LOW STREAMFLOW ANALYSIS AND SUMMER LOW FLOW IMPACT OFFSET FACILITY PROPOSAL

SEATTLE-TACOMA INTERNATIONAL AIRPORT MASTER PLAN UPDATE IMPROVEMENTS

Prepared for

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Sections 6.2.1 and 7.7.5 of the *Comprehensive Stormwater Management Plan, Master Plan Update Improvements, Seattle-Tacoma International Airport* (SMP; Parametrix, Inc. 2000a, 2001a).

The Clean Water Act Section 401 water quality certification was issued by the Department of Ecology on August 10, 2001, and amended on September 21, 2001, subsequent to the submittal of the July 2001 Low Flow Analysis/Flow Impact Offset Facility Proposal (Water Quality Certification #1996-02325 [Amended - 1]). The amended certification required the submittal of a revised Low Flow Analysis/Flow Impact Offset Facility Proposal addressing a number of issues listed in Section I of the amended certification. Additional model runs were required to address some of these issues. During the additional modeling, some errors in data handling were detected. While corrections of these errors do not change the modeling approach, the underlying assumptions, or the calibration, they do impact the results of the modeling analysis. Discussions were held between the Port, its consultants, Ecology, and King County to discuss the errors and their resolution, which are summarized below:

1. Different models were used to simulate different parts of the hydrology of the embankment area. This required data to be transferred back and forth between the different models. In one data transfer, a conversion factor (from daily to hourly flows) was inadvertently applied twice. The result was that modeled flow from the embankment was 1/24 of what it should have been. This error was corrected by applying the conversion factor once in the revised modeling.

2. In another data transfer, an incorrect file ("daily AGWO") was used, where another file ("hourly AGWI") should have been used. This error was corrected by transferring the correct file.

3. When the original model was developed, a number of alternatives to model the impervious areas tributary to the filter strips on top of the proposed embankment were considered. With the change implemented in No. 2 above, a more direct way to model this area became possible. In the original modeling, rainfall on the pervious area was "scaled up" to address the impervious area and flow to the filter strips. In the revised modeling, flow to the filter strips will be calculated based on the "AGWI" and "SURO" time series data.

4. In the original modeling, a two-dimensional version of the Hydrus model was used to calculate one-dimensional (vertical) flows through the proposed embankment. Since the revised modeling results in more water flowing through the embankment, a one-dimensional version of Hydrus was used because it is better able to simulate the more varied saturation conditions.

5. In the original modeling, infiltration from infiltration basins was not simulated because it was negligible. In the revised modeling, more water is available to the infiltration basins; therefore, this flow is no longer negligible. The revised modeling will simulate and document this flow, which will be routed to the groundwater component of the HSPF modeling.

6. In the original modeling, all groundwater from pervious areas in the SDS5, SDS6, and SDS7 basins was inadvertently routed to Des Moines Creek in the pre-developed

conditions model. In the post-developed conditions model, groundwater from these areas was correctly routed to Walker Creek. This error was corrected by routing the groundwater in these areas to Walker Creek in the pre-developed conditions model.

An additional revision to the modeling was discussed with Ecology and King County, but was not incorporated into the revised model. This revision involved routing the "seepage to till" component of the embankment flow directly to the stream. The group concluded that the existing approach was a more accurate way to model this flow component.

1.4 PROJECT DESCRIPTION

The Port's proposal is to collect excess stormwater during the rainy season, store it in underground vaults, and release the stored water continuously into each stream during the designated summer low-streamflow period at a rate equivalent to the calculated summer low-streamflow impact to that stream from planned Port projects. The summer low-streamflow impacts in each stream were determined through detailed modeling analyses. The summer low-streamflow periods were determined through statistical analyses of modeled streamflow from the calibrated HSPF models and consultations with biologists on the effects of low-streamflow periods on stream biology.

The facility, as designed, consists of two stormwater vaults (one vault providing water to offset flow impacts in Walker Creek and one vault providing water to Des Moines Creek). Each of these vaults stores stormwater during the rainy season to be released during the summer low-streamflow periods with features that are unique to low-flow vaults. The extra features consist of additional outlets and controls, floating discharge structures to maintain constant discharge rates, varying configurations to manage sediments, and additional water quality management features (ventilation to facilitate aeration, provisions for filtration and mechanical aeration of discharges, and oil/water separation, as appropriate). Generally, water will be collected beginning in January of each year, and discharged from late July through October (with discharges continuing through November depending on the availability of water). Annual facility maintenance will take place in December of each year.