated with any petroleum product.)					
Odors	Smell	No detectable odor			
Staining	Visual	No unusual color or staining			
Sheen Test	See Footnote # 7	No visible sheen			
IMPORTANT: See Table 12.2 and the footnotes to this Table on the following pages! Test soil for the parameters specified in Table 7.2. *Does NOT include waste oil contaminated soils, which should be disposed of in a landfill. “<” means less than; “>” means greater than					

Table 12.1 Guidelines for reuse of petroleum-contaminated soil.

Table 12.2 Description and Recommended Best Management Practices for Soil Categories in Table 12.1 (continued next page)		
Category	Acceptable Uses	Limitations
<p>Category 1 Soils: Soils with no detectable/ quantifiable levels of petroleum hydrocarbons or constituents using the analytical methods listed in Table 7.3 and are not suspected of being contaminated with any other hazardous substances.</p>	<ul style="list-style-type: none"> • Can be used anywhere the use is allowed under other regulations. • Any use allowed for Category 2, 3 & 4 soils. 	<ul style="list-style-type: none"> • These soils should be odor-free.
<p>Category 2 Soils: Soils with residual levels of petroleum hydrocarbons that could have adverse impacts on the environment in some circumstances.</p>	<ul style="list-style-type: none"> • Any use allowed for Category 3 & 4 soils. • Backfill at cleanup sites above the water table. • Fill in commercial or industrial areas above the water table. • Road and bridge embankment construction in areas above the water table. 	<ul style="list-style-type: none"> • These soils may have a slight petroleum odor, depending on the sensitivity of the individual. This should be considered when reusing these soils. • Should be placed above the highest anticipated high water table. If seasonal groundwater elevation information is not available, place at least 10 feet above the current water table. • Should not be placed within 100 feet of any private drinking water well or within the 10 year wellhead protection area of a public water supply well. • Should not be placed in or directly adjacent to wetlands or surface water where contact with water is possible. • Should not be placed under a surface water infiltration facility or septic drain field. • Any other limitations in state or local regulations.
<p>Category 3 Soils: Soils with moderate levels of residual petroleum contamination that could have adverse impacts on the environment unless re-used in carefully controlled situations.</p>	<ul style="list-style-type: none"> • Any use allowed for Category 4 soils. • Use as pavement base material under public and private paved streets and roads. • Use as pavement base material under commercial and industrial parking lots. 	<ul style="list-style-type: none"> • Should be placed above the highest anticipated high water table. If seasonal ground water elevation information is not available, place at least 10 feet above the water table. • Should be a maximum of 2 feet thick to minimize potential for leaching or vapor impacts. • Should not be placed within 100 feet of any private drinking water well or within the 10 year wellhead protection area of a public water supply well. • Should not be placed in or directly adjacent to wetlands or surface water. • Should not be placed under a surface water infiltration facility or septic drain field. • When exposed, runoff from area in use should be contained or treated to prevent entrance to storm drains, surface water or wetlands. • Any other limitations in state or local regulations.

Table 12.2 Description and recommended best management practices for soil categories in Table 12.1 (continued next page).

Table 12.2 (continued) Description and Recommended Best Management Practices for Soil Categories in Table 12.1		
Category	Acceptable Uses	Limitations
<p>Category 4 Soils: Soils with high levels of petroleum contamination that should not be re-used except in very limited circumstances.</p>	<ul style="list-style-type: none"> • Use in the manufacture of asphalt. • Use as daily cover in a lined municipal solid waste or limited purpose landfill provided this is allowed under the landfill operating permit. 	<p><u>Landfill Limitations:</u></p> <p>The soil should be tested for and pass the following tests:</p> <ul style="list-style-type: none"> ➤ Free liquids test. Soils that contain free liquids cannot be landfilled without treatment. ➤ TCLP for lead and benzene. Unless exempt under WAC 173-303-071(3)(t), soils that fail a TCLP for lead or benzene must be disposed of as hazardous waste. ➤ Flammability test. Soils that fail this test must be disposed of as hazardous waste. ➤ Bioassay test under WAC 173-303-100(5). Soils that fail this test must be disposed of as hazardous waste. ➤ PCBs. Soils with a total PCB content of 2 ppm or more must be disposed of as hazardous waste. <p>Soil used for daily cover should be stockpiled within the landfill lined fill area.</p> <p>Soil containing more than 10,000 mg/kg TPH should be buried immediately with other wastes or daily covered to limit potential worker exposure.</p> <p>Any additional limitations specified in the landfill permit or in other state or local regulations.</p> <p><u>Asphalt Manufacturing Limitations:</u></p> <p>Soil storage areas should be contained in a bermed area to minimize contact with surface water runoff from adjacent areas. Runoff from storage areas should be considered contaminated until tested to prove otherwise.</p> <p>Soil storage areas should also be lined and covered with a roof or secured tarp to minimize contact with precipitation and potential groundwater contamination. Leachate from storage areas should be considered contaminated until tested to prove otherwise.</p> <p>The soil should be tested for and pass the following tests:</p> <ul style="list-style-type: none"> ➤ TCLP for lead and benzene. Unless exempt under WAC 173-303-071(3)(t), soils that fail a TCLP for lead or benzene must be disposed of as hazardous waste. ➤ Flammability test. Soils that fail this test must be disposed of as hazardous waste. ➤ Bioassay test under WAC 173-303-100(5). Soils that fail this test must be disposed of as hazardous waste. ➤ No detectable levels of PCBs in soil (<0.04 mg/kg). <p>Precautions should be taken to minimize worker exposure to soil storage piles and any dust or vapors from these piles prior to feeding into the asphalt batch plant.</p>
<p>IMPORTANT: See the following page for additional information!</p>		

Notes to Table 12.1:

Contaminated soils can be treated to achieve these concentrations but dilution with clean soil to achieve these concentrations is a violation of Washington State solid and hazardous waste laws.

(1) See Table 7.1 for a description of what products fall within these general categories. If the product released is unknown, use the limitations for gasoline range organics. If the soil is contaminated from releases from more than one product, use the limitations for both products. For example, if the release is a mixture of gasoline and diesel, the soil should be tested for components of both gas and diesel and the limitations for both fuels and their components used.

(2) The concentrations for diesel, heavy oil and mineral oil are not additive. Use the TPH product category most closely representing the TPH mixture and apply the limitations for that product to the mixture. ***The reuse of waste oil contaminated soil is not allowed due to the wide variety of contaminants likely to be present.***

(3) Value is total of m, o, & p xylenes.

(4) Value is the total of all PCBs. Only heavy oil and mineral oil contaminated soils need to be tested for PCBs. Soil contaminated with a spill from a regulated PCB containing device must be disposed of in a TSCA permitted landfill, regardless of the PCB concentration. Other PCB contaminated soils may be disposed of in a municipal solid waste landfill permitted to receive such materials, provided the concentration does not exceed 2 ppm PCBs (WAC 173-303-9904).

(5) Value is total of naphthalene, 1-methyl naphthalene and 2-methyl naphthalene. Only diesel and heavy oil contaminated soils need to be tested for naphthalenes.

(6) The value is the benzo(a)pyrene equivalent concentration of the following seven cPAHs. See Appendix C for how to calculate a toxic equivalent concentration. The seven cPAHs are as follows: benz(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; benzo(a)pyrene; chrysene; dibenz(a,h)anthracene; and, indeno(1,2,3-cd)pyrene. Only diesel and heavy oil contaminated soils need to be tested for cPAHs. Soils contaminated with more than 1% polycyclic aromatic hydrocarbons, as that term is defined in WAC 173-303-040 (which is more expansive than the above list), must be disposed of as hazardous waste.

(7) No visible sheen observed on water when approximately one tablespoon of soil placed in approximately ½ liter of water held in a shallow pan (like a gold pan or similar container).

(8) A soil in a lower category can be used for uses specified in any higher category. This means that:

- A category 1 soil can be used for any use specified in categories 1, 2, 3 and 4.
- A category 2 soil can be used for any use specified in categories 2, 3 and 4.
- A categories 3 soil can be used for any use specified in categories 3 and 4.

(9) ***If an environmental site assessment or soil or groundwater analyses indicate contaminants other than common petroleum constituents and naturally occurring levels of metals are likely to be present in the soil of interest at the site (for example, solvents or pesticides), do not reuse the soil.*** The soil should instead be treated using appropriate technology to address all contaminants or landfilled at a solid waste or hazardous waste facility permitted to receive these materials.

(10) Soils in categories 2, 3 and 4 should be stockpiled consistent with the soil storage recommendations in Subsection 11.3 of this guidance.

**Table 740-1 Method A Soil Cleanup Levels for Unrestricted Land Uses^a
From Model Toxics Control Act Cleanup Regulation
Chapter 173-340 WAC**

Footnotes:

Hazardous Substance	CAS Number	Cleanup Level
Arsenic	7440-38-2	20 mg/kg ^b
Benzene	71-43-2	0.03 mg/kg ^c
Benzo(a)pyrene	50-32-8	0.1 mg/kg ^d
Cadmium	7440-43-9	2 mg/kg ^e
Chromium		
Chromium VI	18540-29-9	19 mg/kg ^{f1}
Chromium III	16065-83-1	2,000 mg/kg ^{f2}
DDT	50-29-3	3 mg/kg ^g
Ethylbenzene	100-41-4	6 mg/kg ^h
Ethylene dibromide (EDB)	106-93-4	0.005 mg/kg ⁱ
Lead	7439-92-1	250 mg/kg ^j
Lindane	58-89-9	0.01 mg/kg ^k
Methylene chloride	75-09-2	0.02 mg/kg ^l
Mercury (inorganic)	7439-97-6	2 mg/kg ^m
MTBE	1634-04-4	0.1 mg/kg ⁿ
Naphthalenes	91-20-3	5 mg/kg ^o
PAHs (carcinogenic)		See benzo(a)pyrene ^d
PCB Mixtures		1 mg/kg ^p
Tetrachloroethylene	127-18-4	0.05 mg/kg ^q
Toluene	108-88-3	7 mg/kg ^r
Total Petroleum Hydrocarbons ^s		
[Note: Must also test for and meet cleanup levels for other petroleum components--see footnotes!]		
Gasoline Range Organics		
Gasoline mixtures without benzene and the total of ethyl benzene, toluene and xylene are less than 1% of the gasoline mixture		100 mg/kg
All other gasoline mixtures		30 mg/kg
Diesel Range Organics		2,000 mg/kg
Heavy Oils		2,000 mg/kg
Mineral Oil		4,000 mg/kg
1,1,1 Trichloroethane	71-55-6	2 mg/kg ^t
Trichloroethylene	79-01-6	0.03 mg/kg ^u
Xylenes	1330-20-7	9 mg/kg ^v

- a **Caution on misusing this table.** This table has been developed for specific purposes. It is intended to provide conservative cleanup levels for sites undergoing routine cleanup actions or for sites with relatively few hazardous substances, and the site qualifies under WAC 173-340-7491 for an exclusion from conducting a simplified or site-specific terrestrial ecological evaluation, or it can be demonstrated using a terrestrial ecological evaluation under WAC 173-340-7492 or 173-340-7493 that the values in this table are ecologically protective for the site. This table may not be appropriate for defining cleanup levels at other sites. For these reasons, the values in this table should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage or placement, or similar transactions or purposes. Exceedances of the values in this table do not necessarily mean the soil must be restored to these levels at a site. The level of restoration depends on the remedy selected under WAC 173-340-350 through 173-340-390.
- b **Arsenic.** Cleanup level based on direct contact using Equation 740-2 and protection of ground water for drinking water use using the procedures in WAC 173-340-747(4), adjusted for natural background for soil.
- c **Benzene.** Cleanup level based on protection of ground water for drinking water use, using the procedures in WAC 173-340-747(4) and (6).
- d **Benzo(a)pyrene.** Cleanup level based on direct contact using Equation 740-2. If other carcinogenic PAHs are suspected of being present at the site, test for them and use this value as the total concentration that all carcinogenic PAHs must meet using the toxicity equivalency methodology in WAC 173-340-708(8).
- e **Cadmium.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4), adjusted for the practical quantitation limit for soil.
- f1 **Chromium VI.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4).
- f2 **Chromium III.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4). Chromium VI must also be tested for and the cleanup level met when present at a site.
- g **DDT (dichlorodiphenyltrichloroethane).** Cleanup level based on direct contact using Equation 740-2.
- h **Ethylbenzene.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4).
- i **Ethylene dibromide (1,2 dibromoethane or EDB).** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4) and adjusted for the practical quantitation limit for soil.
- j **Lead.** Cleanup level based on preventing unacceptable blood lead levels.
- k **Lindane.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4), adjusted for the practical quantitation limit.
- l **Methylene chloride (dichloromethane).** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4).

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- m **Mercury.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4).
- n **Methyl tertiary-butyl ether (MTBE).** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4).
- o **Naphthalenes.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4). This is a total value for naphthalene, 1-methyl naphthalene and 2-methyl naphthalene.
- p **PCB Mixtures.** Cleanup level based on applicable federal law (40 C.F.R. 761.61). This is a total value for all PCBs.
- q **Tetrachloroethylene.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4).
- r **Toluene.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4).
- s **Total Petroleum Hydrocarbons (TPH).** TPH cleanup values have been provided for the most common petroleum products encountered at contaminated sites. Where there is a mixture of products or the product composition is unknown, samples must be tested using both the NWTPH-Gx and NWTPH-Dx methods and the lowest applicable TPH cleanup level must be met.
 - **Gasoline range organics** means organic compounds measured using method NWTPH-Gx. Examples are aviation and automotive gasoline. The cleanup level is based on protection of ground water for noncarcinogenic effects during drinking water use using the procedures described in WAC 173-340-747(6). Two cleanup levels are provided. The lower value of 30 mg/kg can be used at any site. When using this lower value, the soil must also be tested for and meet the benzene soil cleanup level. The higher value of 100 mg/kg can only be used if the soil is tested and found to contain no benzene and the total of ethyl benzene, toluene and xylene are less than 1% of the gasoline mixture. No interpolation between these cleanup levels is allowed. In both cases, the soil cleanup level for any other carcinogenic components of the petroleum [such as EDB and EDC], if present at the site, must also be met. Also, in both cases, soil cleanup levels for any noncarcinogenic components [such as toluene, ethylbenzene, xylenes, naphthalene, and MTBE], also must be met if these substances are found to exceed ground water cleanup levels at the site. See Table 830-1 for the minimum testing requirements for gasoline releases.
 - **Diesel range organics** means organic compounds measured using method NWTPH-Dx. Examples are diesel, kerosene, and #1 and #2 heating oil. The cleanup level is based on preventing the accumulation of free product on the ground water, as described in WAC 173-340-747(10). The soil cleanup level for any carcinogenic components of the petroleum [such as benzene and PAHs], if present at the site, must also be met. Soil cleanup levels for any noncarcinogenic components [such as toluene, ethylbenzene, xylenes and naphthalenes], also must be met if these substances are found to exceed the ground water cleanup levels at the site. See Table 830-1 for the minimum testing requirements for diesel releases.
 - **Heavy oils** means organic compounds measured using NWTPH-Dx. Examples are #6 fuel oil, bunker C oil, hydraulic oil and waste oil. The cleanup level is based on preventing the accumulation of free product on the ground water, as described in WAC 173-340-747(10) and assuming a product composition similar to diesel fuel. The soil cleanup level for any carcinogenic components of the petroleum [such as benzene, PAHs and PCBs], if present at the site, must also be met. Soil cleanup levels for any noncarcinogenic components [such as toluene, ethylbenzene, xylenes and naphthalenes], also must be met if found to exceed the ground water cleanup levels at the site. See Table 830-1 for the minimum testing requirements for heavy oil releases.
- t **1,1,1 Trichloroethane.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4).
- u **Trichloroethylene.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4).
- v **Xylenes.** Cleanup level based on protection of ground water for drinking water use, using the procedures described in WAC 173-340-747(4). This is a total value for all xylenes.