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Herrera Environmental Consultants, Inc.

Memorandum

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cc Bob Swope, CH2M HILL
From Mark Ewbank, Herrera Environmental Consultants
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Subject Stormwater management requirements applicable to the Edmonds Crossing project

This memorandum outlines the stormwater management requirements applicable to the Edmonds Crossing multimodal terminal development project, and summarizes the proposed stormwater management plans that will satisfy those requirements. The discussion begins with an explanation of factors complicating the determination of applicable requirements and proceeds with details on the runoff treatment and flow control facilities that are suitable for the preferred Point Edwards project alternative.

Specifically, this memorandum addresses the following key stormwater management issues:

- determination of appropriate runoff treatment facilities in the context of Willow Creek and Puget Sound water quality protection and related Endangered Species Act (ESA) compliance,
- determination of peak flow control requirements, and
- determination of approximate sizes of stormwater management facilities for site layout planning and cost estimating purposes.

Applicable Stormwater Management Requirements

This analysis is based on the minimum stormwater management requirements anticipated for the proposed project according to revisions that are currently being made to the Washington State Department of Transportation (WSDOT) *Highway Runoff Manual*, and the requirements of the Washington State Department of Ecology *Stormwater Management Manual for Western Washington* (the Ecology Manual) (2001). WSDOT is currently in the process of revising the *Highway Runoff Manual* to guide future stormwater management efforts for the state highway system and for Washington State Ferries projects. The revision process is in response to more stringent requirements presented in the Ecology Manual and the extent of protective measures required for compliance with the ESA. At this time it is uncertain what will result from that process, but it can be assumed that the revised *Highway Runoff Manual* will reflect stormwater management requirements for WSDOT facilities in western Washington that are functionally equivalent to the Ecology Manual.

The City of Edmonds municipal code (Title 18, Chapter 18.30) establishes the most recent requirements of the Department of Ecology as governing stormwater management at development and redevelopment sites. The City is currently implementing the requirements of the newest Ecology Manual in its development review processes. It can be expected that the eventual design and permitting of the Edmonds Crossing project will involve negotiations between WSDOT and the City of Edmonds on the stormwater management features of the project, and that the resultant design will effectively satisfy the intent of the Ecology Manual.

Another regulatory issue of concern to the site drainage plans is compliance with the federal ESA. In relation to stormwater planning for its projects, WSDOT relies upon ESA guidance it has prepared in Instructional Letter 4020.02, entitled “Endangered Species Act (ESA) Stormwater Effects Guidance.” To effectively prevent impacts to endangered fish species (i.e, to gain a “no effect” determination under the ESA), WSDOT Instructional Letter 4020.02 states that projects must accomplish the following:

- **Minimum**—Provide water quality treatment for runoff from an area equal to 140 percent of the new impervious surface area within the project limits.
- **Maximum**—Provide water quality treatment for runoff from an area equal to 100 percent of the new impervious surface area plus an area equal to 100 percent of the existing impervious surface area within the project limits.

Stormwater Management Requirements Linked to Storm Drainage Conveyance Plans

The required extent of treatment and flow control applicable to the project is contingent on the proposed stormwater discharge point(s). The Ecology Manual requires “enhanced treatment” for certain types of development site runoff discharges to fish-bearing streams. Under Ecology’s requirements the Edmonds Crossing project would trigger enhanced treatment if runoff were discharged to Willow Creek. The revised WSDOT *Highway Runoff Manual* will have to address the issue of adequate water quality protection for fish-bearing streams but the prescribed runoff treatment options in the *Highway Runoff Manual* may not match those presented in the Ecology Manual. In addition, site runoff will have to be managed for flow reduction if it is discharged to Willow Creek, regardless of whether the Ecology Manual or revised *Highway Runoff Manual* requirements are referenced.

For the purposes of this analysis of the preferred Point Edwards alternative, it is assumed that the Ecology Manual’s enhanced treatment requirements will apply, and thus that the required type(s) and size(s) of stormwater management facilities will vary widely depending upon whether the site runoff will be discharged to Willow Creek or directly to Puget Sound. If the site runoff is discharged to Willow Creek, then flow control is required for all runoff to reduce post-developed peak flows to pre-developed rates. In this scenario, one or more large runoff storage systems will be needed to accomplish the necessary flow control at the site.

With the planned daylighting of Willow Creek downstream (west) of the site, the project has a viable opportunity to discharge onsite runoff directly to the Puget Sound shoreline using the existing 48-inch-diameter Willow Creek culvert. If this culvert is used to convey site runoff to the Sound, runoff flow control (i.e., detention) should not be required. The criteria that allow or prohibit a direct discharge to a large body of water are met by the Willow Creek culvert system (as described in Section 2.5.7 of the Ecology Manual).

This memorandum discusses both discharge options for management of site runoff: 1) direct discharge to Puget Sound via the existing 48-inch diameter culvert, and 2) discharge of runoff to Willow Creek on the east side of the railroad tracks. In either scenario, runoff from a site drainage area of approximately 20 acres will need to be managed.

Based on current information, it is assumed that the runoff from the proposed ferry dock area west of the railroad overpass would be pumped to the main multimodal terminal area east of the railroad tracks so that it could be managed in conjunction with runoff from the rest of the site. If pumping of dock runoff is determined to be infeasible in the detailed design of the project, or is not pursued for other reasons, then in-kind stormwater treatment mitigation will be required for a comparable offsite drainage area. This memorandum assumes that regardless of whether the dock runoff is pumped inland, the onsite stormwater management facilities would be sized for the runoff volumes generated on the equivalent area of the entire project site, including the dock.

Runoff Treatment

It is recommended that the Edmonds Crossing project provide water quality treatment for runoff from all new impervious surface areas to meet the spirit of maximizing protection for endangered fish species, whether or not site runoff is discharged to Willow Creek or directly to Puget Sound. Treatment of runoff from 100 percent of the new impervious surfaces on the site (which would effectively replace any existing impervious surfaces on the site) would meet the basic requirement for a “no effect” ESA determination as described in WSDOT Instructional Letter 4020.02. Commitment to runoff treatment from that amount of site area would not necessarily facilitate a no effect determination by federal agencies overseeing development project reviews under the ESA, but implementation of that type of treatment would accomplish a clear goal of ESA compliance.

The types of treatment options available for a particular site depend on the receiving water environment. As noted above, the drainage that is collected in the multimodal terminal parking and driveway areas could either be conveyed directly to Puget Sound or into Willow Creek following treatment. If the flow is conveyed directly to Puget Sound, the treatment system design will be simpler. Under the Ecology Manual, “basic treatment” is required in this scenario. It is expected that the revised WSDOT *Highway Runoff Manual* will have a similar designation of basic treatment requirements for runoff discharged directly to Puget Sound. If the site runoff is discharged to Willow Creek, enhanced treatment is required per the Ecology manual. Although the treatment systems stipulated by WSDOT may differ from those presented in the Ecology Manual, it is reasonable to assume at this juncture that the *Highway Runoff Manual* will require

treatment facilities that functionally accomplish enhanced treatment of development site runoff to fish-bearing streams to achieve equivalency with the intent of the Ecology Manual.

Under either discharge scenario, it is likely that additional oil control will be required because the site fits Ecology's description of a "high-use site." Runoff from rooftops and other site areas not subject to vehicular traffic or other potentially polluting activities would not require treatment.

Discharge Option A: Multimodal Terminal Runoff Discharged Directly to Puget Sound

For a given drainage area, the basic treatment requirements set forth in the Ecology Manual allow use of one of several types of treatment systems. For the multimodal terminal site at Point Edwards, infiltration is not likely to be feasible due to the presence of shallow groundwater in lower-lying areas of the site where runoff would be directed, and the potential for that ground water to be contaminated from past site uses. The other basic treatment options presented in the Ecology Manual include a sand filter, biofiltration swale, vegetated filter strip, wet pond, wet vault, treatment wetland, and combined detention / wet pool facility. The most feasible option is a wet pond because the existing detention pond (formerly used by UNOCAL) on the site provides a convenient location for a modified stormwater pond facility. Wet pond construction would be cost-effective. A sand filter would require intensive maintenance, and that is one reason WSDOT is not inclined to use them on its projects. To adequately treat runoff from 20 acres of tributary drainage area, it is likely that more than one biofiltration swale would be needed. It may be difficult to design more than one biofiltration swale into the available site area, and biofiltration swales would be slightly less effective than a wet pond. A vegetated filter strip will not work with untreated flow emanating from a variety of directions on the site. A wet vault would be more expensive to construct and maintain than a wet pond.

Based on rough sizing calculations for stormwater treatment facilities it appears that a wet pond would require less area than either a sand filter or a treatment wetland. Thus, we recommend that the plan continue to show a wet pond as the main treatment mechanism for runoff in the parking and driveway areas of the terminal site. The approximate sizing of this pond, per the Ecology Manual, is discussed later in this memorandum.

Discharge Option B: Multimodal Terminal Runoff Discharged to Willow Creek

The equivalent of enhanced treatment would be required for a scenario where the multimodal site drains to Willow Creek. The non-infiltration options that Ecology sets forth in its western Washington manual include a large sand filter, an amended sand filter, a treatment wetland, and two "basic" treatment systems in a combination called a "two facility treatment train." The first facility in the treatment train can be one of the basic treatment options listed above. The second facility in the treatment train must either be a vegetated filter strip (only if the first facility is a sand filter), a sand filter, or another type of media filter, such as a leaf compost filter. Thus, slightly more options are available for creating a "two facility treatment train."

For purposes of this analysis we compared the total treatment area that would be needed using three different approaches to meeting the Ecology Manual enhanced treatment requirements: 1) a

large sand filter, 2) a wet pond followed by a basic sand filter, and 3) a stormwater wetland. Of these, the stormwater wetland would require the least amount of total space, while also providing what would arguably be a more aesthetically pleasing treatment facility on the edge of the terminal parking lot. Thus, based on this preliminary analysis we recommend a stormwater treatment wetland (per the Ecology Manual design guidance, with revisions as necessary upon completion of the revised WSDOT *Highway Runoff Manual*) if the site must discharge runoff to Willow Creek. The approximate size of the wetland that would be needed for enhanced stormwater treatment is discussed later in this memorandum.

Oil Control

The oil control requirement set forth in the Ecology Manual may apply to either runoff discharge option in the multimodal terminal parking and driveway areas. The definition that Ecology uses for “high use sites” where additional oil control is needed includes the following: a commercial or industrial site subject to an expected average daily traffic volume of 100 or more vehicles per 1,000 square feet of gross building area. There are other site definitions that fall within the high use category, but this is the one that is likely applicable. Even if the precise definition is not met, the intent of Ecology’s oil control requirement is for sites where high concentrations of oil and other vehicular contaminants can be expected due to high traffic turnover or frequent transfers of oil. Thus, the project should plan on including oil control facilities at this stage. If it is determined later during permit reviews that oil control is not needed, it will be simple to eliminate those facilities from the design.

The acceptable oil removal facilities include oil/water separators, catch basin filter inserts, and linear sand filters. A linear sand filter is one of the options for a “two facility treatment train” under the Ecology Manual enhanced treatment scenario described above. Such a filter could be used to satisfy the oil control requirement as well, but greater maintenance commitments for oil removal are thereby required.

For the purposes of this analysis we have assumed that catch basin inserts would be used for oil removal in selected locations of the site or else one or more coalescing plate oil/water separator vaults would be provided. Again, the oil control requirement needs to be verified based on projected traffic volumes and, if it is applicable, the portions of the site meeting the “high use” definition need to be determined so that oil control facilities are focused only in those areas.

Preliminary Sizing of Stormwater Management Facilities

The runoff treatment facilities will need to be designed to treat all of the runoff from pollution-generating areas in the 6-month 24-hour storm. This design storm can be expected to apply regardless of whether the Ecology Manual or WSDOT *Highway Runoff Manual* governs the site drainage design. The sizing analyses summarized below were based on the following assumptions:

- The 6-month 24-hour storm rainfall depth in the Edmonds Crossing project area is 1.1 inches.

- Approximately 17.4 acres of the site would drain to treatment facilities on the east side of the railroad tracks. This total area is comprised of all of the proposed impervious surface areas except for pedestrian walkways and railroad platforms. It is assumed that drainage from those relatively clean areas could be infiltrated or dispersed effectively such that it would not reach the conveyance system(s) leading to the treatment system(s).
- The maximum depth that could be accommodated by a pond or sand-filter facility is about 5 feet, excluding the freeboard above maximum ponding level. For sand filters, this 5 feet of depth would include 2 feet of ponding depth above the filter bed, 18 inches of sand thickness, and 18 inches beneath the sand bed to accommodate drain gravel and perforated pipe for collection and discharge of treated flows.
- The required pretreatment cell in front of a basic or large sand filter would take up approximately 40 percent of the site area as calculated for a basic wet pond.

For runoff discharge option A described above, wherein all runoff from the multimodal terminal area is discharged directly to Puget Sound, a wet pond would require approximately 23,000 square feet of land area. This area does not include setbacks from property lines, slopes, or Edmonds Marsh buffer, or other land area that may also have to be dedicated in relation to the pond. These areas account only for the pond, its access driveway, 1 foot of freeboard above a 4-foot-deep treatment pool, and a dividing berm in the pond interior.

For runoff discharge option B described above, wherein site runoff is discharged to Willow Creek, a stormwater wetland sized per the Ecology Manual enhanced treatment design criteria would require approximately 34,000 square feet of land area. This does not include setbacks from property lines, slopes, or Edmonds Marsh buffer, or other land area that may also have to be dedicated in relation to the stormwater wetland. This area accounts only for the wetland, its access driveway, 1 foot of freeboard above a 4-foot-deep presettling pool and above a 1.5-foot-deep wetland pool, and a dividing berm between the presettling cell and wetland cell.

The area needed for either a wet pond or a stormwater wetland to meet the applicable treatment requirements appears to be available on the north edge of the site between the proposed parking area and Edmonds Marsh, although evaluation of implications for the Edmonds Marsh buffer will need to be considered.

We have not sized the detention system that would be needed if runoff were discharged to the new daylighted segment of Willow Creek rather than directly to Puget Sound via the existing (to be abandoned) Willow Creek culvert. That detention system would be large, and could potentially require changes to the site plans to accommodate it.