

Groundwater Protectiveness Measures at the NEXT Renewable Fuels Facility, Port Westward, Oregon

To: Jeffrey Brittain / Oregon Department of Environmental Quality

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Executive Summary

NEXT Renewable Fuels, LLC (NEXT) plans to construct a renewable diesel facility in Port Westward, Oregon (Figure 1). Renewable diesel is sourced from cellulosic biomass materials (for example, crop residues, animal tallow) using a process that creates fewer overall emissions relative to production of conventional hydrocarbon fuels (U.S. Department of Energy, 2021). The Oregon Department of Environmental Quality (DEQ), which is one of the public agencies permitting the project, requested that NEXT develop a memorandum summarizing the practices that will be implemented to protect groundwater quality during facility construction and operation. This memorandum meets DEQ's request by: (1) summarizing background information about facility operations and permitting, (2) providing an overview of DEQ's groundwater protection rules, and (3) discussing the permits that NEXT will obtain and DEQ rules that NEXT will operate in compliance with to meet the overall goal of DEQ's groundwater protection rules. As requested by DEQ, the memo also summarizes an evaluation of potential groundwater quality and flow impacts from installing concrete piling using Soilcrete, which is a soil treatment method that will be used to strengthen site soils and mitigate against liquefaction under large structures due to ground motion caused by seismic events. In summary, through compliance with DEQ permits and rule sets, the NEXT facility will be using the best practicable methods to protect groundwater quality during construction and operations, in compliance with DEQ's rules covering protection of shallow groundwater.

1. Background

The NEXT renewable diesel facility is designed to produce about 50,000 barrels per day (BPD) of renewable diesel from a range of sustainable feedstocks, including soybean oil, corn oil, used cooking oil, and animal fats. The produced diesel will be a drop-in fuel, meaning that it is a synthetic and completely interchangeable substitute for conventional petroleum-derived hydrocarbons (NEXT, 2021a). As shown in Figure 1, the facility will be located on a floodplain of the Columbia River in a topographically level area. The shallow soils at the site are fine-grained alluvium deposited by the Columbia River (i.e., overbank deposits) and are host to a shallow groundwater system (Squier Associates, 2001).

In January 2021, NEXT submitted a Joint Permit Application (JPA) for the project to the U.S. Army Corps of Engineers, Oregon Department of State Lands, and DEQ's 401 Certification Program (NEXT, 2021b). As part application review, DEQ requested that NEXT demonstrate that construction and operation of the facility would be protective of shallow groundwater quality.

The purpose of this memorandum is to demonstrate protection of groundwater at NEXT by describing the groundwater protection elements of: (1) the DEQ permits that NEXT will obtain and (2) DEQ rules that NEXT will operate in compliance with, thereby protecting shallow groundwater in accordance with DEQ rules¹. The objectives of this memorandum are:

- Summarize the DEQ permits that NEXT will obtain for the facility (i.e., the 1200-C general permit for stormwater management during facility construction and the 1200-Z general permit for stormwater management during facility operation) and the conditions in the permits that directly or indirectly protect shallow groundwater quality (e.g., spill prevention and response plans, BMPs, etc.).
- Summarize the Oregon spill rules, which will apply during the construction phase and operational phase of the facility, and provide requirements for spill reporting, response, and cleanup.
- Provide an overview of the Soilcrete method that will be used to stabilize site soils, in the context of potential groundwater impairment.

The following sections of this memorandum provide an overview of DEQ's groundwater protection rules that protect groundwater quality in Oregon (Section 2) and the permits and rules that NEXT will implement to meet DEQ's groundwater protection rules and, therefore, protect shallow groundwater quality (Section 3). An overview of the Soilcrete method to install pilings and strengthen site soils and its potential groundwater impacts is discussed in Section 4.

2. DEQ's Groundwater Protection Rules (OAR 340-040)

DEQ's groundwater protection rules describe Oregon's policies that aim to protect groundwater from pollution that could impair its beneficial use². The rules are designed to minimize or eliminate groundwater quality degradation by requiring point sources to employ the best practicable methods to prevent the movement of pollutants to groundwater³ and employ strategies for prevention, abatement, and control of point and nonpoint sources of groundwater pollution⁴. DEQ implements the groundwater protection rules by requiring appropriate water quality permits for development projects and adopting rules that govern commercial and industrial activities in Oregon (e.g., the Oregon spill rules)⁵.

Typically, DEQ uses Water Pollution Control Facility (WPCF) permits, which are required for discharges to ground, to implement the groundwater protection rules⁶. However, no WPCF permits will be issued to the NEXT facility because the facility will not discharge wastewater or stormwater to the ground. Instead, the DEQ permits that regulate construction of the NEXT facility (i.e. the 1200-C general permit) and operation of the NEXT facility (i.e., the 1200-Z general permit and Port Westward's discharge permit) are stormwater or wastewater permits issued under the National Pollution Discharge Elimination System (NPDES), which is a framework for discharges to surface water. The NPDES permits also protect groundwater quality, either directly by stipulating requirements to prevent uncontrolled discharges of wastewater and stormwater, or indirectly by requiring that the permittee adopt BMPs and technologies that eliminate or reduce pollutants

¹ The format of this demonstration was developed during meetings between DEQ and the NEXT on May 28 and July 1, 2021.

² Oregon Administrative Rules (OAR) 340-040-0020(3).

³ OAR 340-040-0020(11)

⁴ OAR 340-040-0020(6)

⁵ OAR 340-040-0020(12)

⁶ The WPCF rules are found in OAR 340-045

that could impact groundwater. Therefore, DEQ's groundwater protection rules are implemented through the 1200-C and 1200-Z permits, both indirectly and directly.

In summary, through compliance with DEQ permits and, including the implementation of operational controls and related BMPs, the NEXT facility will meet DEQ's groundwater protection rules and be protective of groundwater quality.

3. Groundwater Protection at the NEXT Facility

The NEXT facility will meet DEQ's groundwater protection rules through compliance with multiple DEQ permits and DEQ rule sets. Section 3.1 summarizes groundwater protectiveness measures during construction, and Section 3.2 summarizes groundwater protectiveness measures during operation.

3.1 Protectiveness Measures During Facility Construction

During construction, shallow groundwater quality will be protected through compliance with DEQ's 1200-C general stormwater permit (Section 3.1.1) and compliance with Oregon's spill rules (Section 3.1.2).

3.1.1 Compliance with DEQ Permits (1200-C permit for facility construction)

DEQ requires that any construction project disturbing more than one acre register for coverage under the 1200-C construction stormwater general permit. NEXT will require coverage under the 1200-C permit to construct the project. The 1200-C permit mandates controls of construction process and sediment and erosion controls that protect waters. These controls and permit conditions directly and indirectly protect shallow groundwater, including:

- The permit prohibits discharges of construction stormwater to underground injection control (UIC) systems, which are devices that infiltrate stormwater beneath the ground surface⁷. Using UICs to manage stormwater during the construction phase may not be protective due to the shallow groundwater at the site.
- The permit requires that if contamination of any type is encountered (including groundwater contamination) during construction phase, NEXT must develop an Environmental Management Plan (EMP) before proceeding with construction to ensure that appropriate pollution prevention and/or treatment BMPs are implemented to properly manage the contamination⁸.
- The permit contains requirements for concrete washout to ensure that shallow groundwater is not adversely affected⁹. For example, permit conditions specifically require that concrete washout activities will occur in a designated area, and wash water shall be directed to an impermeable-lined pit or leak-proof container that is adequately sized to prevent overflows. The permit explicitly prohibits discharge of concrete wash water to the ground or ditches, where it may seep into shallow groundwater.
- The permit also contains requirements for disposal and treatment of dewatering water that are protective of groundwater. For example, the permit specifies disposal sites to the extent feasible (i.e., vegetated, upland areas to infiltrate the water generated during construction and utilize the natural filtering/treatment capacity of unsaturated soils) and treatment devices (i.e., oil-water separators, cartridge filters) to remove oil or grease if dewatering water is found to contain these materials¹⁰.
- The permit requires that the registrant: (1) implement pollution prevention controls to prevent the discharge of pollutants to stormwater and to prevent spills and leaks, (2) develop a spill prevention

⁷ See Section 1.0, second paragraph, of the 1200-C General Permit

⁸ See Section 1.2.9 of the 1200-C General Permit

⁹ See Section 2.2.14, item (a) and item (b) of the 1200-C General Permit

¹⁰ See Section 2.4, item (a) and item (d) of the 1200-C General Permit

and response plan, and (3) train employees on the plan¹¹. Collectively, these plans and BMPs help protect shallow groundwater at the site.

NEXT's current spill prevention and response measures, which may be modified during the permit application process, have been documented in the Project Design Basis report (NEXT 2021a). As discussed in the report, all construction equipment will be maintained in good working order to minimize the risk of fuel and fluid leaks or spills, spill containment materials will be on-site prior to and during construction, and spill prevention measures and fuel containment systems designed to completely contain a potential spill will be implemented. Select elements of spill prevention and response will be carried forward to the operational phase of the project (see section 3.2).

In summary, the NEXT facility will protect shallow groundwater quality during construction, both directly and indirectly, through compliance with the conditions of DEQ's 1200-C permit (BMPs, non-use of UICs, and adoption of a spill prevention and response plan).

3.1.2 Compliance with DEQ's Spill Rules

Oregon's spill rules (called the Oil and Hazardous Materials Emergency Response Requirements) are codified in OAR 340-142, and were developed to identify emergency response actions, reporting obligations, and follow-up actions in response to a spill or release of oil or hazardous materials. During construction, contractors at the NEXT facility will be required to adhere to the reporting and response actions in these rules should a spill occur. Spill notifications are forwarded to DEQ, which has oversight authority to ensure the cleanup of certain spills is completed in a way that ensures the environment is protected. A fact sheet summarizing the spill rules is provided in Attachment A.

In summary, potential spills that occur during construction of the facility will be responded to and cleaned up in accordance with the Oregon Spill Rules, which will protect shallow groundwater quality.

3.2 Protectiveness Measures During Facility Operation

During facility operation, shallow groundwater quality will be protected through compliance with DEQ's 1200-Z general stormwater permit and compliance with Oregon's spill rules. Because Oregon's spill rules have already been discussed (see Section 3.1.2), this section focuses on the elements of the 1200-Z permit that directly and indirectly protect shallow groundwater.

The site is currently comprised of agricultural and open land, and precipitation infiltrates into subsurface soils or runs off into surface water drainage features. Upon completion, the NEXT facility will be comprised of roadways, equipment pads, rail spurs, storage tanks, and employee parking to support the renewable diesel production systems, as shown in Figure 2 (Mackenzie, 2021). Because groundwater at the site is shallow, the strategy for stormwater management at the Site is implementation of pollution elimination and reduction control measures and discharge to surface water as opposed to infiltration (Mackenzie, 2021), and the facility will apply for coverage under DEQ's 1200-Z general stormwater permit (DEQ, 2021). The 1200-Z permit contains several conditions that either directly or indirectly protect shallow groundwater, including requirements for:

- A Stormwater Pollution Control Plan (SWPCP) for the facility that contains control measures and BMPs for managing stormwater,
- Spill prevention and response measures¹²,
- Preventative maintenance procedures including equipment inspection, cleaning, and repair¹³,

¹¹ See Section 2.3 of the 1200-C General Permit

¹² Schedule A, condition 1.h

¹³ Schedule A, condition 1.i

- An employee education program on the SWPCP for the facility, which includes spill response, good housekeeping, inspection requirements, etc.¹⁴

Note that several of the preventative maintenance procedures have been documented in the Preliminary Storm Report for the NEXT facility (e.g., periodic inspections, vegetation pruning and replanting, regrading of channelized areas, debris and sediment removal, etc.) (Mackenzie, 2021). The following sections discuss the specific stormwater management strategy at the facility that will protect surface water and shallow groundwater resources using the best practicable methods within the different stormwater basins at the site.

3.2.1 Main Facility Access Road, Maintenance Road, and Rail Spurs

Stormwater runoff will be treated using several best management practices that are generally consistent with DEQ's *Industrial Stormwater Best Management Practices Manual* (Jurries and Ratliff, 2013).

- Stormwater runoff from the paved main facility access road will be routed to a vegetated swale that provides water quality treatment prior to discharge to existing channels and ultimately McLean Slough. Swales provide treatment for sediment, metals, polycyclic aromatic hydrocarbons (PAHs), hydrocarbons, biological oxygen demand (BOD), and phosphorus (Jurries and Ratliff, 2013).
- Stormwater runoff from the pipeline maintenance road and rail spur, which are gravel-surfaced roadways, will be collected and routed through filter strips that run the length of the roadways/spurs for treatment and then to an existing drainage ditch. Filter strips are typically used to treat for sediment, metals, PAHs, BOD, hydrocarbons, and phosphorus (Jurries and Ratliff, 2013).

Some stormwater infiltration may occur in the course of using these BMPs for stormwater treatment. However, this infiltration is not expected to adversely affect shallow groundwater quality because it is expected to be minor in terms of quantity due to the low permeability site soils (Columbia River overbank deposits) and hydrology (Mackenzie, 2021; Squier Associates, 2001). In addition, pollutants in stormwater runoff from areas that experience vehicular traffic (e.g., copper and zinc from wear of brake pads) are characterized by low concentrations, will be treated by the BMPs described in the bullets above, and are generally not mobile in subsurface soils based on research work completed by Oregon's DEQ (see DEQ, 2017).

3.2.2 Renewable Diesel Facility Footprint

Stormwater within the footprint of the renewable diesel facility will be managed to protect both surface water and shallow groundwater quality:

- Stormwater within some areas of the facility may accumulate oils in the runoff due to contact with oil-handling equipment. In these areas, stormwater will be collected and routed to a wastewater treatment plant to remove oils, suspended solids, and to cool the water prior to discharge to Port Westward's conveyance system, which discharges to the Columbia River [see Appendix E of Mackenzie (2021) for a detailed discussion of wastewater treatment system].
- In areas of the facility where stormwater is not expected to accumulate oils (e.g., building roofs, parking areas, laydown yards, roadways, etc.), stormwater will be collected and routed to a stormwater treatment facility that consists of a surge storage tank, filtration system, and pump station and then discharged to Port Westward's conveyance system, which discharges to the Columbia River (Mackenzie, 2021).

In summary, the NEXT facility will protect shallow groundwater quality during operation, both directly and indirectly, through compliance with the conditions of DEQ's 1200-Z permit (BMPs, non-use of UICs, and adoption of a spill prevention and response plan) and the Oregon spill rules.

¹⁴ Schedule A, condition 1.j

4. Potential Impacts of Soilcrete on Groundwater

To protect the facility against the potential of seismic activity, NEXT is required to install piles beneath the building foundations and large above ground storage tanks. NEXT contractors will use the Soilcrete method to install concrete piles, which is common in the Pacific Northwest and involves mechanically mixing wet soils with a dry cement binder using a drill that is equipped with a mixing tool. Neat cement will be used as the binder (Pers. Comm., 2021). Using neat cement to stabilize the soils at the site is not anticipated to adversely affect shallow groundwater quality because neat cement has no additives to modify its setting time or rheological properties (Schlumberger, 2021) and is comprised only of Portland Cement (calcium silicates, aluminates and aluminoferrites¹⁵) (Britannica, 2021). Note that the Oregon Water Resources Department (OWRD) approves neat cement use for decommissioning and sealing of water wells in saturated soils (see OAR 690-210). Although the concrete pilings are impermeable, they are not anticipated to significantly affect groundwater flow because areas with pilings are separated by areas with undisturbed native soils. Groundwater levels will rise slightly around the pilings, which will have the effect of diverting groundwater flow horizontally around the pilings through the areas of undisturbed native soils. Therefore, effects of Soilcrete pilings on groundwater flow will be localized.

5. Conclusions

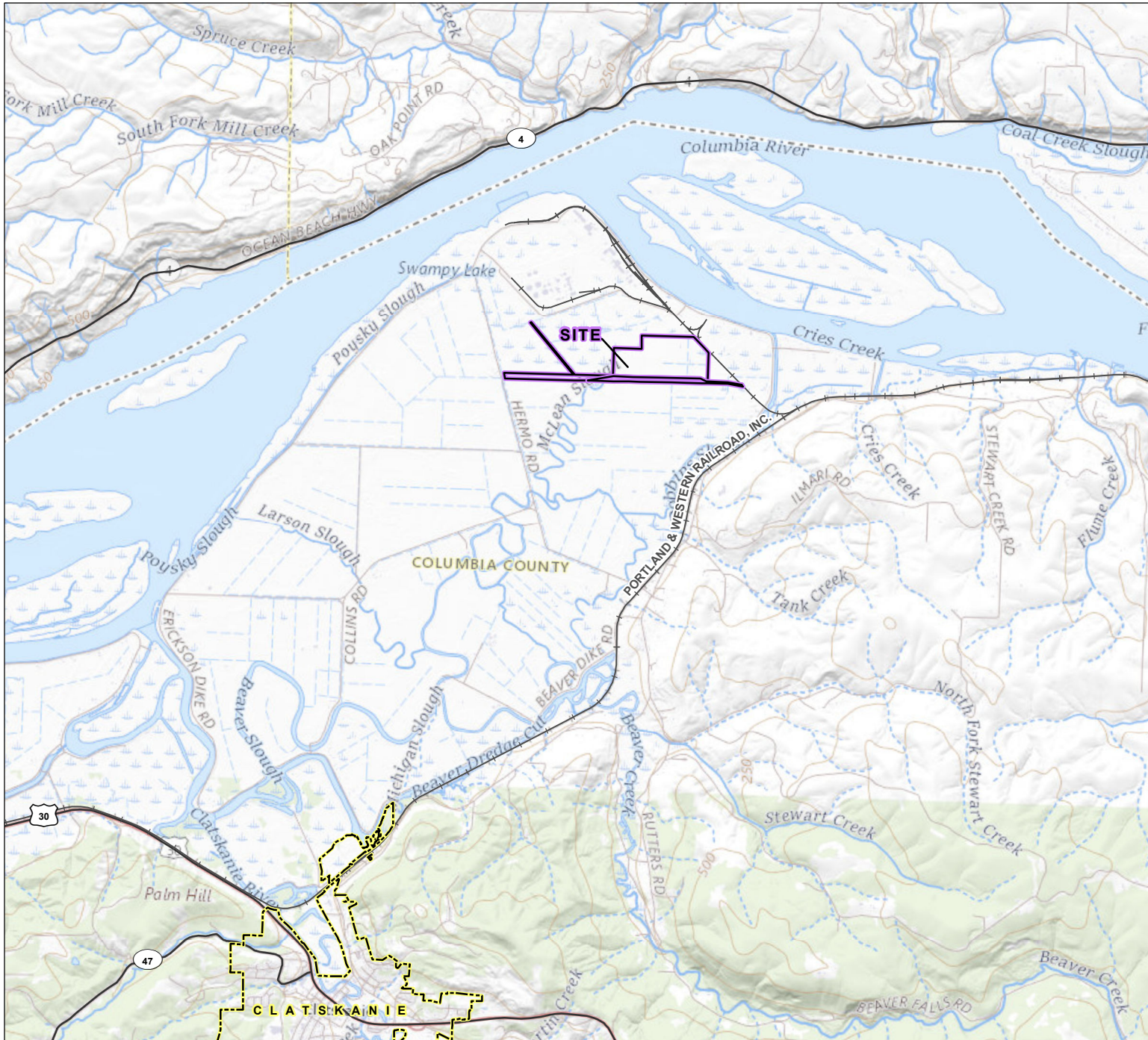
The proposed NEXT facility in Port Westward will be regulated under multiple DEQ permits and rule sets during facility construction and facility operation. These permits and rule sets meet DEQ's groundwater protection rules, either directly or indirectly, by requiring multiple BMPs, including development of spill prevention and response procedures, methods for managing waste (e.g., concrete washout), capture and treatment of stormwater and wastewater, preventative maintenance of facility equipment, and employee education. Through compliance with these permits, the NEXT facility will be protective of shallow groundwater quality at the site using the best practicable methods. In addition to these permits and rule sets, review of the Soilcrete soil stabilization method for installing pilings are consistent with the materials other agencies have approved for similar subsurface emplacements (i.e., well abandonments and well sealing). In summary, through compliance with DEQ permits and rule sets, and implementation of BMPs, the NEXT facility will be using the best practicable methods to protect groundwater quality, in compliance with DEQ's rules covering protection of shallow groundwater.

¹⁵ $3\text{CaOSiO}_2, 2\text{CaOSiO}_2, 3\text{CaOAl}_2\text{O}_3, 4\text{CaOAl}_2\text{O}_3\text{Fe}_2\text{O}_3$





6. References

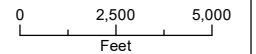
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FIGURE 1
NEXT Renewable Fuels
Facility Site Location Map
 Groundwater Protectiveness
 Measures



LEGEND

-  Site Location
-  City Boundary
-  Railroad
-  Major Road



Date: September 27, 2021
 Data Sources: BLM, ESRI, ODOT,
 USGS



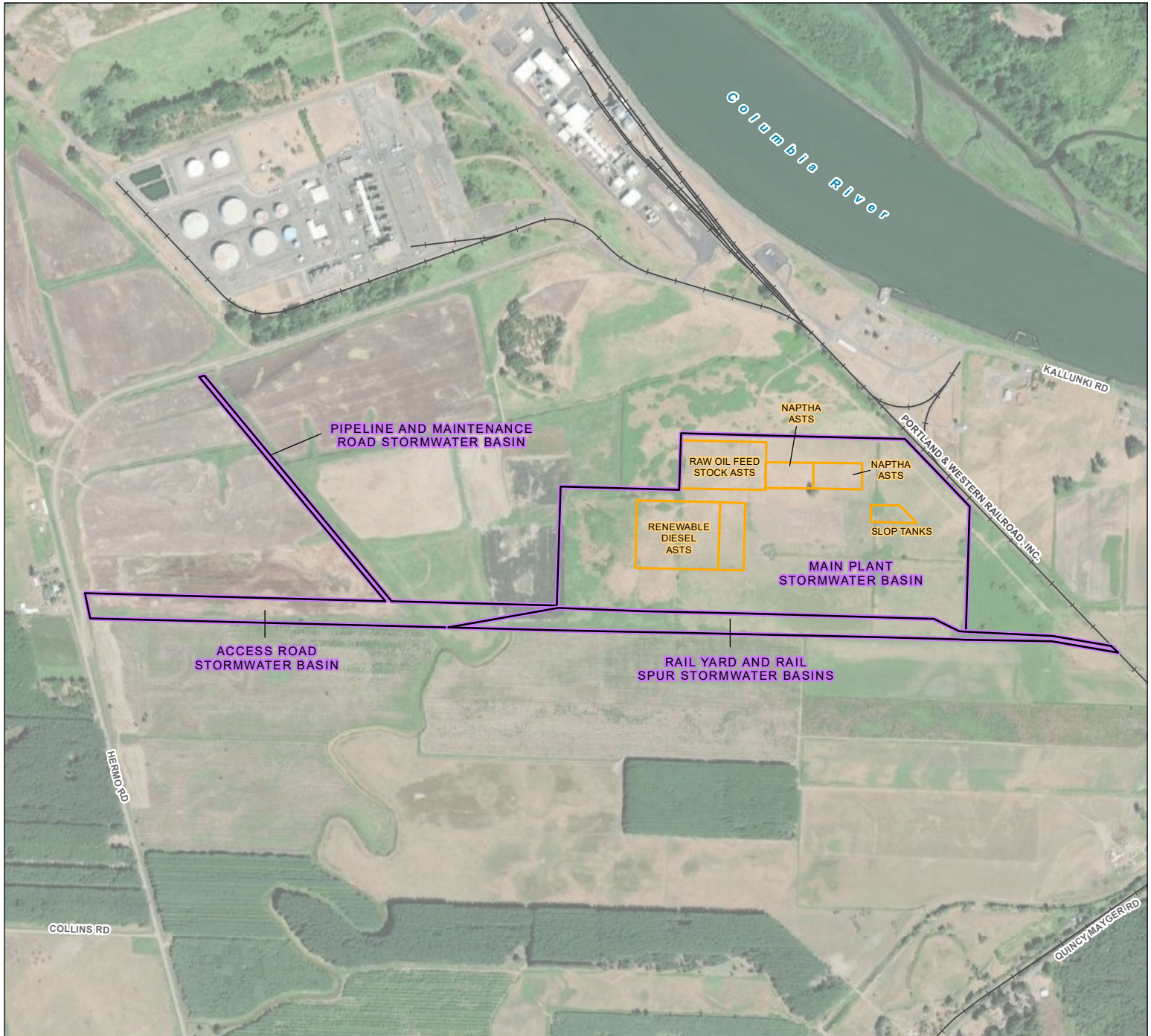




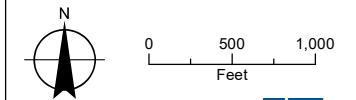
FIGURE 2
NEXT Renewable Fuels Site
Plan
 Groundwater Protectiveness
 Measures

LEGEND

-  Containment Berm
-  Site Location
-  City Boundary
-  Railroad

NOTE

Stormwater Basins and Site Boundary are from Mackenzie (2021).



Date: September 27, 2021
 Data Sources: BLM, ESRI, ODOT,
 USGS, Mackenzie (2021),
 Maxar imagery (2017)



ATTACHMENT A

Oregon Department of Environmental Quality Spill Response
Fact Sheet

What to do when you've had a spill

Contact local emergency services

Call 911 for medical emergency and public safety assistance from the local fire, police and medical services.

Report the spill immediately

Immediately report the spill or threatened spill to the Oregon Emergency Response System, 1-800-452-0311, when the spill or threat of a spill includes:

- Any amount of oil to waters of the state;
- Oil spills on land in excess of 42 gallons;
- Hazardous materials and reportable quantities that are equal to the Code of Federal Regulations, [40 CFR Part 302](#).

Provide information

When you report the spill to OERS, you will need to provide basic spill information:

- Contact names and phone numbers
- Type of oil or hazardous material
- Estimated quantity
- Location descriptions (land or water)

U.S. Environmental Protection Agency Notification

Some oil or hazardous material spills will require a separate notification to the National Response Center, 1-800-424-8802. Visit [EPA's Emergency Response](#) website for information necessary to determine if you need to report to the federal system.

Other actions to take

- Move away or upwind from the spill if you detect an odor and are unsure if it is safe.
- Avoid contact with liquids or fumes.
- Keep non-emergency people out of the area.
- Control and contain the spill.
- Clean up what you can immediately.
- Remove cleanup materials to an approved facility (such as a solid or hazardous waste landfill or recycling facility.) Save your receipts for documentation.
- Continue with long-term cleanup measures.
- File a completed [Spill Release Report Form](#) with DEQ

Your role

You are responsible for the immediate cleanup of your spill, regardless of the quantity involved.

The responsibility lies with the person who spills the product, as well as the person owning or having authority over the oil or hazardous material. You may need to hire a qualified

contractor or properly trained and equipped personnel to respond immediately to the spill. If you fail to clean up your spill, DEQ may clean it up for you and, as allowed by law, fine you up to three times the cost of the cleanup, in addition to the actual cost of the cleanup ([Oregon Administrative Rules 340-142](#)).



Contractors can work to control, contain and mitigate difficult spills like this truck crash on the North Umpqua Highway that caused diesel to leak into the river.

DEQ's role

DEQ is responsible for ensuring that the cleanup is completed in a way that protects human health and the environment. Oregon law also requires DEQ to recover its costs in carrying out this responsibility.

Depending on the type and quantity of material spilled, and the potential threat to people or the environment, DEQ may choose to oversee the cleanup. This oversight may take the form of DEQ staff at the scene, phone contact, document review or a combination of these actions. You are responsible for these oversight costs and will normally be billed within 45 days.

For more information

Regional Emergency Response coordinators are listed in the margin. You may also visit the [DEQ Emergency Response webpage](#).

Alternative formats

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email deqinfo@deq.state.or.us.



State of Oregon
Department of
Environmental
Quality

Emergency Response
700 NE Multnomah
Portland, OR 97292
Phone: 503-229-6931
Fax: 503-229-5408
Contact: Mike Zollitsch
zollitsch.michael@deq.state.or.us

Contact the State On-Scene Coordinator in your area:

Northwest Region
Portland-Metro and North Coast
Michael Greenburg
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Willamette Valley, Cascades, Central and South Coast
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