Norseland / SITS.4

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ENGINEERING DESIGN REPORT

NORSELAND SITE DEVELOPMENT INFORMATION TO SUPPORT SITE DEVELOPMENT ACTIVITY PERMIT APPLICATION

Prepared for:

The Port of Bremerton
Port Orchard, Washington

and

Kitsap County
Port Orchard, Washington

Submitted by:

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Seattle, Washington

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1. INTRODUCTION

This Engineering Design Report (EDR) has been prepared to support the remedial actions and substantive requirements of:

1. the Norseland Mobile Estates Site Cleanup Action Plan (June 2000),
2. the Kitsap County Site Development Activity Permit,
3. the Washington State Department of Ecology (Ecology) General Permit to Discharge Stormwater Associated with Construction Activity and
4. the Bremerton Kitsap County Health District – Ordinance 1996-11 for landfill closure.

The Norseland Site is a State of Washington Priority Listed Site under the Model Toxics Control Act, Chapter 70.105D RCW. Capping and grading are being completed as a part of the Cleanup Action Plan (Golder Associates, 1999). The cleanup is being conducted such that the site may be developed as an industrial site in the future.

Included in this report are the grading plan, the drainage plan, the erosion and sedimentation control plan, and the downstream analysis, prepared in accordance with the requirements of the Kitsap County Stormwater Ordinance and Design Manual. Attachments to this report include stormwater management system design calculations and the soils report. The completed SEPA checklist for the site is included in the Cleanup Action Plan.

1.1 Remedial Action Objectives

The Remedial Investigation (RI)/or the site did not identify unacceptable impacts to soils, ambient air, groundwater, or surface water from the landfill at the Norseland site, based upon regulatory or screening levels. Accordingly, the remedial action objectives for this site are:

- Reduce the potential for migration of landfill waste or waste constituents in surface water run-off or airborne dust.
- Reduce the potential for future direct exposure of human or ecological receptors to landfill waste and waste constituents at the site via direct contact or exposure to potentially hazardous constituents in stormwater run-off or airborne dust. Special attention should be given to areas with elevated concentrations of detected compounds as observed beneath Lot 62 and 63.
- Remedial actions should be consistent with potential future land uses.

1.2 Selected Remedial Action

The selected remedial action in the Norseland Cleanup Action Plan provides a cap consisting essentially of clean soil cover. Because it does not include a low-permeability liner or layer, this cap would not meet all of the landfill closure specifications of WAC

173-304-460. However, this cap would meet the cap thickness requirement of WAC 173-304-460 and would exceed the closure specifications of WAC 173-304-461 for inert waste landfills. In addition, this cap meets the requirements for a variance under WAC 173-304-700. Any gases still produced by the old landfill could escape to the atmosphere through the cap. Such diffusion is preferable to concentrating any gases to point sources as would occur with a low-permeability cap.

The major steps in this remedial action are:

1. Fill and grade the site for even slope and good stormwater drainage.
2. Place a soil cap over the landfill area (18 inches of clean fill plus 6 inches of vegetated topsoil).
3. Maintain the cap for at least 20 years.
4. Implement and maintain institutional controls and long-term monitoring.

1.3 Remedial Action Schedule

The Norseland Mobile Estates Site Cleanup Action Plan (June 2000) identifies the anticipated schedule for remedial actions.

2. SITE DESCRIPTION

2.1 Site Location

The Norseland Site is located at 8651 State Highway 3, Port Orchard, Washington. The site location is shown on Drawing 1. The Norseland Site is in Kitsap County, Washington and is located near the Bremerton National Airport (0.25 miles east), the Olympic View Sanitary landfill (0.75 miles northwest), and the Olympic View Industrial Park (0.5 miles north). The legal description of the site is as follows:

> Those certain portions of the South half of Section 11, together with the Northwest quarter of Section 14, all in Township 23 North, Range 1 West, W.M., lying Northwesterly of, adjacent to the right of way of, and measured at right angles to the center line of Primary State Highway No. 21 for a distance Northwesterly of 1070 feet, and extending along the Northwesterly side of said State Highway from Highway Engineer's Station 221+00 to Highway Engineer's Station 240+00 containing 32.00 acres more or less. Highway Engineer's station and right of way mentioned in above description are identical with these shown on Sheet 7, Plan of Primary State Highway No. 21, Lost Lake to Gorst, bearing date of approval by State Highway Commission of July 9, 1957, and showing revision under date of November 21, 1961.

2.2 Site History

The site was transferred from the U.S. Government to Kitsap County in 1948. In 1951, the Bremerton-Kitsap County Health District granted a permit to Puget Service Company to operate a landfill on the property that included a portion of the Norseland Site. The landfill was operated between 1952 and 1961, at which time the landfill was closed. For most of the life of the landfill, it was operated as a burning dump. The landfill was closed consistently with 1961 standards. In 1962, Kitsap county leased property to a developer who created a mobile home park called Norseland Mobile Estates. The park was privately run until recently. It is now owned and operated by the Port of Bremerton.

In 1991, Ecology received reports that transitory odors at the mobile home park were detected by residents. Ecology conducted a Site Hazard Assessment of the site, including air monitoring and soil and water sampling and analysis. In 1992, Ecology formally listed the site under MTCA. The Port of Bremerton and Kitsap County conducted a remedial investigation and feasibility study, in which a report was completed. The capping of the landfill will occur as a result of the studies, described in the Cleanup Action Plan.

2.3 Environmental Conditions at Norseland

Investigations found that a municipal waste landfill, known as the Puget Service Company Landfill, was operated at Norseland from 1952 to 1961. In 1962, construction

of Norseland began on land immediately to the east of the landfill. Later, as the mobile home park expanded, it expanded over areas either underlain by landfill debris or which had been brought up to grade with landfill debris.

Remedial Investigation Conclusions

Soil

No chemical constituent compounds above state cleanup standards were detected in the soil samples collected at the site. Based on the soil gas analyses, landfilled waste at the Norseland site contains compounds that are considered hazardous substances under current law.

Groundwater

While some compounds were detected at levels above regulatory criteria groundwater, the source of the compounds does not appear to be associated with the site.

Air

Subsurface sources of volatile organic compounds (VOCs) exist at Norseland and are emitting to the ambient atmosphere. The incremental increase in VOC concentrations to the local atmosphere is estimated to be insignificant. Odorous compounds (sulfides, amines, and acetaldehydes) were not detected to any significant extent in the soil gas or ambient air at the former landfill.

2.4 Existing Physical Conditions

The Norseland Site slopes to the northwest from an elevation of about 470 feet above mean sea level (amsl) along the eastern and southeastern margin to about 410 feet amsl on the western and northwestern margin. The current topography is shown on Drawing 3. Most of the former mobile homes have been removed. However, the area still contains roads, buildings, building pads, and landscaping.

The adjacent downslope properties, also owned by the Port of Bremerton, are shrubbed and forested lands. Other nearby land uses include the Bremerton National Airport (0.25 miles east), the Olympic View Sanitary landfill (0.75 miles northwest), and the Olympic View Industrial Park (0.5 miles north).

The soils in the upper portion of the site are primarily glacial tills and are described in the attached soils report, a Golder Memorandum titled "Test Pit Investigations – Business Park Site." These soils will be used for soil cover over waste areas at the site. The lower portion of the site is mapped as the Neilton formation gravelly loamy sand. This has been verified by the logs taken during monitoring well installation. There are two monitoring wells located in the lower portion of the site. As shown on the existing topography, Drawing 3, there are a number of existing slopes which are steeper than 2H:1V. These areas are indicated on the drawing.

There is no evidence of current permanent or intermittent streams on the site. There are two unnamed creeks near the site. One is north and one is south of the site. Both are approximately ½ mile from the site. Both creeks discharge to the Union River, located about two miles west of the site. Wetlands are present in the general area, although none are located directly on the site. There is negligible offsite drainage onto the property, as this property is at the top of the drainage. Most of the site drains northwest toward Union River. However, a small portion of the site drains towards the State Highway 3. The drainage in this area discharges to the Port of Bremerton's Regional Surface water facility being constructed to the northeast of the site. Therefore, no additional surface water control will be implemented on this part of this site. There are not currently any natural or manmade drainage facilities within and adjacent to the site. The surface runoff generally occurs as sheet flow, but may be concentrated somewhat by roads through the site. There are no specific points of discharge for on site flows, but rather the flow appears to travel overland.

There are three monitoring wells on site, which were installed as a part of the RI studies. The well locations are shown on Drawing 3. The local water table beneath the site occurs at a depth between about 40 feet and 60 feet, depending on the location. The direction of groundwater flow beneath the site is to the northwest, consistent with the ground surface topography. The average hydraulic gradient is approximately 0.06 ft/ft.

There are no known fuel tank locations; however, underground electrical, sewer, water, and other utilities which previously served the trailer park are still in place in some areas. These utilities will be removed, as necessary, during the regrading efforts. Any underground tanks or vaults, which are encountered, will be removed.

2.5 Future Development

The site capping and grading is designed so that the site may be used as an industrial park in the future. Final grading will provide two relatively flat platforms where building may take place. Roads will be roughed in, to allow for future development. Utility corridors will be provided through capped waste areas, so that future utilities can be laid without disturbing the cap or digging up additional refuse. Surface water management facilities consisting of drainage ditches, drop structures, and a detention pond will be installed to control sediment. Following site capping and grading, the entire site will be hydroseeded.

3. GRADING PLAN

The engineered grading plan is shown on Drawing 5. The primary objective of this grading plan is to provide a two-foot-thick clean soil cover over the existing landfill debris. The secondary objective is to provide a developable site. The site-grading plan has been prepared to accommodate development as an industrial site.

4. SURFACE WATER PLAN

4.1 General Description

The purpose of surface control is to collect and convey surface water so that erosion is minimized and runoff from disturbed areas is collected by a sediment pond or trap. Surface water control consists of three elements: 1) interception of runoff on and above slopes, 2) if collected from a disturbed area, conveyance of the runoff to a sediment pond, and 3) release of the runoff downslope of any disturbed area. Surface water control will be installed prior to grading of the project area and will be in place before construction activities begin.

Because the Norseland trailer park was developed by 1987, the year the Kitsap County Stormwater Ordinance was adopted, the pre-development scenario is the developed site. For the purposes of the stormwater analysis, it is assumed that the site within the compliance boundary is partially developed, i.e., an intermediate between 1987 impervious surfaces and current impervious surfaces. Water *quantity* control is provided for the developed site; however, water *quality* facilities will be implemented as each parcel is developed. These water quality facilities will likely consist of bioswales, vegetated strips, or water quality vaults. Wet ponds will not be included due to the vicinity of the site to the Bremerton National Airport.

The surface water facilities have been designed such that up to 66% of the site area can be covered with impervious surfaces. Any additional impervious surfaces will result in reassessment of the surface water control features.

4.2 Existing Drainage

The Norseland Site straddles two drainage areas. The total compliance area is approximately 32 acres. 88% (30.6 acres) of the Norseland Site flows to the northwest, eventually into two creeks, which drain into the Union River. A small portion of the site (approximately 4 acres) drains towards State Highway 3, into a regional stormwater facility, which will be constructed prior to site development. The drainage basins included in the regional facility are shown on a figure in the calculations. A downstream analysis has been completed for the northwest-draining portion of the site, see Section 4 below. Because the eastern portion of the site has been included in the regional facility, an additional downstream analysis was not prepared for this area.

4.3 Surface Water Conveyance Facilities

The surface water conveyance system for the developed Norseland site consists of grass lined swales, riprap lined ditches, and drop pipes. The ditches, shown on Drawing 7, have been placed to direct water around and across the regraded 3H:1V slopes and into the site detention facility. The ditch and pipe sizes, cross sections, and details are shown on Drawing 11.

The stormwater routing was done using the software SEDCAD4, a stormrouting computer model. Details are available in the surface water design calculations from Golder Associated Inc.

4.4 Detention Facility

The detention pond has been designed to provide adequate stormwater detention times both during construction and for the developed site. Due to topographic and monitoring well location constraints, the pond is located to the west of the compliance boundary.

The pond size is based on the surface water runoff during construction activities, the more critical case. The Department of Ecology's method (Ecology, 1992) was used. The detailed calculations are provided in the attached calculation package. The construction pond required is:

- Pond volume to the crest: 5.0 ac-ft
- Maximum embankment height: 8 ft

The pond has additional capacity to provide surface water detention for an additional 2 acres outside of the construction area. See the attached stormwater design calculations and Drawing 8 for additional pond design information.

5. DOWNSTREAM ANALYSIS

The purpose of the downstream analysis report is to assess potential offsite drainage impacts to downstream properties associated with the development of the project site. The current surface water management design focuses on mitigation of water quantity flows. With the installation of the detention pond, peak event flows leaving the project site will not exceed the pre-development condition, and in the case of the 2 year event, will not exceed 50% of the 2 year event, in accordance with Kitsap County requirements. As development of the site continues into an industrial site, water quality treatment facilities will be added as necessary.

The downstream analysis for the project area applies to the westerly side of the site up to but not including the existing business park area. This downstream analysis represents a Level 1 Analysis. By definition, the limits of the analysis extend one-quarter mile downstream of the project site. Continued evaluation farther downstream is not required, as the project site constitutes approximately 11.6%, or less than 15% of the drainage tributary area.

The downstream analysis addresses three main levels of concern:

1) Type-1, conveyance system nuisance problems
2) Type-2, severe erosion problems
3) Type-3, severe flooding problems

Type 1-Conveyance system nuisance problems are minor but chronic flooding or erosion problems that result from overflow of constructed conveyance facilities. Examples include inundation of a shoulder or lane of a roadway, overflows collecting in yards or pastures, shallow flows across driveways, minor flooding of crawl spaces or unheated garages/outbuildings, and minor erosion. *Type 2-Severe erosion problems* are defined as downstream channels, ravines, or slopes with evidence of or potential for erosion/incision sufficient to pose a sedimentation hazard to downstream conveyance systems or pose a landslide hazard by undercutting adjacent slopes. *Type 3-Severe flooding problems* can be caused by conveyance system overflows, or elevated water surface of ponds, lakes, wetlands, streams, rivers, or closed depressions. Severe flooding problems are defined as flooding of finished area, habitable buildings, or roadways.

The outflow from the proposed detention pond discharges via a flow dispersion trench onto existing native forestland. This discharge location is in excess of 1600 lineal feet from either of two downstream unnamed creeks. Discharge flows will not be routed and will not flow through any existing ditches or culverts between the discharge location and the existing streams. Additionally, this area is heavily forested and vegetated, and has no existing development structures, with the exception of one railroad trestle servicing a rail line at the extreme downstream end of the drainage.

As there are no existing homes or roadways downstream of the pond location, and discharge flows are dissipated by use of the dispersion trench, the resulting discharge flow results in no initiation of defined channels, erosion, or significant ground surface

incision. Additionally, the buffer zone between the proposed discharge location and the existing stream is heavily forested and vegetated, and exhibits no significant unstable slopes, erosion channels, or other natural conveyance systems that can be affected or influenced by discharges from the development site. This eliminates the criterion outlined in the Type 1, Type 2, and Type 3 problem definitions. Consequently, no mitigation downstream of the discharge location is recommended at this time.

6. EROSION AND SEDIMENT CONTROL PLAN

6.1 General

The goal of the ESC Plan is to comprehensively address controlling, preventing, or mitigating for erosion within the project site, and/or preventing sediments from leaving the site. Emphasis is placed on avoiding the initial erosion process. This technical summary, in conjunction with the ESC Plan sheets describe the specifications and construction activities necessary for implementation of the ESC Plan.

The proposed site development drainage facilities have been planned and designed so as to be consistent with best management practices outlined by Kitsap County and corresponding engineering criteria relative to the proposed site use. ESC will utilize some of these facilities, primarily ditches and the detention pond, to control sediment during construction. Other controls as described below will also be implemented. The temporary controls will be removed at the end of construction, and the remaining features will provide permanent erosion and sediment control for the site.

6.2 Erosion and Sedimentation Control Methods

This section describes the ESC measures that will be implemented to minimize erosion and sediment transport off the project site. Plans and details are shown on Drawings 10 and 11.

6.2.1 Clearing Limits

The purpose of established clearing limits is to prevent disturbance of those areas of the project site that are not designated for clearing or grading. Limiting site disturbance is the single most effective method for reducing erosion. Clearing limits will also be used to control construction traffic, thus reducing the disturbance of soil and limiting the amount of sediment tracked off site. Clearing limits will be established prior to the clearing and/or grading of the site. Refer to the Grading Plan (Drawing 5) for the extent of proposed clearing limits.

6.2.2 Cover Measures

Temporary and permanent cover measures will be used to protect disturbed areas. The purpose of covering exposed soils is to prevent erosion, thus reducing reliance on methods that remove sediment after it is entrained in runoff. The primary cover method which will be used on the site is seeding. Mulch and plastic sheeting may be used for short periods of time, but will not be relied on for long term stability. Slopes 3H:1V or steeper will be protected with a jute matting, in addition to seed and mulch.

6.2.3 Construction Entrance

A construction entrance consisting of a layer of riprap will reduce the amount of sediment transported off site by construction vehicles. The construction entrance will be installed prior to the start of this project, as a part of the stockpile placement activities to take place in late 1999. However, this project will assume responsibility to maintain the construction entrance, and develop any new entrances in a similar way. Details of the entrance are shown on Drawing 11.

6.2.4 Perimeter Protection

The purpose of perimeter protection is to prevent sediment from being transported beyond the disturbed areas of the construction site. Silt fences will be use for this site. They will be installed prior to any up-slope clearing and grading.

Silt fences will be located primarily at the toes of the stockpiles. The stockpiles and fences will be in place prior to the start of the project. This project will assume responsibility for maintaining the fences throughout the course of construction and until the upslope areas have stabilized. Additional silt fences will be installed elsewhere as needed. Silt fence locations are shown on Drawing 10 and details are presented on Drawing 11.

6.2.5 Sediment Retention

The purpose of sediment retention is to remove sediment from runoff discharged from disturbed areas. The detention pond and ditches 1 and 2 (see Drawing 10) will be installed prior to the start of other construction activities. Other surface water conveyance structures will be connected to the sediment retention facilities as the site development proceeds.

6.3 Emergency Contact Information

Both the contractor and the owner will designate emergency contact personnel who can be contacted 24 hours a day during construction if there is an emergency. The Contractor has not been selected. The Owner's representative will be Jeffery Robb, Port of Bremerton, Emergency Contact Number (360) 674-2381.

7. REFERENCES

Ecology, 1992, *Stormwater Management Manual for the Puget Sound Basin*, Olympia, Washington, February.

Golder Associates Inc., 1999, *Cleanup Action Plan, Norseland Site, Bremerton, Washington, Draft*, prepared on behalf of the Kitsap Public Authority Team for the Washington State Department of Ecology, Redmond, Washington, April 26.

Kitsap County, 1997, *Kitsap County Stormwater Management Ordinance and Design Manual*, Department of Public Works, Port Orchard, Washington, April 1.